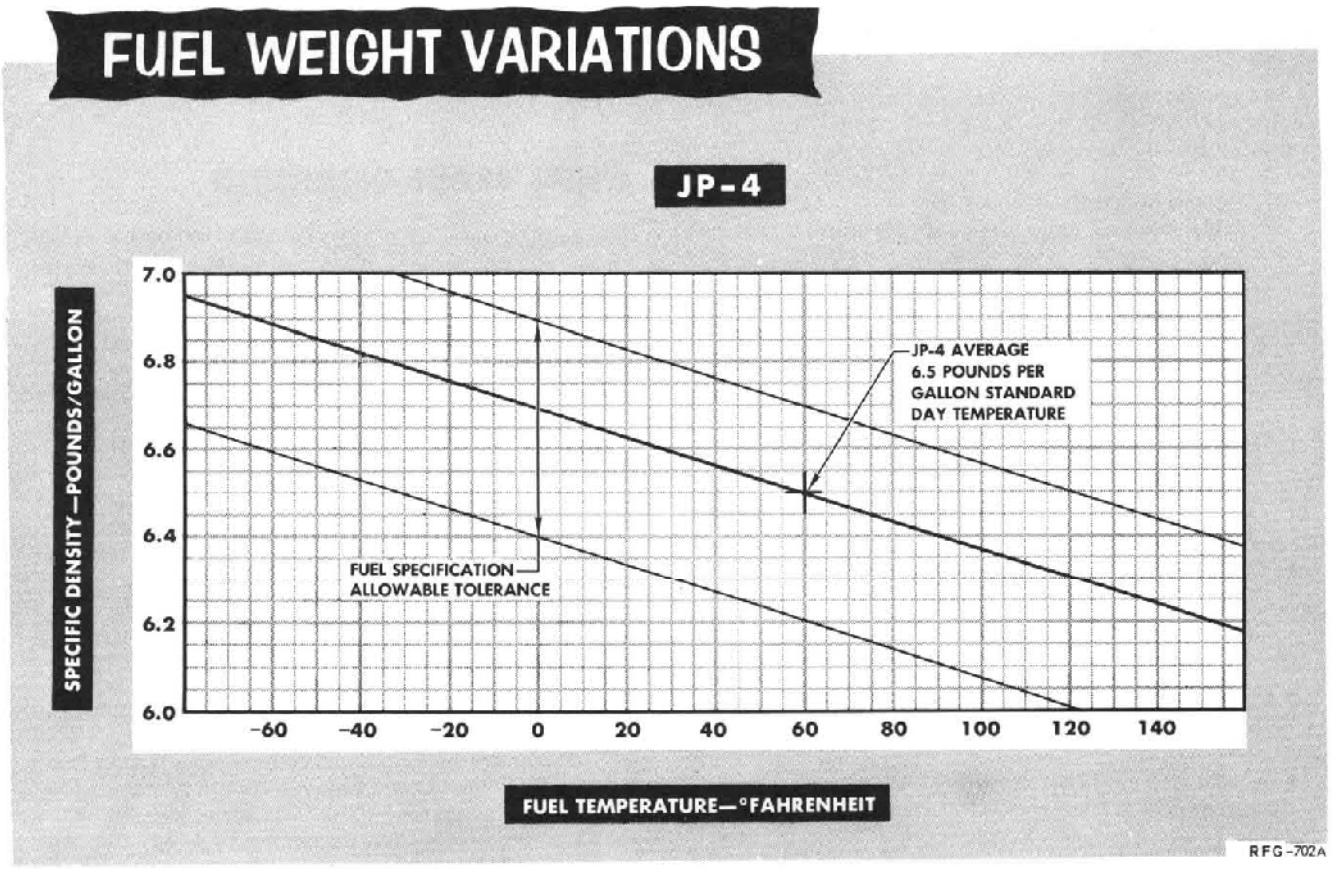

Figure 7-1

Note

With the IFR probe or receptacle extended, all fuselage transfer pumps cannot be energized except when the fuel level in cell number 2 decreases to approximately 850 pounds.

During wing or external transfer without the fuselage transfer pumps operating, wing or external fuel is directed to cell 2 if the cell is not full or to cells 1, 3, 4 and 5 if cell 2 is full. When the transfer pumps are operating wing and external fuel is directed to cell 2 only. The following fuel transfer sequence is recommended to keep the c.g. at an intermediate position between the limits.

Note

To insure transfer pump operation, place the fuselage transfer switch to ALL PUMPS whenever the feed tank low level warning light illuminates.

Use the following procedures for fuel system management.

1. During taxi, take-off, and climb, fuselage transfer switches - NORMAL, external and wing tank transfer switches - STOP
2. As soon as cruise altitude is reached, wing tank and/or external tanks - NORMAL.

Note

- If fuselage fuel has been partially depleted in fuel cells 1, 4 and 5, it can be replenished by placing the fuselage transfer switch to GRAV.
- External tanks may be fed individually to assure a positive indication of fuel transfer.
- Fuel from the wing tanks may be transferred before fuel from the external tanks has been transferred, depending on mission requirements.

3. Before landing, external tank transfer switches - STOP

CAUTION

- Do not position the external tank transfer switches to STOP until the Before Landing check. With the external tank switches in the STOP position, the external tanks could collapse during rapid descent due to insufficient venting of the tanks.
- Position the wing tank selector to NORM if a rapid fuel loss is noted or if fuel is seen streaming from the aircraft.

FUEL CELL MONITORING

It is recommended that the fuel quantity gage tank selector knob be utilized with the fuel quantity gage for the following fuel cell monitoring sequence:

1. During take-off - On Cell No. 2
2. After take-off and as soon as Military thrust or less is used - Check all tanks for proper feeding.
3. Throughout flight - ON TOTAL
   a. During all afterburner operations (except take-off), monitor total fuel and frequently cross check cell No. 2.
   b. If wing and/or external fuel has been consumed, monitor TOTAL and periodically (once every fifteen minutes) check all tanks for proper feeding.

Correct fuel monitoring will lead to an early detection of fuselage transfer pump failure.

Note

- Monitor fuselage cell number 2 whenever the total fuel quantity drops below 3000 pounds.
- In the event that fuel does not transfer, place the fuselage transfer switch to GRAVITY.

FUEL WEIGHT VARIATIONS

Variations between quantity and weight of JP-4 are a source of considerable difficulty in accurate determination of airplane performance. The primary purpose of the fuel quantity data table (figure 1-8) is to list the individual fuel cell quantities in gallons. Since the airplanes are equipped with fuel gages that measure fuel load in terms of pounds, the standard pound per gallon equivalent of 6.5 (standard temperature) is also quoted. Production specifications allow a specific density variation of 6.2 to 6.7 pounds per gallon, or, a maximum of one-half pound per gallon. It can readily be seen that the total fuel weight can vary as much as 1575 pounds, depending on specific density alone. Added to the specific density variation is the effect of temperature. For each change in temperature of one degree Fahrenheit, the fuel density varies inversely by .055 percent. With the additional variations of weight caused by temperature, a wide range of fuel weights for a constant quantity, can be realized. For example, if the number 1 fuel cell were filled with JP-4 manufactured at the low end of the specific density scale (6.2 pounds per gallon), and the fuel temperature was at 105 degrees, the fuel quantity gage would read 4652 pounds. The same cell would indicate 5268 pounds if filled with JP-4 manufactured at the high end of the specific density scale (6.7 pounds per gallon) and was at 15 degrees. While it is not expected that a clinical study of the fuel density be made prior to each flight, it should be remembered that the engine fuel control schedules fuel in pounds, not gallons. Or, engine performance is based on heating value, per pounds, of fuel. Figure 7-1 illustrates the extremes of the mean, minimum and maximum fuel weights in relation to changes in temperature.

WHEEL BRAKE OPERATION

The brakes are conventionally operated by toe action on the rudder pedals. This action meters utility hydraulic pressure to force the brake disks together. Since the brake valves are spring-loaded metering type valves, hydraulic pressure cannot be felt at the pedals. The resulting characteristics is a soft, full travel brake pedal with slightly increasing pedal force as the brake valve holdback spring is compressed. This characteristic is conducive to inadvertently "riding" the brakes during taxi operation and locking the wheels during landing roll with the anti-skid system inoperative or while utilizing the emergency brake system. Obviously, the soft pedal characteristic should be cautiously considered during the above mentioned phases of operation. Additional techniques that should be used to minimize brake wear are full utilization of nose gear steering while taxiing and maximum aerodynamic braking during the landing roll. For all conditions, normal and emergency, the most desirable braking technique is a single, smooth application of the brakes with a constantly increasing pedal pressure (to just below the skid point) as the airplane decelerates. In the event of anti-skid system cycling, indicating maximum braking, the pedal force should be reduced.

Note

Cycling of the anti-skid system can be detected by the change in longitudinal deceleration as the braking action is released and reapplied by the anti-skid control valve.

CAUTION

Do not pump the brakes at any time, since this action will reduce the amount of constant pressure available at the brakes and will tend to store heat energy within the brake assembly.

If it is suspected that the brakes have been used excessively, and are in a heated condition, the airplane should not be taxied into a crowded parking area. Peak temperatures occur in the wheel brake assembly from 5 to 15 minutes after maximum braking and is further transferred to the tire. To prevent brake fire and possible tire explosion, the specified procedures for cooling brakes should be followed. It is recommended that a minimum of 15 minutes elapse between landings where the landing gear remains extended in the slip stream, and a minimum of 30 minutes between landings where the landing gear has been retracted to allow sufficient time for cooling between brake applications. Additional time should be allowed for cooling if brakes are used for steering, crosswind taxiing operation, or a series of landings.

RUNWAY OVERRUN BARRIERS

MA-1A BARRIER

The MA-1A overrun barrier is a web-cable barrier which consists of two across-runway cables, a series of nylon straps, and two sets of heavy link chains. When in the "ready" position the "tripping" cable is suspended approximately three feet above the runway and the larger "stopping" cable lies on the runway. Extending between, and connected to the cables are the nylon straps. Heavy link chains, which are attached to the "stopping" cable, provide the required force to stop the airplane. See figure 7-2.

MODIFIED MA-1A BARRIER

The modified MA-1A barrier is an MA-1A web-cable barrier with an additional across-runway cable. The additional across-runway cable is positioned 20 feet in front of the web-cable barrier and is supported approximately 3 inches above the runway surface. The additional across-runway cable and the larger "stopping" cable of the web-cable barrier are attached to heavy link chains which supply the required forces to stop the airplane. See figure 7-2.

BAK-6 OR BAK-9 BARRIER

The BAK-6 or BAK-9 barrier consists of an across-runway cable plus an energy exchanging installation. The BAK-6 barrier utilizes a water squeezer installation, and the BAK-9 barrier utilizes a friction-energy exchanger. The across-runway cable is supported approximately three inches above the runway. Refer to figure 7-2.

BAK-12 PORTABLE BARRIER

The BAK-12 portable barrier gear is an air-transportable barrier. The BAK-12 consists of an across the runway cable and two energy absorbers. It has an energy-absorbing capacity of 65 million ft/lb, which is equivalent to arresting a 40,000 pounds aircraft at 190 knots. Results of tests on the BAK-12 barrier are reported in AFFTC TRD 63-34. The BAK-12 operates the same as the BAK-9, except the energy obsorbers for the BAK-12 are at each side of the runway.

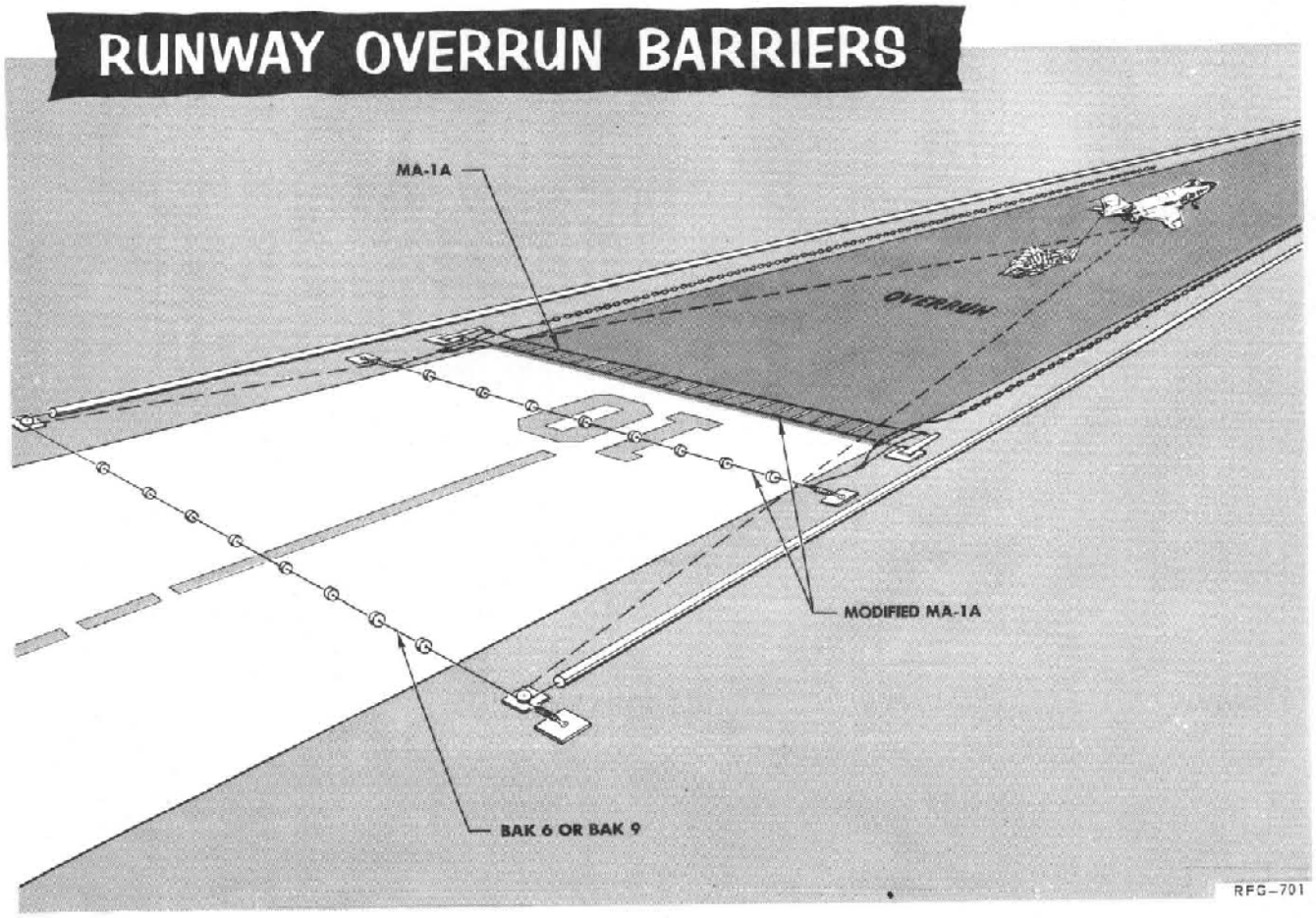

Figure 7-2

M21 ARRESTING SYSTEM

The M-21 arresting system is a portable arresting gear that is easily installed, simple to operate, and capable of rapid retraction. The M-21 is a rapid cycle gear that involves twin arrest units, one on each side of the runway. Each unit contains a horizontal drum of nylon tape with a connector at the free end. The connectors are joined by a length of steel arresting cable, which is stretched across the runway and held in a raised position by spring type wire supports. The tail hook of the aircraft will engage this cable and pull it along. This tends to unwind the tapes from the drums. The arresting action retards the rotary motion of the drum, eventually stopping the unwinding process and thereby arresting the aircraft.

Arrestment by the M-21 gear depends upon the ability of the braking unit to gradually stop the unwinding tape. The main braking unit is an energy-absorber, located directly beneath the tape drum, which can bring the aircraft to a stop within the operational limit of 650 feet. The nylon tape itself is 11 inches wide. Included in the unit is a throttle which is set before each arrestment. Aircraft weight determines the throttle setting which controls the energy-absorbing capabilities. Power for retraction is supplied by the diesel retraction engine and transmitted through a drive shaft assembly to the energy absorber which rewinds the tapes. The retracting system has its own control panel, mounted behind the retraction engine.

BARRIER ENGAGEMENTS

To insure a positive engagement and a safe arrestment, barrier engagements should be made perpendicular to, and in the center of the barrier. Brakes should be released just prior to engagement. After engagement braking may be resumed to maintain directional control and to aid in stopping the airplanes. Although off-center barrier engagements produce undesirable effects, in time of emergency, a barrier engagement should be attempted regardless of airplane speed, gross weight, or position on the runway. The following barrier engagements have been successfully flight tested:

BAK-6

160 knots	34, 000 pounds	15 feet off-center
115 knots	34, 000 pounds	75 feet off-center
145 knots	45, 000 pounds	15 feet off-center
140 knots	52, 000 pounds	15 feet off-center

Flight tests of the Modified MA-1A barrier were terminated at 90 knots, 34, 000 pounds at 50 feet off-center. The MA-1A and Modified MA-1A barriers are limited by the length of chain available. Airplane damage can be expected from chain whipping action after all of the chain available has been utilized.

MA-1A Barrier Engagement

Engagement of the MA-1A web-cable barrier is accomplished when the nose gear of the airplane strikes the "tripping" cable. As the airplane continues forward, the nylon straps lift the "stopping" cable to a position suitable for main landing gear engagement. The barrier engagement is then complete when the "stopping" cable engages the main landing gear. Deceleration begins when the heavy link chains are pulled onto the runway. A positive barrier engagement can be detected by slight fore and aft "tugs" produced by the chain. The external fuel tanks should be jettisoned prior to engagement. If the external tanks are retained, the "stopping" cable may be slapped back to the runway surface, and the main landing gear tires may roll over it.

WARNING

If the external tanks are retained, the stopping cable may be snapped over the top of the tank(s) and slide toward the rear of the aircraft, possibly rupturing or severing the tank to aircraft fuel and pressurization connections. Should the tanks contain fuel, the possibility of fuel spillage exists following such an engagement. If this occurs, fire could result and cause serious injury to personnel and damage the aircraft.

Modified MA-1A Barrier Engagement

The tail hook (if installed) should be lowered well in advance of barrier engagement. Engagement of the additional across-runway cable is accomplished by the tail hook, and deceleration begins when the chains are pulled onto the runway. Where a remote control capability from the tower to the web-cable (MA-1A) barrier exists, the web-cable barrier should be lowered if preparing for a tail hook arrestment. If the additional across-runway cable is engaged by the tail hook, and the main landing gear engages the web-cable barrier, the tail hook will be unloaded. In this case only, the web-cable barrier will supply stopping forces. External loads do not have to be jettisoned if a tail hook barrier engagement is anticipated.

BAK-6, BAK-9, or BAK-12 Barrier Engagement

The MA-1A web-cable barrier will be available for airplanes that are not equipped with tail hooks. Engagement of the across-runway cable of the BAK-6, BAK-9, or BAK-12 barrier is accomplished by the tail hook. The BAK-6, BAK-9 or BAK-12 barrier will normally be located in front of the web-cable (MA-1A) barrier. If the tail hook engages the across-runway cable of the BAK-6, BAK-9, or BAK-12 barrier and the main landing gear engages the web-cable (MA-1A) barrier, both barriers will supply stopping forces. External tanks do not have to be jettisoned if a tail hook barrier engagement is anticipated. Engagement of the BAK-6, BAK-9, or BAK-12 across-runway cable may not be felt; however, a smooth deceleration will be noticed almost immediately.

F/RF-101 MAXIMUM BARRIER ENGAGEMENT GROUND SPEEDS

Group A limit speeds are based on a design hook strength of 67,000 pounds.
Group B limit speeds are based on a yield hook strength of 77,000 pounds.
The respective aircraft "G" loads for each weight and speed are given beside the BAK-12 listings.

AIRCRAFT WEIGHT	GROUP A (LIMIT SPEED IN KNOTS)			GROUP B (LIMIT SPEED IN KNOTS)		
	BAK-9	BAK-12	BAK-13**	BAK-9*	BAK-12	BAK-13**
30,000	181	173 (2.23)	148	188	184 (2.57)	159
32,000	179	171 (2.10)	147	186	182 (2.40)	158
34,000	177	170 (1.97)	146	184	181 (2.26)	157
36,000	175	168 (1.86)	145	182	179 (2.14)	156
38,000	173	166 (1.76)	143	180	177 (2.02)	154
40,000	171	165 (1.67)	141	177	176 (1.93)	152
42,000	167	161 (1.60)	139	173	172 (1.83)	150
44,000	163	157 (1.52)	137	169	168 (1.75)	148
46,000	159	153 (1.45	135	165	164 (1.67)	147
48,000	155	149 (1.40)	134	161	160 (1.60)	146
50,000	151	145 (1.34)	133	158	157 (1.54)	145
52,000	148	141 (1.29)	132	155	153 (1.48)	144

M-21: For aircraft weights up to 44,000 pounds, maximum engaging speed for long field landings is 90 knots with dry tape, 75 knots with wet tape, at a throttle setting of 8-1/2. For aircraft weights in the range of 44,100 to 51,000 pounds, maximum engaging speed for aborted take-offs is 85 knots with dry tape, 70 knots with wet tape, at a throttle setting of 10.

BAK-6: For an aircraft weight of 30,000 pounds, the maximum engagement speed is 160 knots; for a weight of 50,000 pounds, the limit speed is 146 knots.

*The limiting factor for these speeds was the BAK-9 barrier. For the other BAK-9 and BAK-12 speeds the limiting factor for calculating limit speeds was the aircraft tailhook.

**The BAK-13 limit speeds are preliminary information obtained from ASNMH-10 letter, 17 October 1968.

The limitations contained herein on barrier engagements are based on the design limits of the barrier system and/or the aircraft tailhook yield strength. These provide a maximum at which successful engagement can be expected. If conditions demand engagement in excess of these limits, it is recommended that such an engagement be attempted. The safety factors designed into the tailhook and barrier system provide a reasonable probability of a successful engagement, providing the tailhook and the barrier have not been previously damaged or weakened.

An entry in Form 781 is required if a barrier arrestment is made. This entry should state the airspeed, gross weight at time of arrestment, and the type of barrier engaged.

SECTION VIII
CREW DUTIES

Not Applicable

SECTION IX
ALL WEATHER OPERATION

TABLE OF CONTENTS

Instrument Flight Procedures 9-1
Ice and Rain 9-6
Turbulence and Thunderstorms 9-7
Night Flying 9-7
Cold Weather Operation 9-7
Hot Weather and Desert Procedures 9-8

Except for some repetition necessary for emphasis or continuity of thought, this section contains only those procedures which differ from or are in addition to, the normal procedures presented in section II. See section IV for discussion of the operations of various systems.

INSTRUMENT FLIGHT PROCEDURES

Within the limits specified in the following paragraphs, this airplane handles well during all phases of instrument flight. Like all fighters, it requires the pilot to pay constant attention to his flight instruments. Ordinary instrument techniques must be modified somewhat because of the airplane's rapid acceleration, lateral control sensitivity and buffet regions. These modifications do not restrict the airplane's operational effectiveness, nor do they present any particular control difficulties to the pilot. Several navigational aids are furnished which facilitate instrument flight. These aids include UHF direction-finding, TACAN, and a navigation computer. IFF with the selective identification feature (SIF) is installed to facilitate positive identification of the airplane by ground radar stations during radar penetrations and radar approaches. An autopilot relieves pilot fatigue on long flights and frees him for in-flight planning.

Note

The F-101 is a Category E aircraft for approach purposes.

BEFORE ENTERING AIRPLANE

On instrument flights, delays in departure and descent and a low rate climb to altitude are often required by heavy traffic. These factors make fuel consumption and flight endurance critical and demand that all instrument flights be carefully planned. Consult Appendix I for flight planning information. Pay particular attention to the traffic procedures, found in the Flight Information Publications for the destination and alternate.

BEFORE INSTRUMENT TAKE-OFF

After aligning the airplane with the centerline of the runway, set the heading indicator and adjust the attitude indicator so that the miniature airplane is two bar widths (4°) below the horizon line.

INSTRUMENT TAKE-OFF

Instrument take-offs can be made with military or maximum thrust. Maximum thrust take-offs involve rapid initial changes of attitude and steep pitch angles, and also increase the possibility of accelerating past the gear and flap down limit speeds. If preflight planning shows that a maximum thrust take-off is required, turn off the afterburners as soon as the airplane is definitely airborne. Use of maximum thrust, however, considerably shortens the take-off roll.

MILITARY THRUST TAKE-OFF

Recheck all instruments and release brakes.

Maintain directional control with nose gear steering until the rudder becomes effective.

The rudder will become effective at approximately 70 knots. Do not use the brakes to maintain heading. Doing so will lengthen the take-off run, reduce acceleration, and increase the possibility of blowing out a tire.

At 150 knots, smoothly increase back pressure to reach an indication of +5° (first short bar above the horizon bar) on the attitude indicator.

The airplane will fly off at take-off speed.

Hold a +5° attitude indication and wait until the altimeter and vertical velocity indicator show a definite climb before retracting the gear. The first momentary indications of these instruments are downward.

Landing gear handle - UP when definitely airborne.

Smoothly increase the indicated pitch attitude to +10° (first long bar above the horizon bar).

At 200 knots, wing flap lever - RETRACT

WARNING

Do not raise the flaps at airspeeds below 200 knots. The airplane may settle back onto the runway and/or all lateral control could be lost.

Cross check the vertical velocity indicator to make certain that the rate of climb is increasing steadily.

Continue climb straight ahead. Make no turns before reaching 250 knots IAS. Limit low altitude maneuvering to 30° maximum bank angle and 350 knots maximum IAS.

MAXIMUM THRUST TAKE-OFF

Recheck all instruments and release brakes.

Maintain directional control with nose gear steering until the rudder becomes effective.

The rudder will become effective at approximately 70 knots. Do not use the brakes to maintain heading. Doing so will lengthen the take-off run, reduce acceleration, and increase the possibility of blowing out a tire.

At 150 knots smoothly increase back pressure to reach an indication of +5° (first horizontal bar above the horizon bar) on the attitude indicator.

The airplane will fly off at take-off speed.

As soon as definitely airborne, increase the pitch attitude to +10°. The airplane will fly off at take-off speed.

Hold a +10° attitude indication and wait until the altimeter and vertical velocity indicator show a definite climb before retracting the gear. The first momentary indications of these instruments are downward.

Landing gear handle - UP when definitely airborne.

Flap lever - RETRACT

Raise flaps immediately after gear is fully retracted.

WARNING

Do not raise the flaps at airspeeds below 200 knots. The airplane may settle back onto the runway and/or all lateral control could be lost.

Turn off the afterburners at 230 to 250 knots depending on gross weight.

Note

Changes in attitude and trim caused by turning off the afterburners are slight.

Cross check the vertical velocity indicator to make certain that the rate of climb is increasing steadily.

Continue climbing straight ahead. Make no turns before reaching 250 knots IAS. Limit low altitude maneuvering to 30° maximum bank angle and 350 knots maximum IAS.

INSTRUMENT CLIMB

The optimum VFR Military thrust climb schedule is suitable for instrument flight. However, the steep attitude and high rates of climb require thinking well ahead of the airplane. Maintain approximately +10° to +12° indicated pitch attitude until intercepting the climb schedule between 6000 to 10,000 feet altitude. As soon as the climb schedule is intercepted the Mach indicator becomes the primary pitch control instrument for the remainder of the climb. This technique will consume about the same amount of fuel as would be consumed if the climb schedule were intercepted immediately after take-off. Maintain the recommended airspeeds. If the airspeed falls below the proper schedule, a light buffet may occur at high altitude and high gross weights rendering instrument control more difficult. If airspeed increases as much as .05 Mach above the proper schedule, extreme pitch angles will be needed to return it to normal. Maximum thrust climbs may be made safetly on instruments, but they are uncomfortable because the steep pitch angles make detection and correction of minor attitude changes difficult. It is therefore advisable to utilize Military thrust for long climbs under instrument conditions.

INSTRUMENT CRUISING FLIGHT

Level Flight

After leveling off from the climb, establish cruising airspeed and retrim the airplane for level flight. Use the thrust settings for recommended optimum cruise schedule. Precise lateral trimming and equalized thrusts are essential due to the sensitive lateral control. When the airplane is in level flight at cruising airspeed, readjust the horizontal bar on the attitude indicator to indicate level flight attitude. The airplane has excellent handling characteristics throughout its normal speed range if properly trimmed and flown by reference to the attitude flight instruments. With heavy gross weights at altitudes above 35,000 feet, a slight buffet may occur but creates no control problem. At airspeeds below cruise schedule, buffet at heavy gross weights may be disturbing. The autopilot greatly simplifies the pilot's task and enables him to read his navigational charts without the responsibility of airplane control. For long cruises use the autopilot as much as possible.

Turns

A constant 30° angle of bank may be used for all turns except where rate turns are desired or required. At high gross weights, a buffet may be encountered during turns at high altitudes, but it creates no control problem as long as the recommended cruise schedule airspeed is maintained.

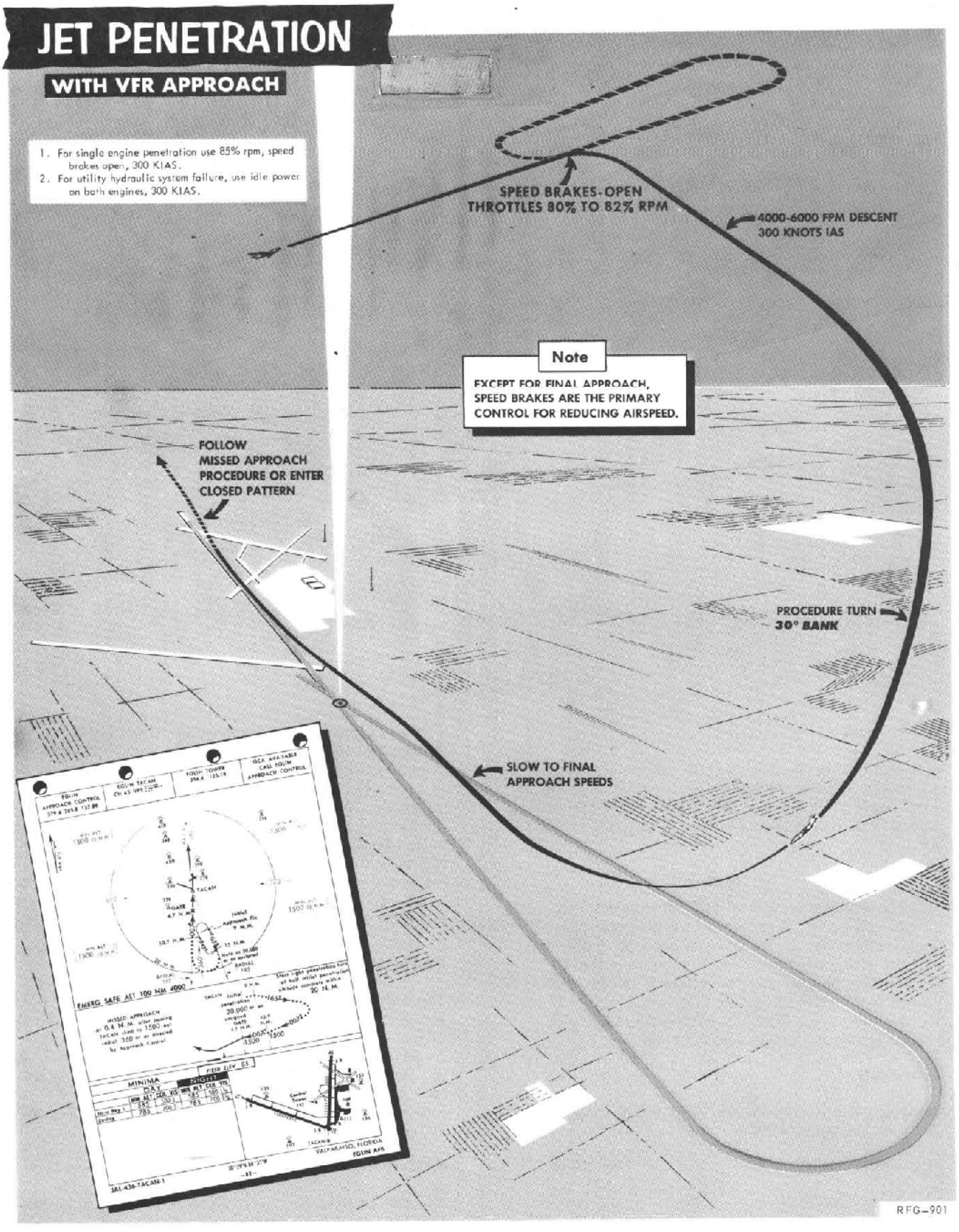
JET PENETRATION
WITH VFR APPROACH
1. For single engine penetration use 85% rpm, speed brakes open, 300 KIAS.
2. For utility hydraulic system failure, use idle power on both engines, 300 KIAS.
SPEED BRAKES-OPEN
THROTTLES 80% TO 82% RPM
4000-6000 FPM DESCENT
300 KNOTS IAS
Note
EXCEPT FOR FINAL APPROACH, SPEED BRAKES ARE THE PRIMARY CONTROL FOR REDUCING AIRSPEED.
FOLLOW
MISSED APPROACH
PROCEDURE OR ENTER
CLOSED PATTERN
PROCEDURE TURN
30° BANK
SLOW TO FINAL
APPROACH SPEEDS
RFG-901

Figure 9-1

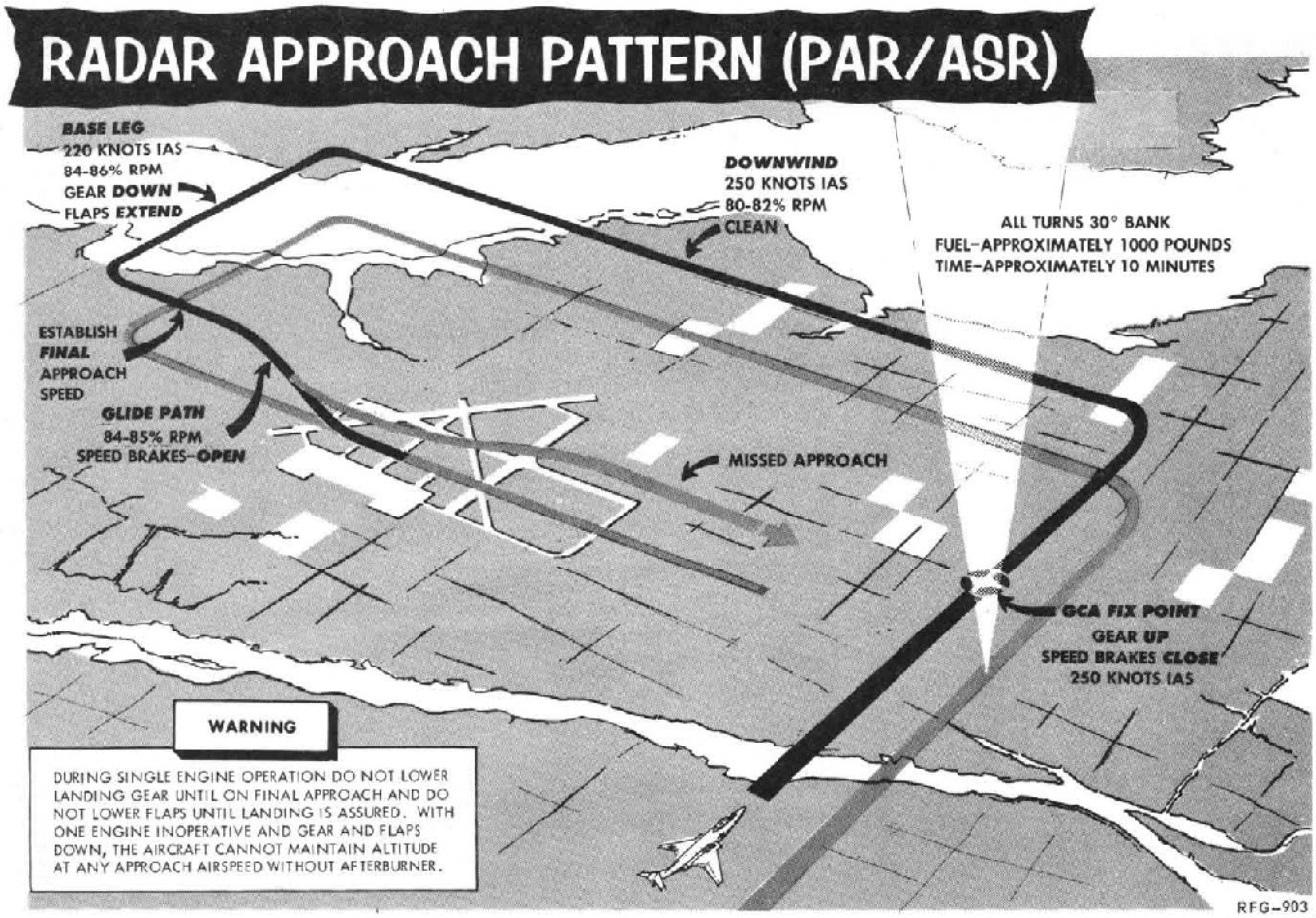

Figure 9-2

Steep Turns

Any angle of bank exceeding 30° is considered a steep turn. The airplane is easily controlled on instruments in banks up to 60°, however a high airspeed is desirable when the angle of bank exceeds 45°.

Note

The attitude indicator will precess slightly during turns. Precession grows progressively worse as the bank is steepened and the airspeed increased. It may take the attitude indicator several minutes to precess back to a level position after rolling out of a steep turn. Constant cross-checking will be required during these periods.

HOLDING

Holding patterns should be flown at 300 knots, 30° of bank are recommended.

Altitude	RPM	IAS	Fuel Flow
20,000	83-85%	300	4500 lbs/hr
30,000	85-87%	300	4200 lbs/hr
40,000	91-93%	300	5300 lbs/hr

Whenever possible, fly holding patterns between 20,000 and 30,000 feet. Formations can be maintained readily at these altitudes and airplane control is easy and positive. Holding at 40,000 feet provides no advantage in fuel consumption to compensate for the control difficulty and buffet present at that altitude. To descend when holding, lower the nose and maintain the holding pattern airspeed by extending the speed brakes. Lead the desired level-off attitude by about 1000 feet, first retracting the speed brakes and then adjusting thrust as necessary.

INSTRUMENT APPROACHES

The airplane is equipped to make TACAN, ILS, ADF and radar approaches. When flown with recommended thrust settings, response to throttle movement is rapid and airspeed control is good at all times. Lower the flaps (except when one engine is inoperative) on base leg and stabilize the final approach airspeed before intercepting the glide path. See figures 9-2 and 9-3.

MISSED APPROACH OR GO-AROUND

As soon as it is determined that a go-around is necessary, apply thrust as necessary to establish proper rate of climb. Raise the gear as soon as climb has

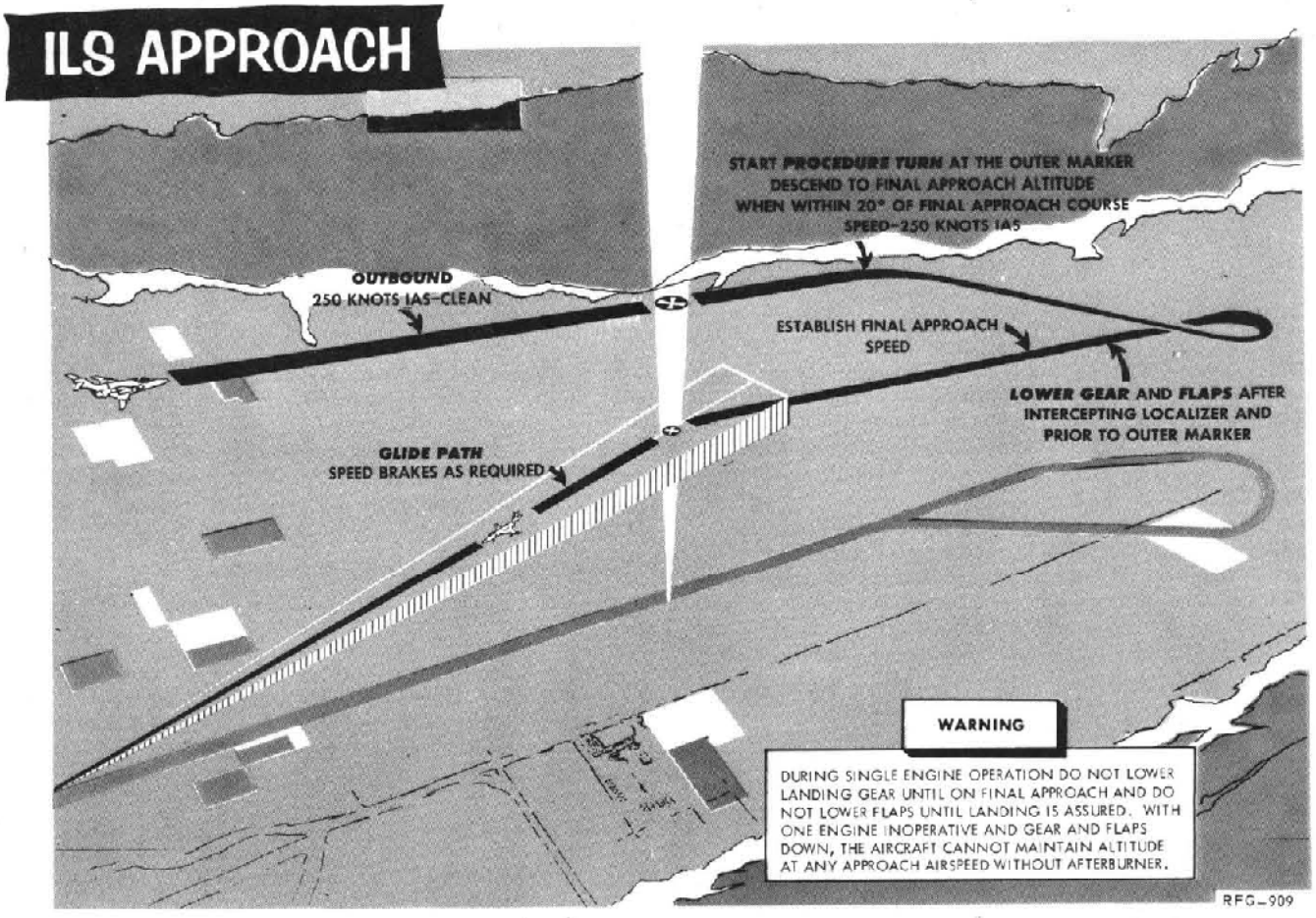

Figure 9-3

been established, and raise the flaps at 200 knots. Climb to the missed approach altitude at an airspeed of 250-300 knots, reducing thrust to establish a climb of about 2000 feet per minute.

Note

After a climb has been established the Military thrust setting must be reduced without delay so that the airplane does not overshoot the missed approach altitude. The required thrust setting will vary, depending on the airplane's gross weight and height of the local missed approach altitude. Under average conditions, however (when the climb is 1500 feet or less), a reduction to 85% rpm will permit the airplane to climb at 250 knots at a rate which is not excessive.

Make no turns below 250 knots and limit bank angles to 30°. Missed approaches can be made from any point before the landing flare, at gross weights up to normal take-off weight, if the recommended approach speed, as shown on the appropriate diagram, is followed.

SINGLE ENGINE INSTRUMENT APPROACH

In addition to the techniques noted under Instrument Approaches, follow the single engine landing procedures in section III and observe the following precautions:

- Make no large thrust reductions at any time.
- Never reduce thrust below 85% RPM.
- Prevent high rates of descent. Make all necessary corrections immediately.
- Maintain recommended airspeeds. Correct any loss of airspeed immediately with Military thrust.
- Do not lower landing gear until wings are level on final approach.

WARNING

Do not lower the flaps until just prior to flare-out and landing is assured. With one engine inoperative and the gear and flaps down, the airplane cannot maintain altitude without afterburner.

SINGLE ENGINE MISSED APPROACH OR GO-AROUND

On a single engine approach, make the decision to go-around early. Apply Military thrust and level off

momentarily, maintaining at least 200 knots. Raise the gear as soon as descent has stopped. Allow the airspeed to build-up to 250-300 knots. Use afterburner only if necessary and turn it off as soon as possible in order to conserve fuel. A single engine missed approach can be made without afterburner at any time before the landing flare is begun, at gross weights up to normal take-off weight.

ICE AND RAIN

The possibility of engine and/or airframe icing is always present when the airplane is operating under instrument conditions. Icing is most likely to occur when take-offs must be made into low clouds with temperatures at or near freezing. Normal flight operations are carried on above the series icing levels, and the airplane's high performance capabilities will usually enable the pilot to move out of dangerous areas quickly. When an icing condition is encountered, immediate action should be taken to avoid further accumulation by changing altitude and/or course and increasing the rate of climb or airspeed. Ice accretion can best be observed on the wing leading edges inboard of the stall fences. Wing icing changes the shape of the airfoil and destroys lift causing stall speeds to increase, therefore, careful airspeed control is required. Inlet duct icing can be anticipated when critical quantities of ice can be seen accumulating on the airframe. If a 1/2 to 3/4 inch layer of ice gathers on the intake duct lips, or on areas within the ducts, large pieces of it can be drawn into the engine. If this happens, compressor stall will occur and the engine will probably flame-out. The compressor may be damaged; however, there is little chance that the engine will be totally disabled. Ice ingestion and subsequent flame-out can be expected within 4 to 10 minutes after entering an area of heavy icing. Areas of icing enroute should be avoided, but since such areas cannot always be predicted, the following rules of thumb may be used. If the outside air temperature when flying in visible moisture is between 0° and 5°C (32° to 41°F), maintain an airspeed of at least 300 knots to lessen the possibility of inlet icing. Icing may be expected in visible moisture anytime the air temperature is between -10°C and +5°C (14° to 41°F). Ice cannot be evaded while flying an approach pattern and a flame-out at approach altitude is critical. If a GCA must be flown under these conditions, request a minimum fuel (short) pattern. In order to prevent flame-outs and engine damage due to ice ingestion, do not clear to a destination where ice accumulation at low approach altitude is forecast and avoid flight in conditions conducive to the rapid build-up of ice. When ice accumulation is experienced, take immediate corrective action by changing course and/or altitude and increasing airspeed.

Note

Ice accumulation can best be observed on the wing leading edges inboard of the stall fences; however, ice formation may be more rapid on the thinner inlet duct lips.

If possible, dissipate ice accumulations before descending to low altitudes. This will prevent flame-outs due to ice ingestion at critical altitudes.

FLAME-OUTS DUE TO ICE INGESTION

Note

A flame-out caused by ice ingestion is recognized by a series of light rapid compressor stalls followed by a drop in rpm and exhaust temperature.

If flame-out due to ice ingestion occurs, and loss of altitude is not critical, perform a normal air start. If loss of altitude is critical when the flame-out occurs, perform the following:

a. As soon as rpm begins falling, move the throttle on the affected engine to IDLE and the remaining throttle to OPEN.
b. Depress the ignition button immediately.
c. If the engine rpm falls below 40%, move the throttle to CLS'D and perform a normal air start.

After the air start has been accomplished, maintain on the affected engine the lowest possible rpm necessary to make a safe landing.

Note

After ice ingestion has been experienced, make a notation on Form 781 to inspect the engine for damage.

LANDING IN THE RAIN

The windshield anti-icing and blower system will provide a clear left side panel and windshield in medium rain conditions.

CAUTION

See rain clearing system operating speeds, section V.

TURBULENCE AND THUNDERSTORMS

Intentional flight through thunderstorms is not recommended. This type of flight may result in structural damage to the airplane. Heavy rain or hail may erode the radome, the tip of the vertical stabilizer, and other plastic parts. Heavy turbulence can be penetrated safely at all normal cruise speeds if the yaw damper is operating. However, penetration will be easier at 300 to 350 knots. The following factors, singly or in combination, have caused engine flameouts:

Penetration of cumulus build-ups with associated high liquid content.

Engine inlet duct icing.

Turbulence associated with penetration can result in angles of attack of plus nine degrees or more causing marginal engine performance.

Above 40,000 feet, the surge margin of the engine is reduced and there is poor air distribution across the face of the compressor.

CAUTION

- Flight through moderate or heavy turbulence is not recommended when the yaw damper is inoperative.
- Flight through turbulence may increase inlet distortion. At higher altitudes this distortion can result in engine surge and possible flameout. However, normal air starts may be accomplished.

APPROACHING THE STORM

300-350 KNOTS

RECOMMENDED PENETRATION AIRSPEED

RFG-951

Prepare the airplane before entering turbulent air. Adjust thrust as necessary to obtain a safe penetration airspeed of 300-350 knots.

Note

Autopilot operation is not recommended.

NIGHT FLYING

See instrument take-off this section.

COLD WEATHER OPERATION

BEFORE ENTERING AIRPLANE

Check that all snow, frost, or ice is removed from the wings, fuselage, and tail before flight is attempted. Do not permit the ground crew to chip or scrape away ice. This may damage the airplane surface.

WARNING

Failure to remove snow, frost or ice can lead to serious consequences when flight is attempted. At best, take-off distance and climb performance will be adversely affected, and loss of lift and stalls will result. Insure that water from melted ice is removed.

STARTING ENGINES

Start the engines in the normal manner; however, exercise caution when ambient temperature is 0°C (32°F) or lower, as the engine rotor may be ice-locked by frozen condensation. If any indication of a locked rotor, or unusual noise, or low engine speed is noted, discontinue the start. Hot air blown through the engine will free the rotor if icing is present.

CAUTION

During start, if the engine is not free to rotate, immediately move the engine start switch to STOP-START and have external heat applied to the forward section of the engine. The engine should be started as soon as possible after heating to prevent moisture from refreezing.

WARM-UP AND GROUND CHECK

Note

If a start is made with an engine which has cooled to a temperature of -35°C (-31°F), the engine must be allowed to warm up at idle for two minutes before running at higher speeds.

Turn on the cockpit air conditioning and windshield and canopy defrosting systems immediately after engine start. Check canopy and windshield for cracks, paying particular attention to the areas around the mounting screws. Operate all flight controls sufficiently to assure that speed of operation of control surfaces is adequate.

WARNING

In cold weather, make sure all instruments have warmed up sufficiently to insure normal operation. Check for sluggish instruments during taxiing.

TAXIING

Avoid taxiing in deep snow as braking, steering and directional control is extremely difficult to maintain. Increase the space between airplanes while taxiing to at least 300 feet to insure a safe stopping distance and prevent icing of the aircraft surfaces. If possible, minimize taxi distance to reduce the amount of ice fog generated by the engines. Check with ground personnel to be sure that wheels are actually turning, as brakes may be frozen. Taxi slowly to minimize the amount of slush thrown into the flaps.

TAKE-OFF

Start the take-off run at 70% rpm. After the airplane is rolling and properly aligned with the runway, advance the throttles to OPEN.

Note

Afterburner operation is not recommended. Very rapid acceleration makes take-off difficult and does not allow sufficient time for the landing gear to retract before the gear down limit speed is reached.

AFTER TAKE-OFF

After take-off from a wet snow or slush-covered field, operate the brakes several times to expel wet snow or slush. Cycle the gear several times so that it does not freeze in the retracted position. Except considerably slower landing gear operation in cold weather because the lubricants are stiffer.

CAUTION

In cold weather operation the increased thrust makes acceleration to gear limit speeds even more critical. Do not exceed 250 knots until gear and flaps are fully retracted. The nose gear may not retract, and gear doors may be damaged, at higher airspeeds.

CLIMB

Climb performance at lower altitudes will be improved during cold weather operation. Follow the recommended climb speeds given in Appendix I.

APPROACH

Make a normal pattern and landing. Pump the brake pedals several times to free any accumulated ice.

HOT WEATHER AND DESERT PROCEDURES

In general, hot weather procedures do not differ from normal procedures, except that precautions must be observed to protect the airplane from damage due to high temperatures and blowing sand. Particular care should be taken to prevent sand from entering the various airplane components and systems.

ON ENTERING AIRPLANE

Do not permit foreign objects to come in contact with the canopy, since it is possible to damage the plexiglas in extremely hot weather.

STARTING ENGINES

Normal starting procedures are used in hot weather. Temperatures will probably be on the high side of operating ranges. Engine ground operation should be kept to a minimum.

TAKE-OFF

Note

Whenever possible, avoid taking off in air contaminated with blowing sand.

Take-off distances are greatly increased by high temperatures. See Appendix I, Take-Off Distances at various temperatures.

LANDING

Hot weather operation requires the pilot to be more cautious of gusts and wind shifts near the ground. Landing ground rolls are only slightly longer than those which occur with normal temperatures. Refer to Appendix I.

BEFORE LEAVING AIRPLANE

Check that protective covers are immediately installed on pitot head, canopy, and intake and exhaust ducts to prevent contamination of dust or sand. The canopy should be left open if the location is not subject to blowing sand or dust.

APPENDIX I

PERFORMANCE DATA

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Part 4 RANGE A4-1

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Part 9 MISSION PLANNING A9-1

RFG-TC

Part 1
INTRODUCTION

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Airspeed Installation Error Correction . . . A1-5
Mach Number Correction. A1-6
Compressibility Correction. A1-8
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Engine Thrust Check Curve. A1-10

Flight performance data in chart form is provided the pilot. These charts are based on flight test and estimated data. Two types of charts are provided: (1) Profile-type charts for maximum range, endurance, and maximum continuous thrust operations, and (2) Graphical charts for take-off, climb, nautical miles per pound of fuel, descents and landing. Profile-type charts integrate much of the information provided in the graphical chart for ease in flight planning computations. These charts are based on the recommended climb-cruise performance shown in the specific airplane configuration. Direct interpretation of fuel and time required for any given distance, while flying the recommended schedules, is available using the profile presentation. The graphical charts should be used when other than the recommended schedules are maintained. The fuel used and subsequent decrease in gross weight is computed in the presentation. Graphical charts should be utilized where more accurate interpretations for flight planning is required. The complete operating speed range for the airplane is given on these charts. All data, profile and graphic charts, are based on ICAO standard day conditions. In some instances temperature corrections for nonstandard atmosphere have been included. These corrections are based on maintaining the recommended Mach number or indicated airspeed (IAS). Performance charts are based on data obtained using J57-P-13 engines.

Note

The Mach numbers quoted throughout this appendix are True Mach numbers unless otherwise indicated.

DRAG INDEX SYSTEM

The drag index chart (figure A1-1) presents, in tabular form, the drag number for each externally carried store and its associated suspension equipment. The drag index for a specific load configuration is found by multiplying the quantity of the stores to be carried by their individual drag numbers and adding these computed drags together. This drag index may then be used to enter the flight planning data charts. The drag index on the flight planning data charts will be noted in one of three ways. Charts marked "Drag Index, All Configurations", may be entered without taking drag into account. Charts marked "Drag Index, Individually Note, 0-60" must be entered with the computed drag index. Charts marked "Limited Configurations, Drag Index 'X'" must also be entered with the computer drag index; however, since these charts are plotted for a specific drag index, enter that chart whose drag index is closest to the computed drag index.

AIRSPEED CONVERSION

An airspeed conversion chart (figure A1-2) is provided to correct calibrated airspeed (CAS) to true airspeed (TAS), and true Mach number (M).

AIRSPEED INSTALLATION ERROR CORRECTION

This chart (figure A1-3) is provided to obtain calibrated airspeed (CAS) from indicated airspeed (IAS) and true Mach number from indicated Mach number. Two airplane configurations are given. After compliance with T.O. 1F-101-1197 (AIMS) there is no airspeed installation error correction required.

Indicated Airspeed

Indicated airspeed (IAS) is read directly from the airspeed indicator.

Calibrated Airspeed

Calibrated airspeed (CAS) is indicated airspeed corrected for position error. To obtain calibrated airspeed, add correction shown in figure A1-3, to indicated airspeed.

Equivalent Airspeed

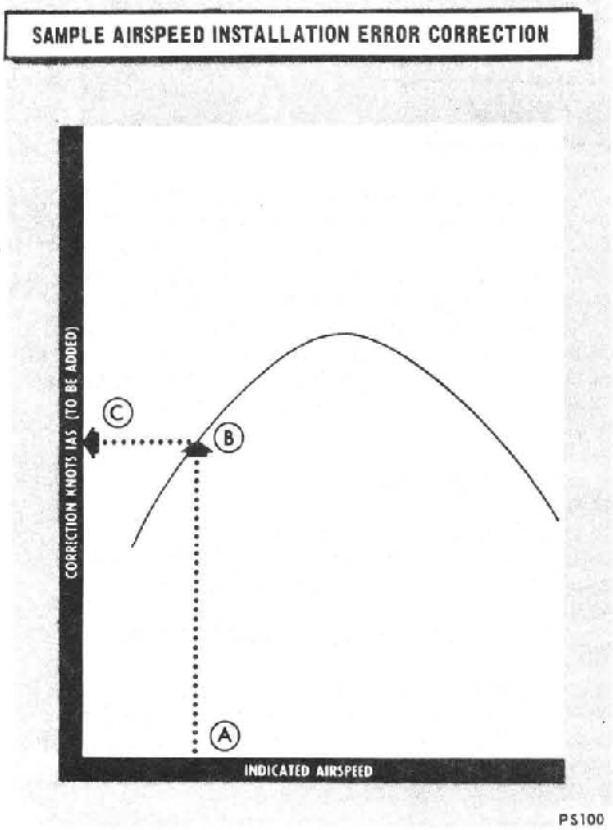
Equivalent airspeed (EAS) is calibrated airspeed corrected for compressibility effect. To obtain equivalent airspeed, subtract correction shown in figure A1-5 from calibrated airspeed.

True Airspeed

True airspeed (TAS) is equivalent airspeed corrected for atmospheric density. Refer to Airspeed Conversion, figure A1-2.

USE

For purpose of explaining the use of the Airspeed Installation Error Correction chart, consider the airplane flying at an indicated airspeed (IAS) of 150 knots, flaps extended and gear down. Read up the 150 knots line to where it intersects the correction curve and from this point draw a straight line to the left margin of the chart to find the correction factor, which is -1 knot. Therefore the CAS is 149 knots.



MACH NUMBER CORRECTION

Since most speeds in this section are quoted in terms of true Mach number, a direct reading correction chart is provided (figure A1-4) to obtain true Mach number from indicated Mach number or vice versa. MACH NUMBER CORRECTION, after compliance with T.O. 1F-101-1197 (AIMS), is also provided.

USE

For Mach number correction, consider the airplane flying at an indicated Mach number of 1.1 Mach, flaps and gear up. Read up to 1.1 (indicated Mach number) line to where it intersects the correction curve, and from this point draw a straight line to the left margin of the chart to find the true Mach number of 1.13 Mach.

SAMPLE PROBLEM

A. Indicated Airspeed	150 Knots
B. Reflector Line	
C. Correction	-1.0 Knot
D. Calibrated Airspeed (A + C)	149 Knots

COMPRESSIBILITY CORRECTION

Calibrated airspeed (CAS) may be corrected for compressibility by using the chart presented in figure A1-5. Subtract correction from calibrated airspeed to obtain equivalent airspeed (EAS)

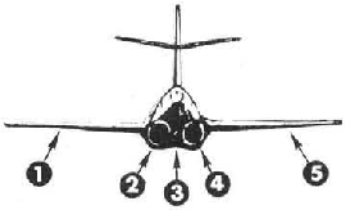
ALTIMETER INSTALLATION ERROR CORRECTION

This chart (figure A1-6) is provided to give altimeter error corrections for given Mach numbers at various altitudes. A sample problem is included on this chart.

ENGINE THRUST CHECK CURVE (PRESSURE RATIO)

This chart (figure A1-8) is provided to give maximum and minimum acceptable limits of engine pressure ratio for the existing ambient temperature. Separate plots for right and left engine are included.

DRAG INDEXES



STORE	STORE DRAG	STATION LOADING					STORE WEIGHT POUNDS
		1	2	3	4	5	
F-84 450 GALLON TANK	8.5		●		●		EMPTY – 240.5 FULL – 3165.5
450 GALLON TANK	10.5		●		●		EMPTY – 206.5 FULL – 3131.5

Note

- THE DRAG INDEX FOR THE CLEAN AIRPLANE IS ZERO.
- STORE DRAG x QUANTITY OF STORES TO BE CARRIED = DRAG INDEX.

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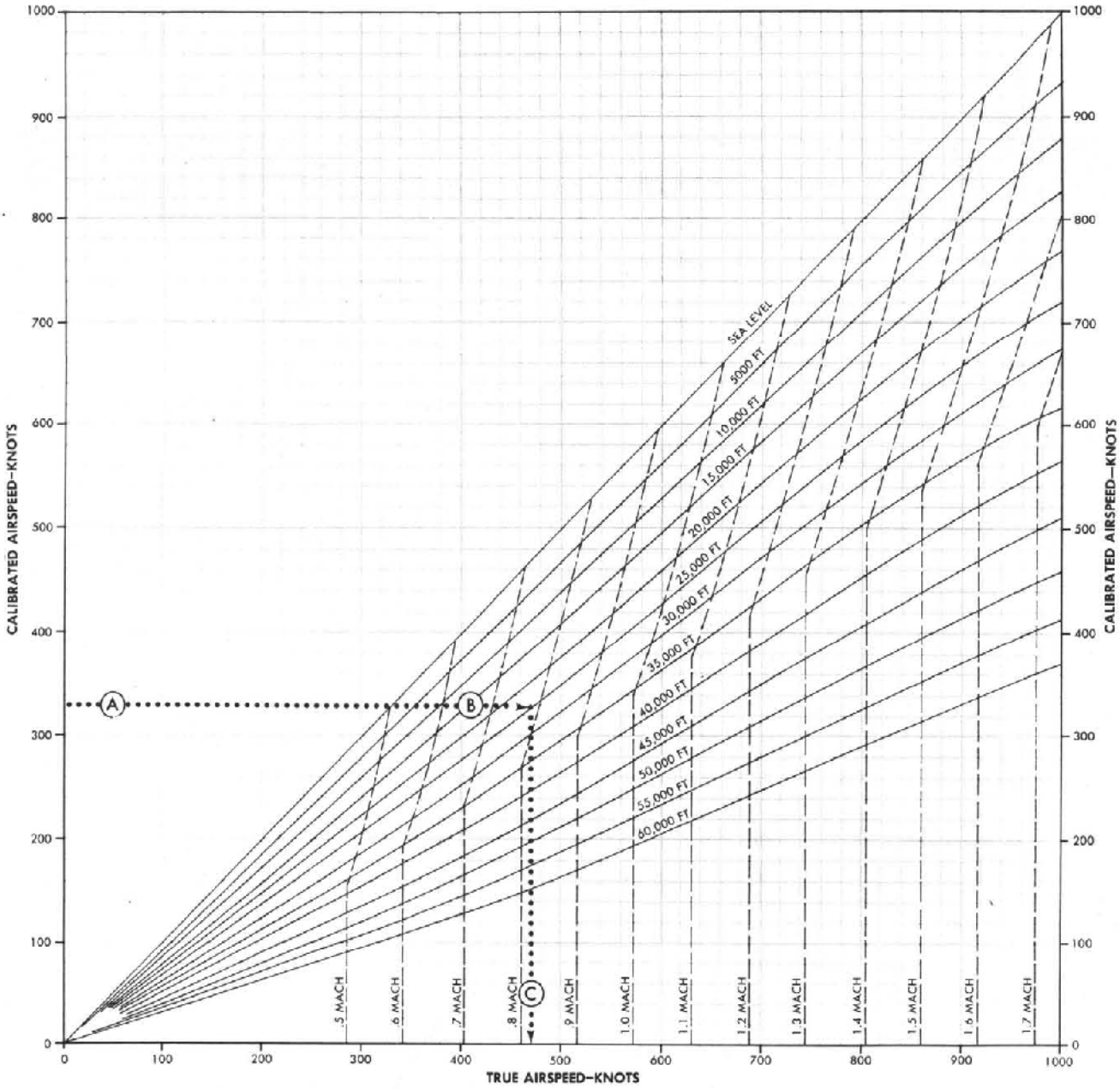
Figure A1-1

AIRSPEED CONVERSION



USE OF CHART

ENTER WITH CAS "A". MOVE HORIZONTALLY TO ALTITUDE "B" TO FIND TRUE MACH NUMBER. DROP VERTICALLY TO FIND TAS "C". TAS VALUES FROM THE GRAPH ARE CORRECT ONLY ON ICAO STANDARD DAY. OTHERWISE, TAS VALUES TEND TO BE CONSERVATIVE WHEN TRUE. FREE AIR TEMPERATURE IS GREATER THAN STANDARD AND HIGHER WHEN TRUE FREE AIR TEMPERATURE IS LOWER THAN STANDARD.

EXAMPLE

A=330 KNOTS CAS
B=.78 TRUE MACH NUMBER AT 25,000 FEET
C=470 KNOTS TAS

FA/C20-P100A

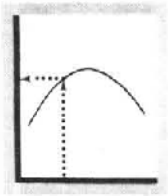
Figure A1-2

AIRSPEED INSTALLATION ERROR CORRECTION

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : ALL CONFIGURATIONS
FLAPS EXTENDED, GEAR DOWN

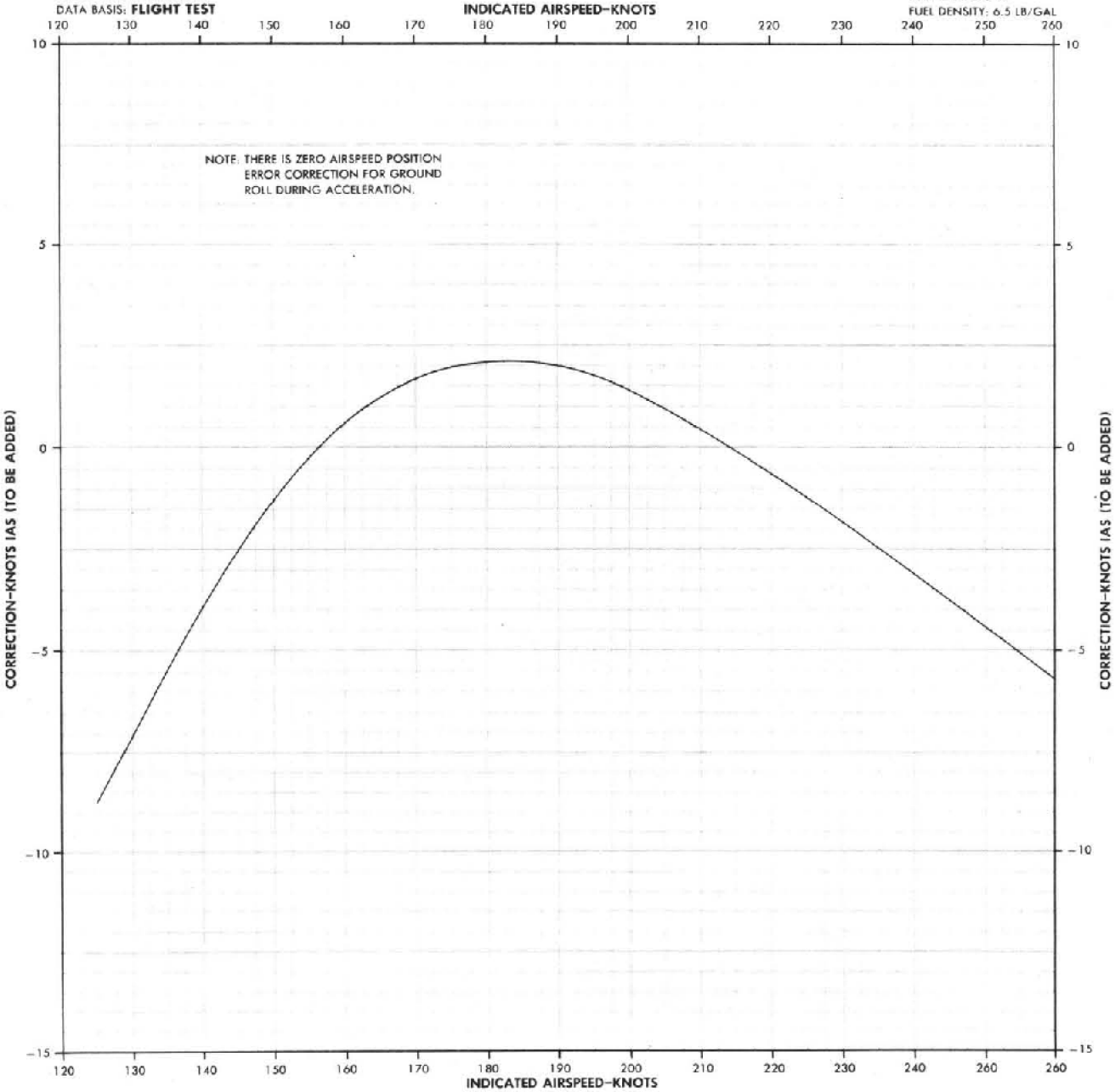
REMARKS
ENGINE(S):(2)J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1958
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P101

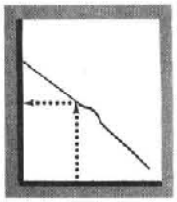
Figure A1-3

MACH NUMBER CORRECTION

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : ALL CONFIGURATIONS
FLAPS RETRACTED, GEAR UP

REMARKS
ENGINE(S):(2)J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1958
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

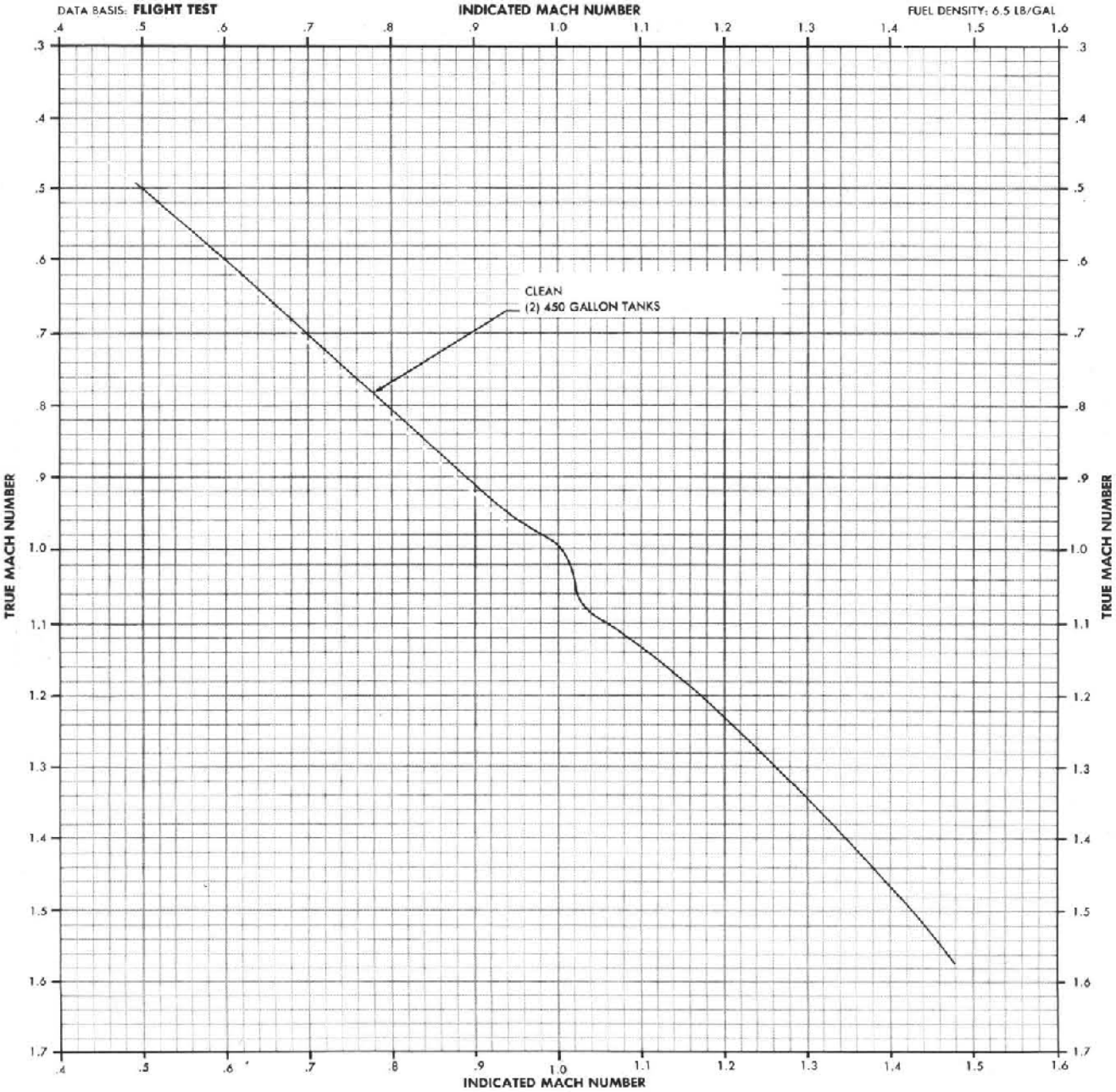


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Figure A1-4

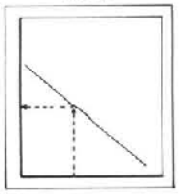
MACH NUMBER CORRECTION

AFTER T.O. 1F - 101 - 1197 (AIMS)

AIRPLANE CONFIGURATION
RF-101G OR RF-101H: ALL CONFIGURATIONS
FLAPS RETRACTED, GEAR UP

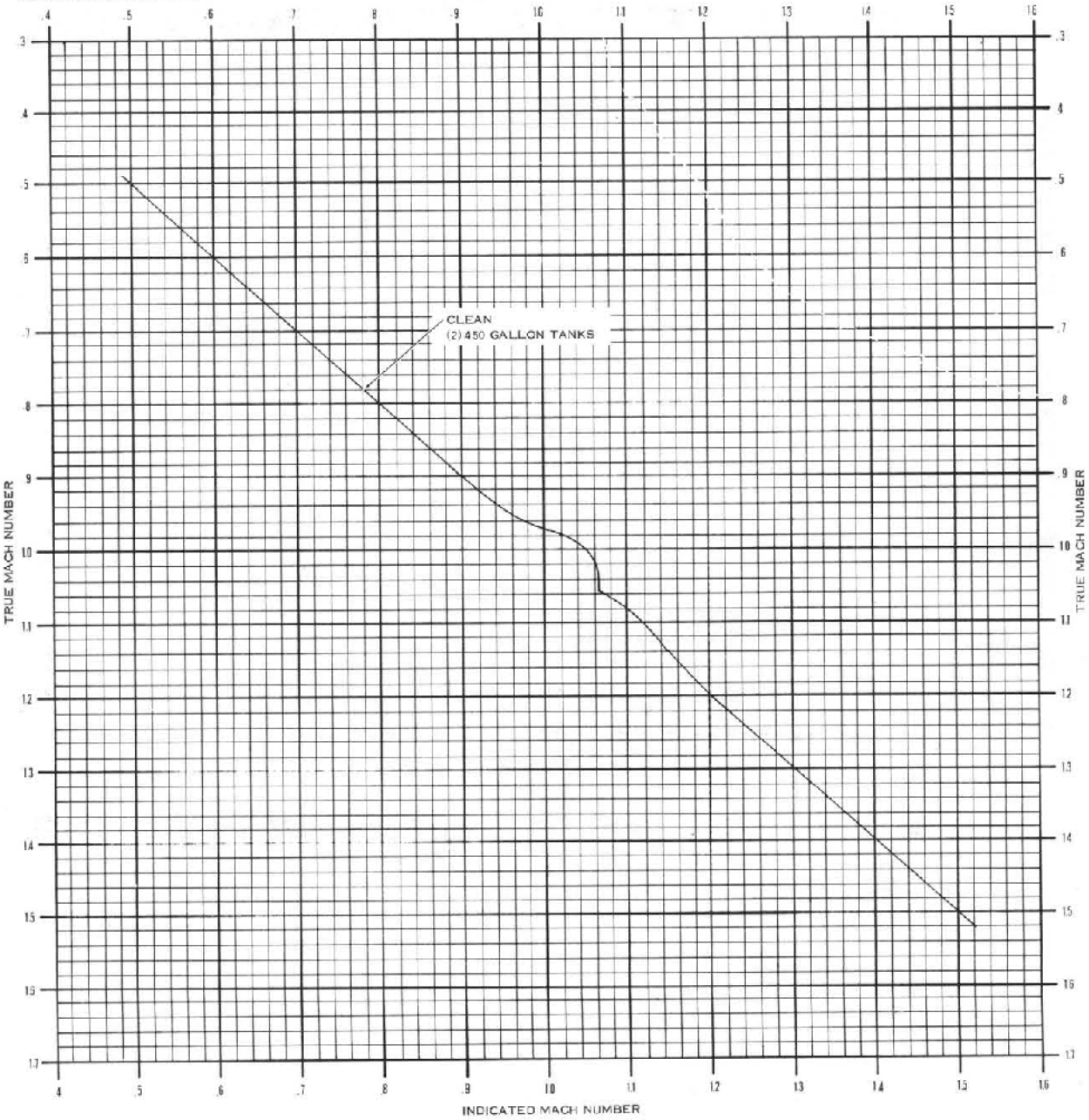
REMARKS
ENGINE(S): (2)J57 P 13
ICAO STANDARD DAY

GUIDE



DATE: OCTOBER 1969
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

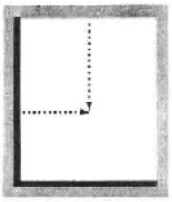


COMPRESSIBILITY CORRECTION

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : ALL CONFIGURATIONS

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



PRESSURE ALTITUDE-FEET	CAS-KNOTS											
	150	200	250	300	350	400	450	500	550	600	650	700
5000	0	0	1	2	2	3	5	6	8	10	12	14
10,000	0	1	2	3	5	7	10	13	17	21	24	26
15,000	1	2	3	5	8	12	17	23	31	32	36	40
20,000	1	3	5	8	12	17	23	31	37	43	47	50
25,000	2	4	7	11	17	24	32	41	48	54	57	59
30,000	2	5	9	15	23	32	41	50	58	63	66	68
35,000	3	7	12	20	29	40	50	59	67	72	75	76
40,000	4	9	16	25	37	48	59	68	75	80	82	—
45,000	5	11	20	32	44	56	66	74	82	88	—	—
50,000	7	14	25	38	51	62	72	81	89	—	—	—

SUBTRACT CORRECTION FROM CALIBRATED AIRSPEED TO OBTAIN EQUIVALENT AIRSPEED

RFG-P102

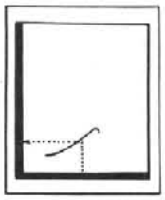
Figure A1-5

ALTIMETER INSTALLATION ERROR CORRECTION

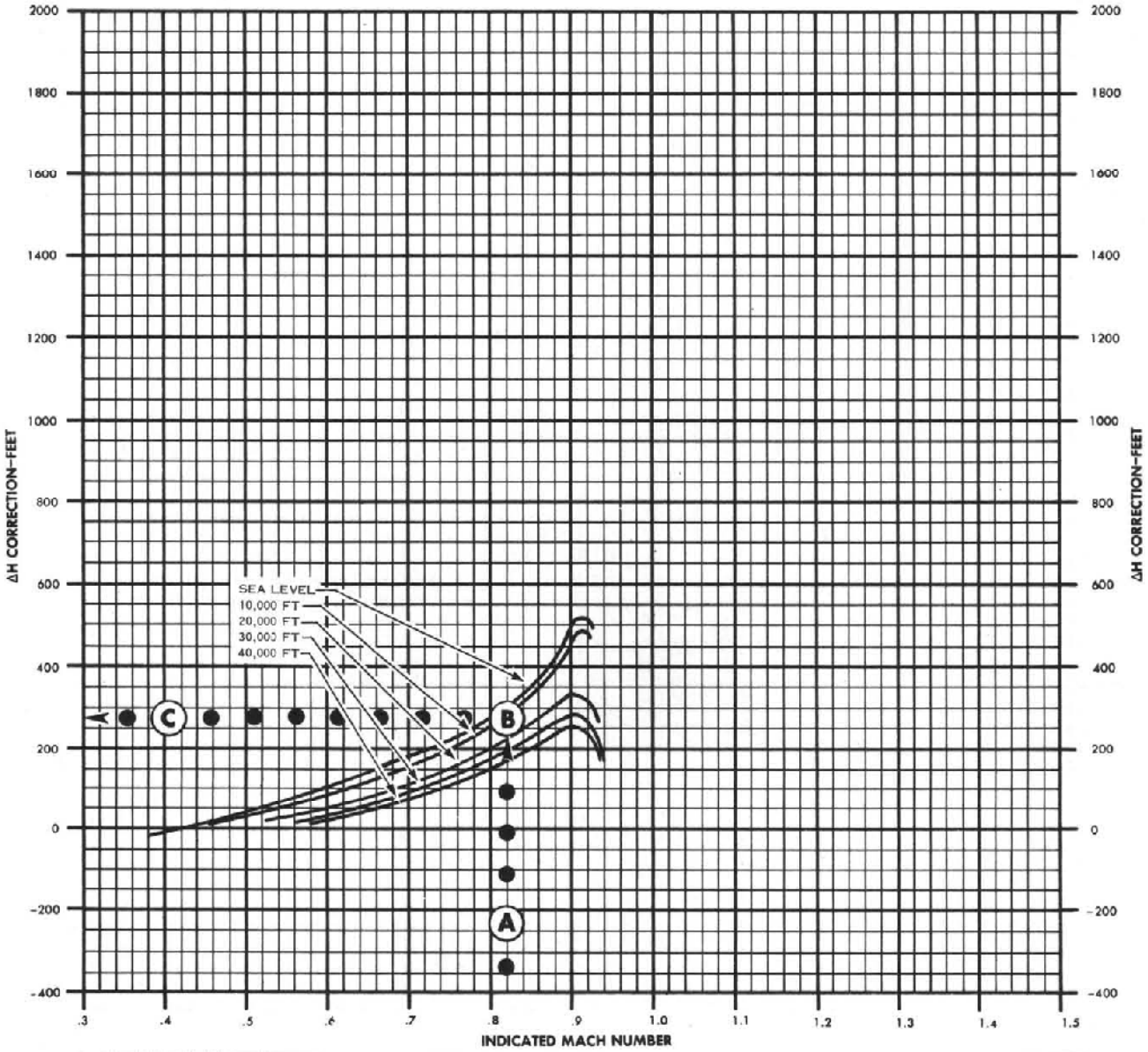
AIRPLANE CONFIGURATION
RF-101G OR RF-101H, WITHOUT EXTERNAL TANKS

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE, 1 FEB 1971
DATA BASIS, FLIGHT TEST



USE OF CHART

ENTER GRAPH AT INDICATED MACH NUMBER. PROCEED VERTICALLY TO INTERSECTION OF INDICATED ALTITUDE. READ CORRECTION FACTOR ON VERTICAL SCALE, ADDING THIS FACTOR TO INDICATED ALTITUDE GIVES FLIGHT LEVEL PRESSURE ALTITUDE, COMPUTATIONS MUST STILL BE MADE FOR CORRECTION ALTITUDE, I.E. PRESSURE ALTITUDE AND TEMPERATURE.

EXAMPLE

A-.8 2 INDICATED MACH NUMBER
B 10,000 FEET
C CORRECTION FACTOR = +280 FEET
D CORRECTED ALTITUDE B + C

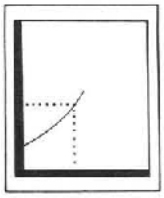
Figure A1-6

ALTIMETER INSTALLATION ERROR CORRECTION

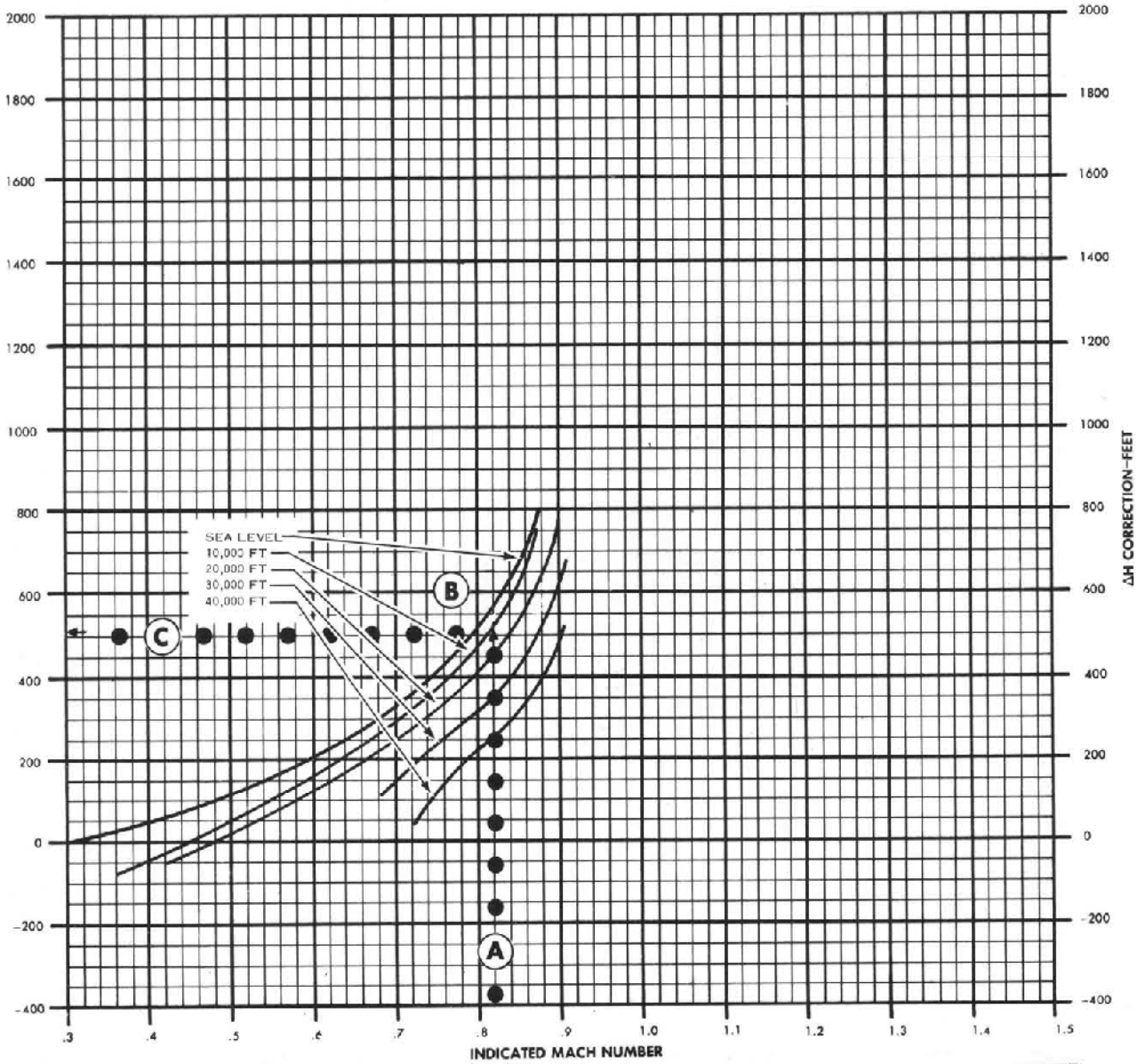
AIRPLANE CONFIGURATION
RF-101G OR RF-101H, 2 450 GALLON EXTERNAL TANKS

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 FEB 1971
DATA BASIS: FLIGHT TEST



USE OF CHART

ENTER GRAPH AT INDICATED MACH NUMBER. PROCEED VERTICALLY TO INTERSECTION OF INDICATED ALTITUDE. READ CORRECTION FACTOR ON VERTICAL SCALE, ADDING THIS FACTOR TO INDICATED ALTITUDE GIVES FLIGHT LEVEL PRESSURE ALTITUDE, COMPUTATIONS MUST STILL BE MADE FOR CORRECTION ALTITUDE, I.E. PRESSURE ALTITUDE AND TEMPERATURE.

EXAMPLE

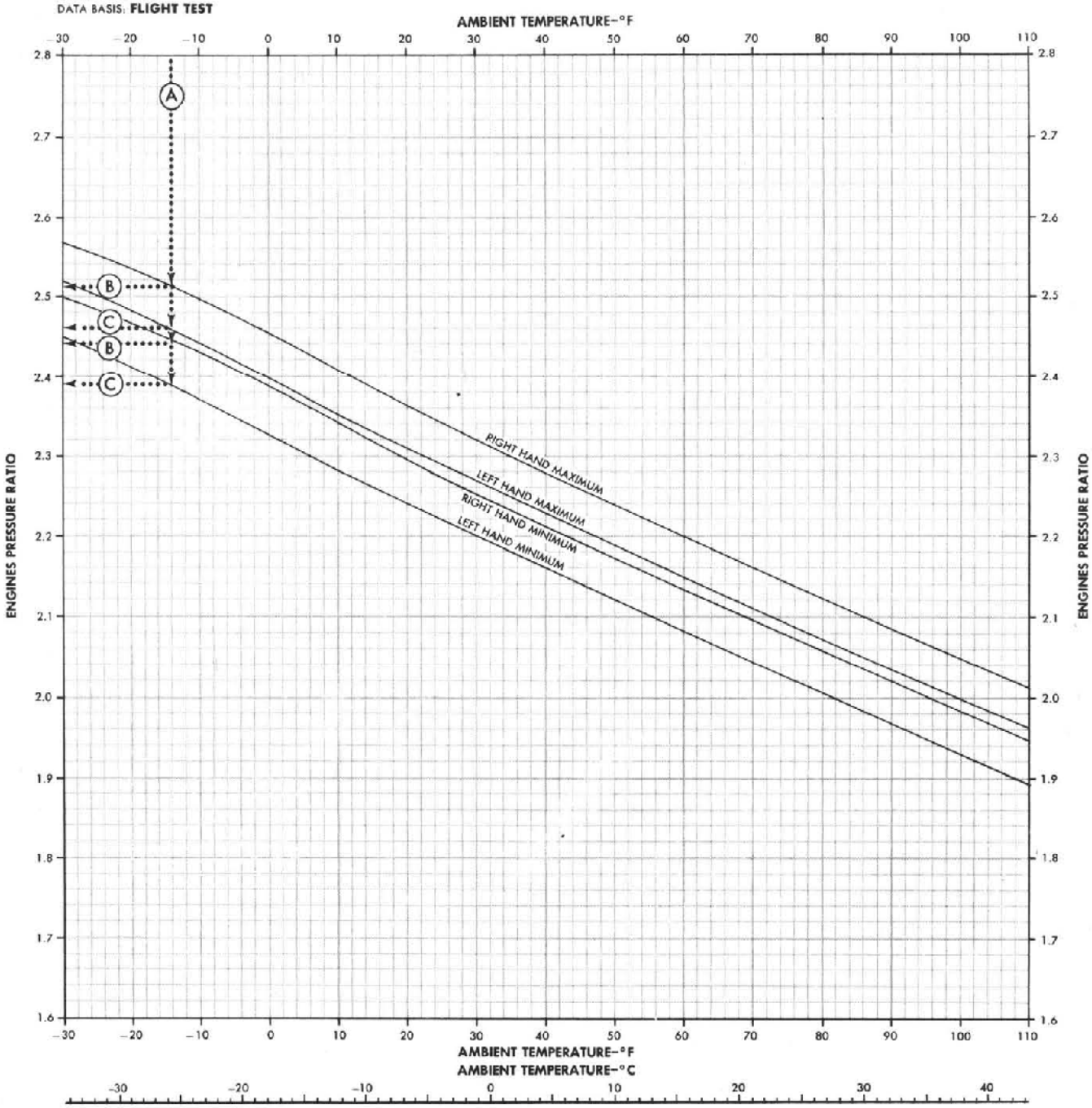
A .8 INDICATED MACH NUMBER
B 10,000 FEET
C CORRECTION FACTOR = + 520 FEET
D CORRECTED ALTITUDE B + C

Figure A1-7

ENGINE THRUST CHECK CURVE

J57-P-13 ENGINES

DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**



USE OF CHART

ENTER GRAPH AT THE HORIZONTAL SCALE WITH THE EXISTING AMBIENT TEMPERATURE "A". PROCEED VERTICALLY TO THE CURVES, THEN HORIZONTALLY FROM EACH CURVE TO THE VERTICAL SCALE. THE VALUES THUS LOCATED ON THE VERTICAL SCALE ARE THE INDIVIDUAL ENGINE'S MAXIMUM AND MINIMUM ACCEPTABLE LIMITS OF ENGINE PRESSURE RATIO ("B" TO "B" AND "C" TO "C") FOR THE EXISTING AMBIENT TEMPERATURE.

EXAMPLE

ACCEPTABLE RATIO FOR:
A = AMBIENT TEMPERATURE -14°F
B = RIGHT ENGINE ACCEPTABLE LIMITS 2.51 TO 2.44
C = LEFT ENGINE ACCEPTABLE LIMITS 2.46 TO 2.39

FA/C20-P106B

Figure A1-8

Part 2
TAKE-OFF

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DEFINITION OF TERMS USED

REFUSAL SPEED

Refusal speed (figure A2-2) is the maximum speed at which engine failure permits stopping at the end of the runway and is used during takeoff planning to determine the Go/No-Go speed. If engine failure occurs at a speed greater than refusal speed, the pilot must take off with the remaining engine.

REFUSAL DISTANCE

Refusal distance (figure A2-2) is the distance required to accelerate to refusal speed under normal conditions. The refusal distance, in conjunction with refusal speed, is useful only as a criterion for establishing the Go/No-Go distance.

GO/NO-GO SPEED AND DISTANCE

The Go/No-Go distance (figure A2-6) is the line check marker distance from the start of takeoff run to the first runway marker below refusal distance. The Go/No-Go speed is the acceleration line check speed that the airplane will normally attain within the Go/No-Go distance. Since the rapid acceleration of the airplane makes more than one line speed check impractical, the Go/No-Go distance together with qualifying restrictions imposed on the Go/No-Go speed (by refusal speed) provides an optimum acceleration line check.

TAKEOFF PLANNING CHARTS

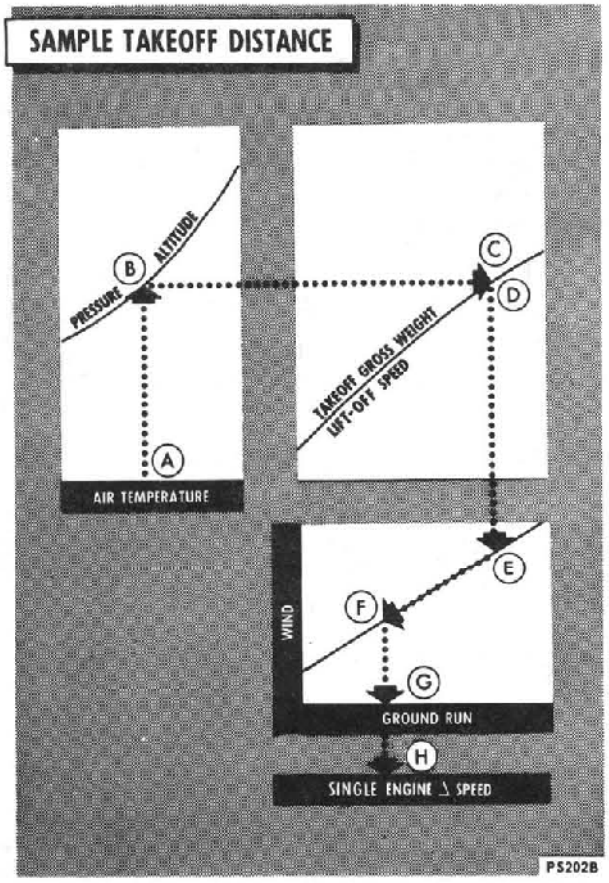
The following charts are provided for takeoff planning. Refer to Mission Planning, Part 9 of Appendix I, for detailed instructions in completing the Takeoff Data card.

MAXIMUM REFUSAL SPEED CHARTS

These charts (figures A2-2 and A2-3) present the maximum refusal speeds. The maximum refusal speed is read for the total runway length and represents the maximum speed at which a single engine failure may occur and successful stopping accomplished within the runway length. Stopping distance is based on using flaps and speed brakes and with or without the drag chute as noted on separate scales.

USE

Enter the chart at the airplane gross weight and proceed horizontally to the intersection of the pressure altitude. Descend to intersect the temperature scale and proceed horizontally to intersect the total runway length. From the total runway length intersection, descend to the base of the chart to read maximum refusal speed with drag chute and further to the lower scale to read maximum refusal speed without the drag chute.



SAMPLE PROBLEM

Configuration: Gear Down, Flaps Extended; Maximum Thrust

A. Takeoff Gross Weight	45,000 Lbs.
B. Pressure Altitude	Sea Level
C. Temperature	60°F
D. Length of Actual Runway	7,500 Ft.
E. Refusal Speed (with drag chute)	163 Kts.
F. Refusal Speed (without drag chute)	145 Kts.

TAKEOFF DISTANCE CHARTS

Ground run distances using Maximum and Military thrust are shown in the Takeoff Distance Charts (figures A2-4 and A2-5). All distances computed are for normal technique on a hard dry runway. Temperature, pressure altitude, gross weight, head and tail winds, and single engine failure are variables plotted on this graph. The graphs may be used for any configuration, considering gross weight. Airspeeds given (IAS) for takeoffs are shown on the gross weight lines.

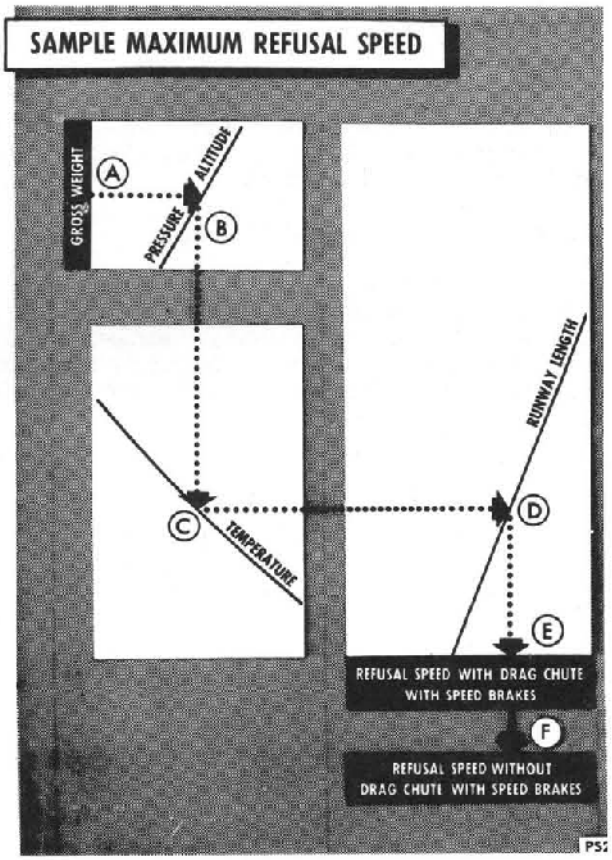
USE

Enter the chart at the temperature scale, proceeding vertically to intersect the pressure altitude. Proceed horizontally to the takeoff gross weight and read liftoff speed. Descend to the base line for wind effect and apply effective wind. Descend to the ground run scale reading ground run distance required for liftoff. If computed takeoff distance is between 5800 and 8800 feet project further down to single engine "Δ" takeoff speed. If engine failure occurs and takeoff is to be continued add "Δ" takeoff speed to normal takeoff speed.

SAMPLE PROBLEM

Configuration: Gear Down, Flaps Extended, Maximum Thrust.

A. Temperature	25°C
B. Pressure Altitude	4000 Ft.
C. Takeoff Gross Weight	50,000 Lbs.
Takeoff Speed	189 Kts.
D. Wind Base Line	
E. Ground Run (no wind)	5750 Ft.
F. Effective Tailwind	10 Kts.
G. Ground Run	6200 Ft.
H. "Δ" Takeoff Speed	4 Kts.
I. Liftoff Speed (C + H)	193 Kts.



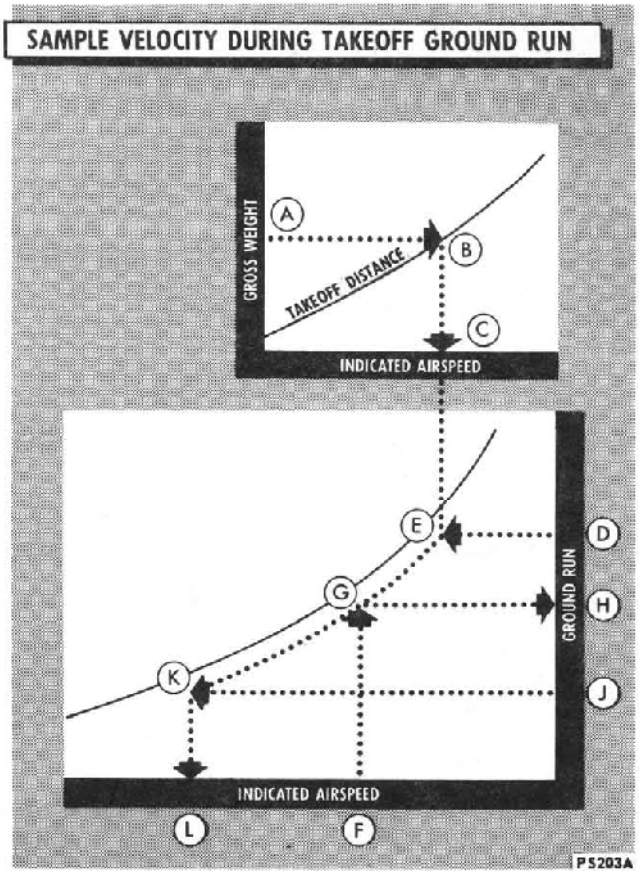
VELOCITY DURING TAKEOFF GROUND RUN

CHARTS (GO/NO-GO LINE CHECK)

These charts (figures A2-6 and A2-7) provide the normal takeoff speed, with both engines operating, for the various takeoff gross weights of the airplane and a means of obtaining a Go/No-Go line check. The Go/No-Go line check distance marker speed is the 1000 ft. marker speed below refusal speed. The charts can be used to obtain any line distance and speed relationship such as: Line distance at critical engine failure speed, line distance at refusal speed, speed at any runway marker or takeoff ground run for other than normal takeoff speed. However, it is recommended that the Go/No-Go line check distance marker, as defined above, be used as the criterion for decision to abort or take off after engine failure. If a definite failure occurs prior to reaching the Go/No-Go distance marker, the airplane should be stopped. If the marker is reached and partial failure is indicated by the fact that the airplane speed is less than that predicted for that marker, the airplane should be stopped. If the failure occurs after passing the Go/No-Go line check distance marker, do not attempt to rotate the airplane to lift off attitude until single engine takeoff speed is attained. If critical field length exceeds the total runway length or 10,000 ft. for any takeoff gross weight, temperature and altitude combination, climb-out capabilities with one engine are insufficient.

USE

Enter the chart at the airplane gross weight and read airspeed determined by the intersection of the takeoff - normal distance reflector line. The takeoff - minimum distance reflector line is used only where field length is a critical factor. Re-enter the chart at the ground run scale for the previously computed takeoff distance and proceed horizontally to intersect the line projected down from the takeoff - normal distance reflector line. From this intersection (E) project a line, to the left, parallel to the nearest acceleration guide line. Re-enter the chart at the indicated airspeed scale with the previously computed refusal speed, and project up to intersect the newly plotted acceleration guide line (G). From this point, project horizontally to the ground run scale and read refusal distance. Re-enter the ground run scale at the Go/No-Go distance marker (the first 1000 ft. marker below refusal distance; i.e., Go/No-Go distance marker would be 2000 feet if refusal distance fell between the 2000 ft. and 3000 ft. markers) proceed horizontally to intersect the newly plotted acceleration guide line (K) then vertically to the indicated airspeed scale to read Go/No-Go line check speed.



SAMPLE PROBLEM

Configuration: Gear Down, Flaps Extended; Maximum Thrust

A. Takeoff Gross Weight	45,000 Lbs.
B. Takeoff - Normal Distance Intersection	
C. Normal Takeoff Speed	180 Kts.
D. Normal Takeoff Ground Run (Takeoff Distance Chart)	2900 Ft.
E. Intersection of C and D	
F. Refusal Speed (with drag chute) (Maximum Refusal Speed or Critical Engine Failure Speed Chart)	163 Kts.
G. Intersection of E and F	
H. Refusal Distance	2300 Ft.
J. Go/No-Go Distance (First Runway Marker Before Refusal Distance)	2000 Ft.
K. Intersection of E and J	
L. Go/No-Go Speed	150 Kts.

CLIMB-OUT FLIGHT PATH

These charts, (figures A2-8 thru A2-10) provide the pilot with plots of distance traveled from unstick, versus height above the runway for "flaps down" "gear and flaps down" and gear up, flaps down, single engine configurations.

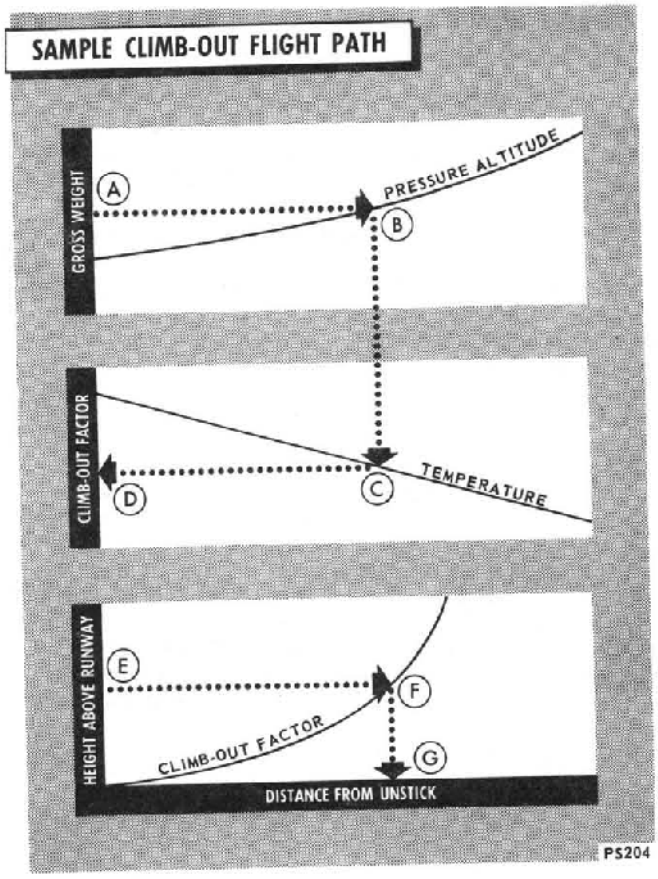
USE

Enter the charts with the takeoff gross weight. Proceed horizontally to the right to the pressure altitude, then descend to the ambient temperature. From this point, project horizontally to the left to read "climb-out factor (K)". Enter the bottom plot with the height above the runway for which distance traveled is required. From the height, project horizontally to the right to the applicable "climb-out factor". From this point, descend and read distance from unstick.

SAMPLE PROBLEM

Configuration: Flaps Down.

A. Takeoff Gross Weight	45,000 Lbs.
B. Pressure Altitude	Sea Level
C. Temperature	15°C
D. Climb-Out Factor	9.6
E. Height Above the Runway	4000 Ft.
F. Climb-Out Factor	9.6
G. Distance From Unstick	10,850 Ft.



TAKEOFF ABORT CRITERIA

(GO/NO-GO CONCEPT)

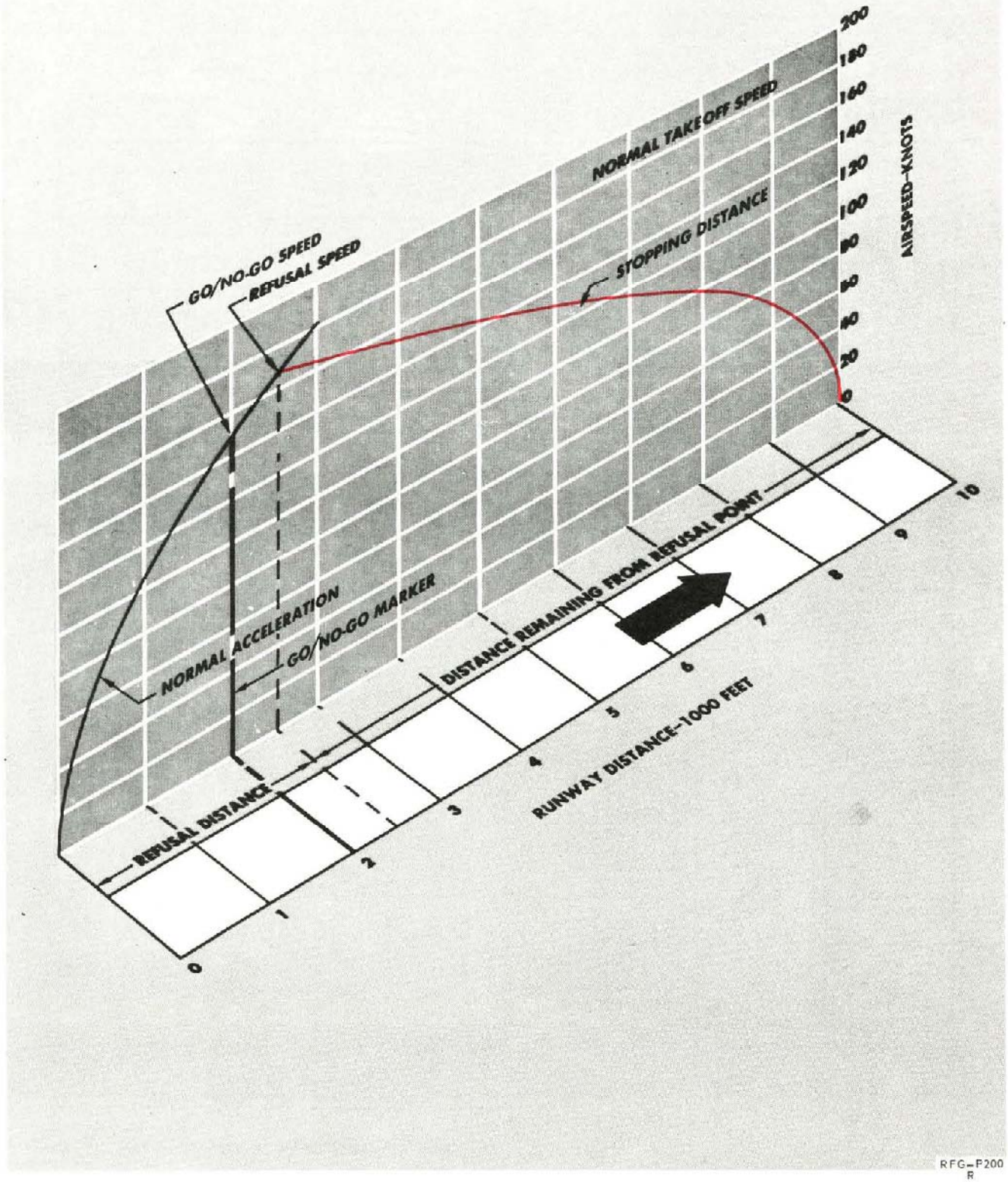


Figure A2-1

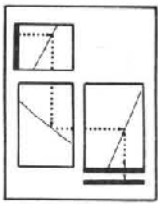
MAXIMUM REFUSAL SPEEDS

MAXIMUM THRUST

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : ALL CONFIGURATIONS
FLAPS EXTENDED, GEAR DOWN

REMARKS
SINGLE ENGINE FAILURE

GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

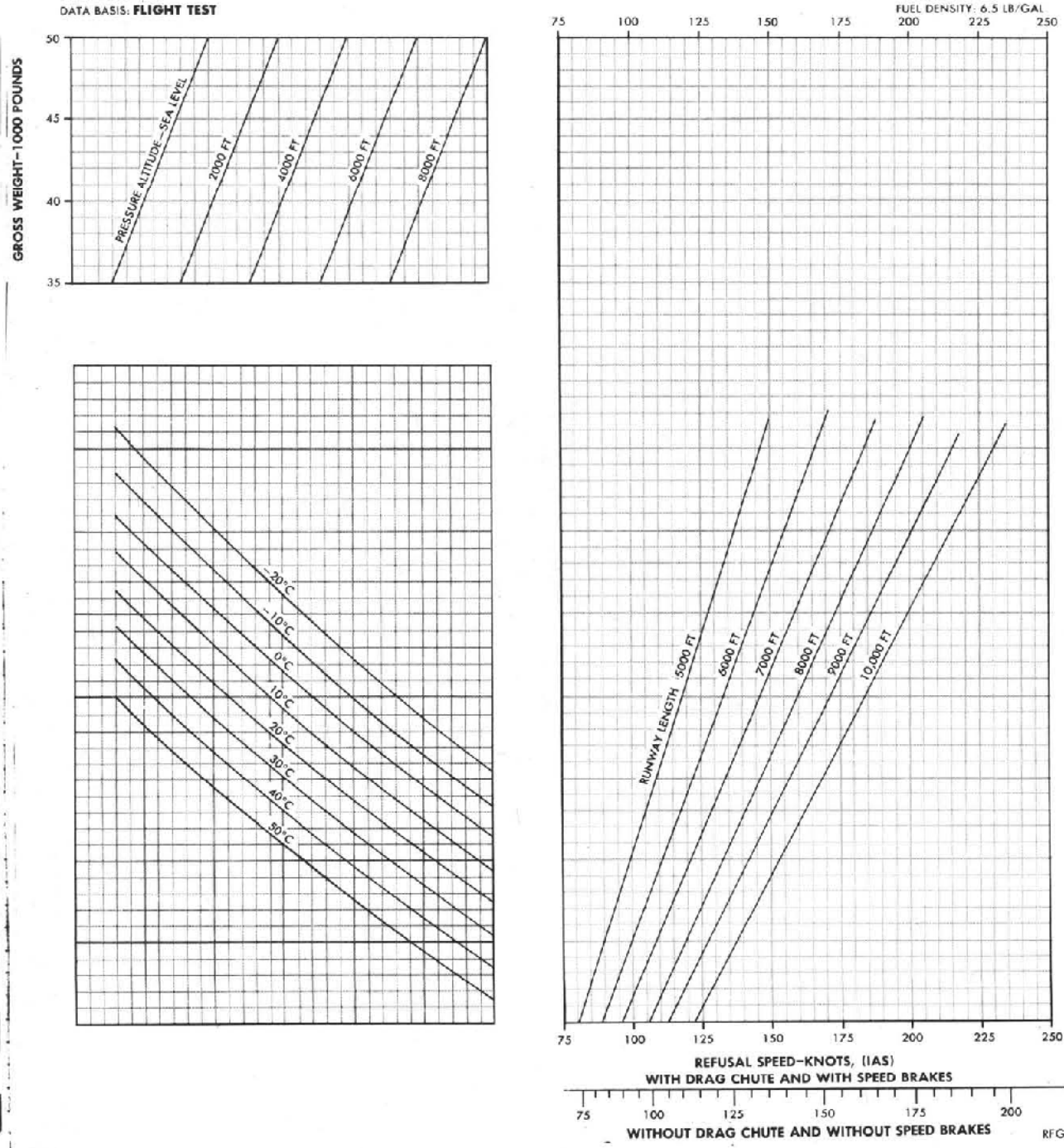


Figure A2-2

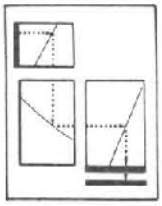
MAXIMUM REFUSAL SPEEDS

MILITARY THRUST

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : ALL CONFIGURATIONS
FLAPS EXTENDED, GEAR DOWN

REMARKS
SINGLE ENGINE FAILURE

GUIDE



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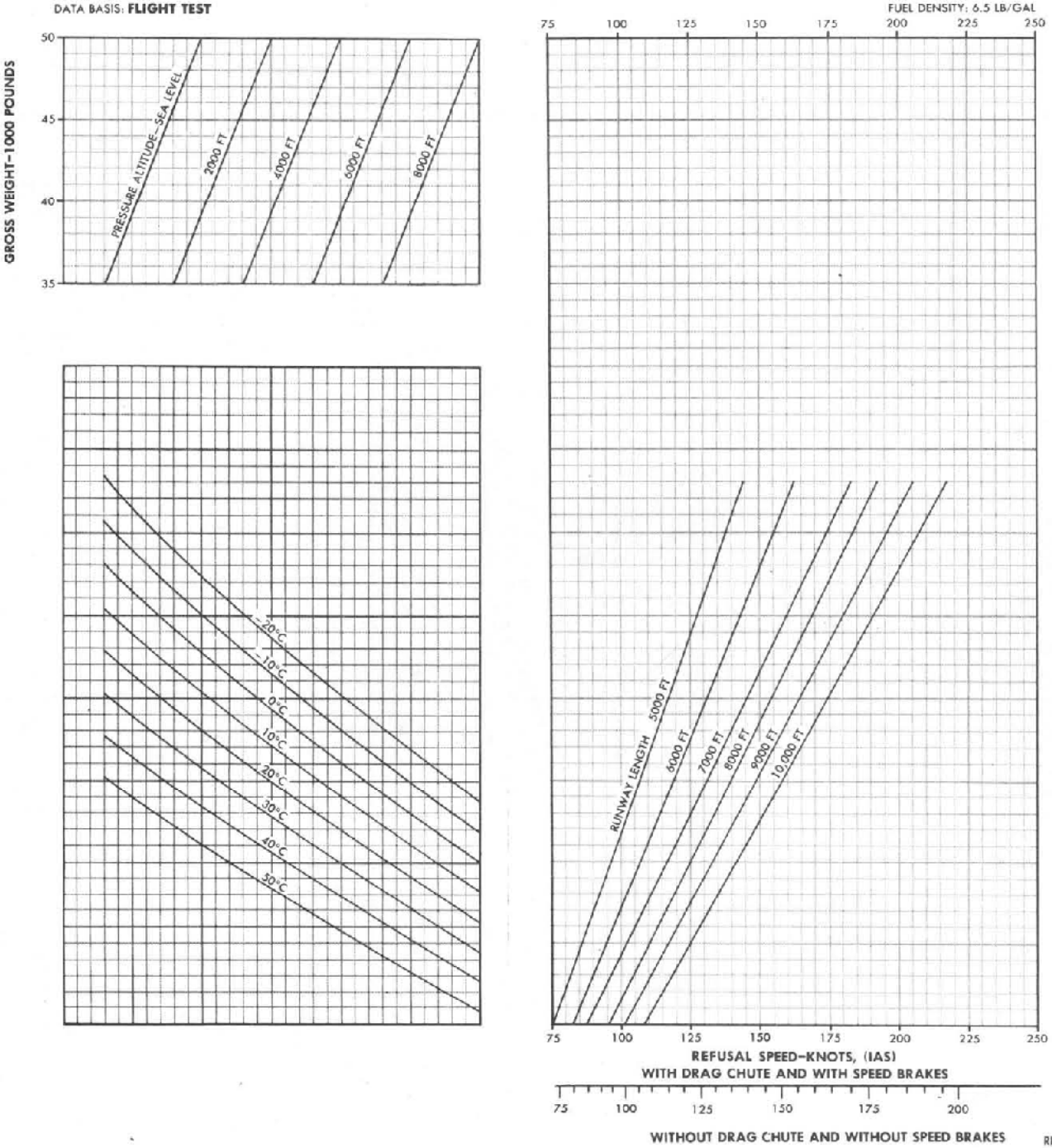
FUEL DENSITY: 6.5 LB/GAL



RFG-P202

Figure A2-3

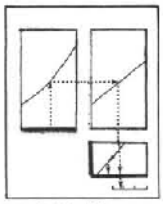
TAKEOFF DISTANCE
MAXIMUM THRUST
HARD DRY RUNWAY

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
FULL FLAPS, GEAR DOWN

DRAG INDEX
ALL CONFIGURATIONS

REMARKS
ENGINE(S): (2) J57-P-13

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: FLIGHT TEST

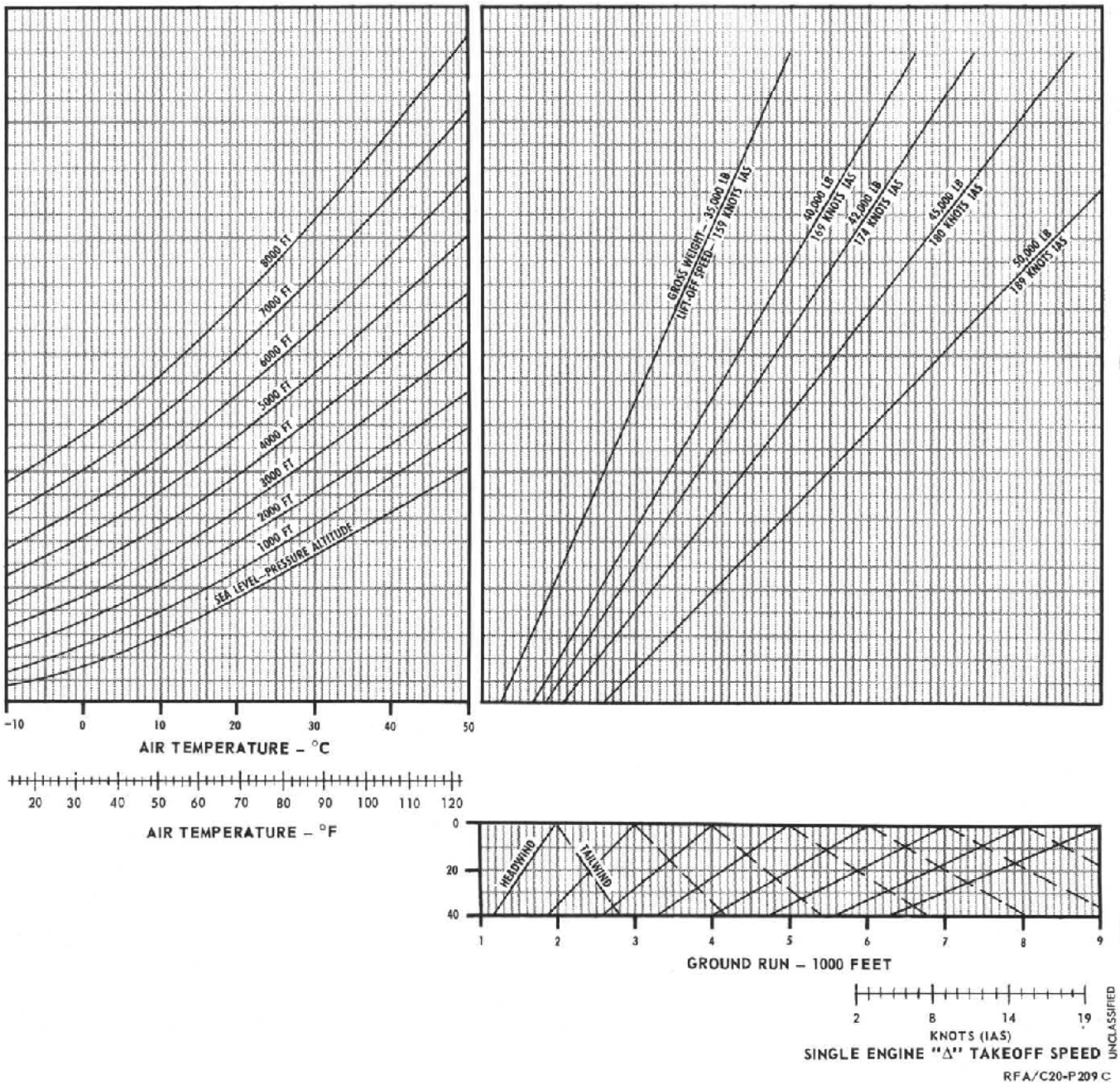


Figure A2-4

TAKEOFF DISTANCE

MILITARY THRUST
HARD DRY RUNWAY

AIRPLANE CONFIGURATION

RF-101G OR RF-101H
FULL FLAPS, GEAR DOWN

DRAG INDEX

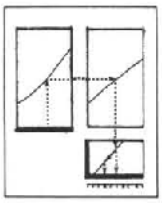
ALL CONFIGURATIONS

DATE: 1 NOVEMBER 1964
DATA BASIS: FLIGHT TEST

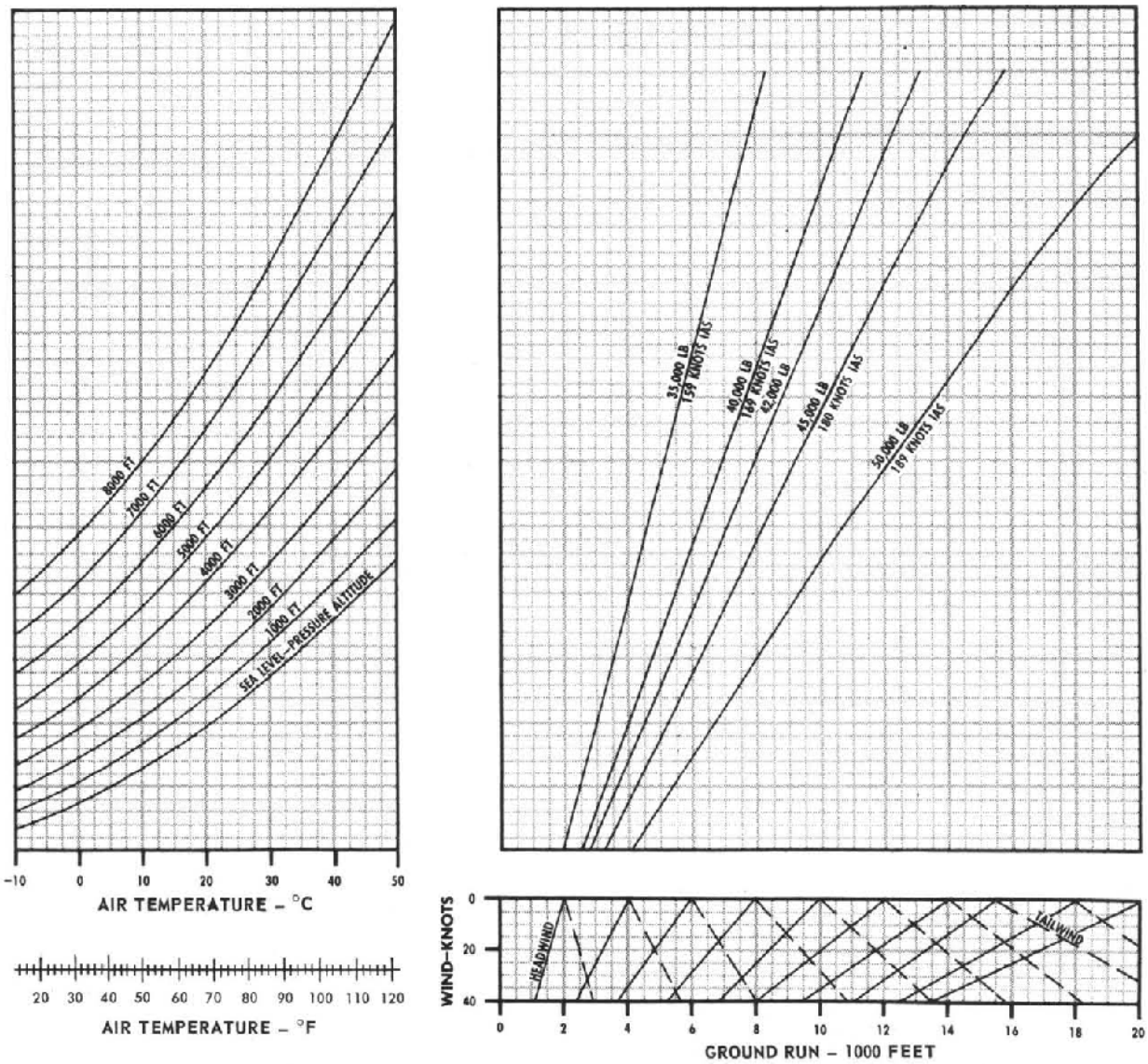
REMARKS

ENGINE(S): (2) J57-P-13

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



UNCLASSIFIED

RFG-P210C

Figure A2-5

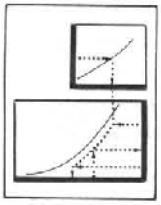
VELOCITY DURING TAKEOFF GROUND RUN

(GO/NO-GO LINE CHECK)
MAXIMUM THRUST
HARD DRY RUNWAY

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : ALL CONFIGURATIONS
FLAPS EXTENDED, GEAR DOWN

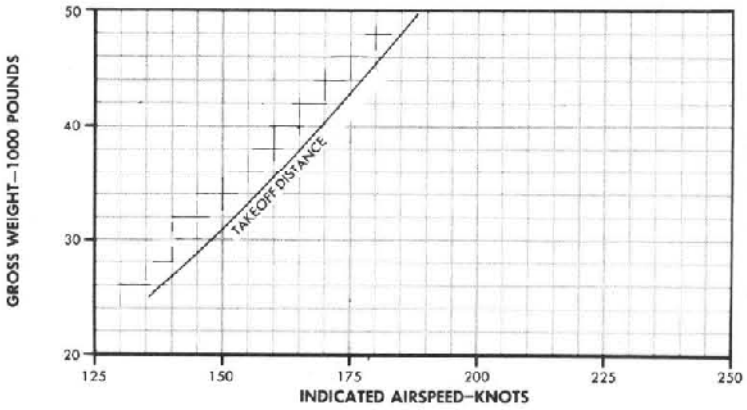
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

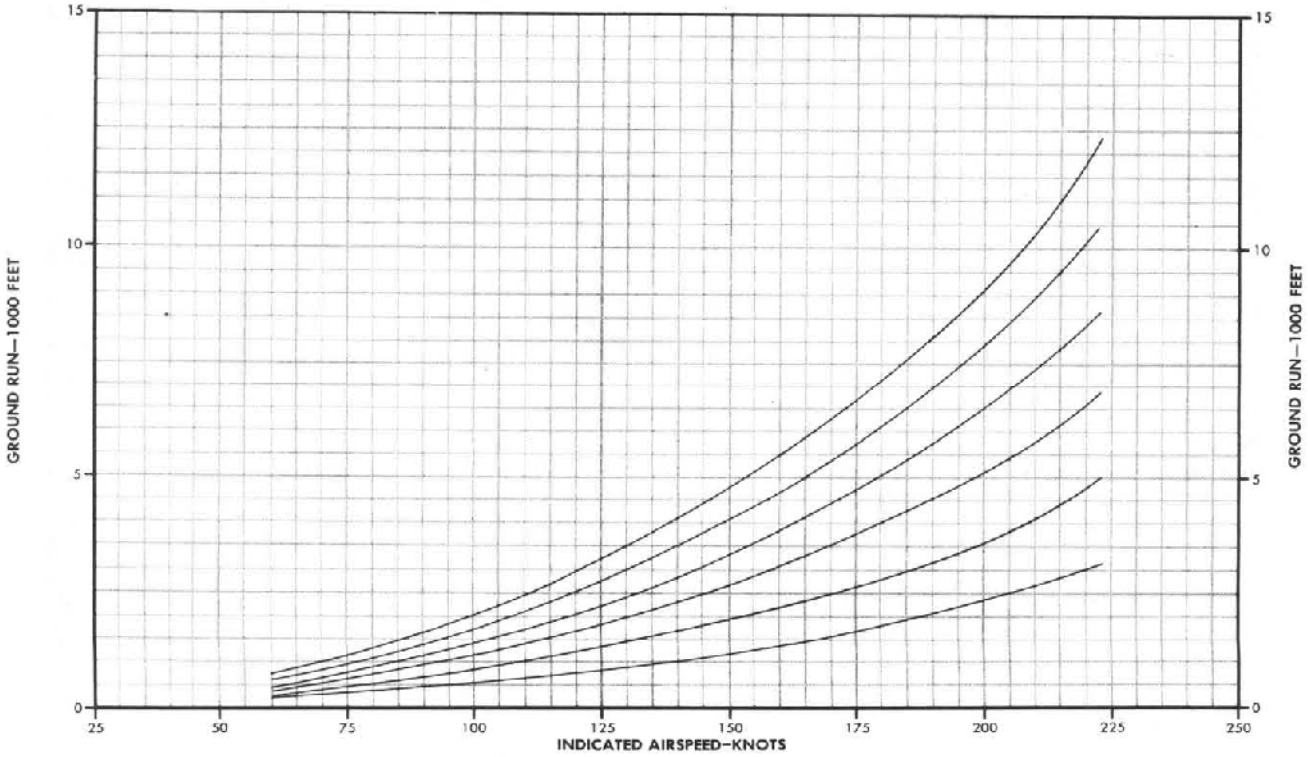
GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFG-P207

Figure A2-6

VELOCITY DURING TAKEOFF GROUND RUN

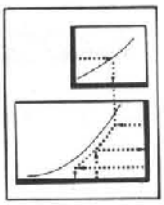
(GO/NO-GO LINE CHECK)
MILITARY THRUST
HARD DRY RUNWAY

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
FLAPS EXTENDED, GEAR DOWN

DRAG INDEX
ALL CONFIGURATIONS

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



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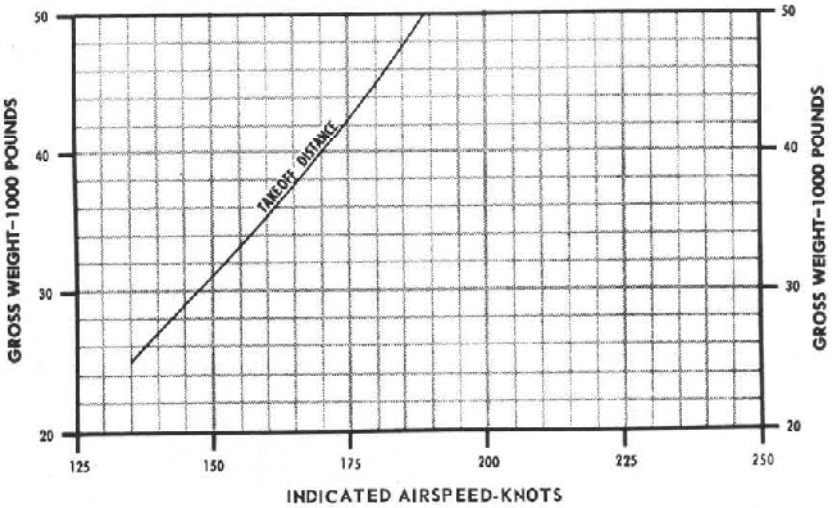
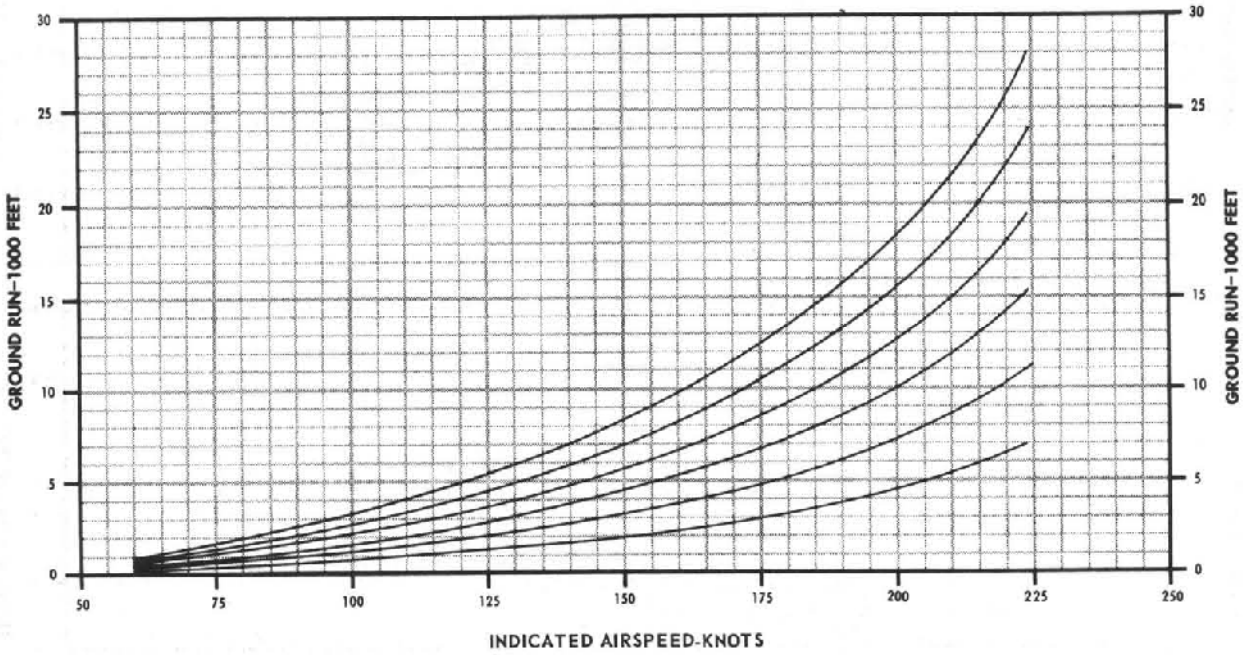
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





UNCLASSIFIED

RFG-P208C

Figure A2-7

CLIMB-OUT FLIGHT PATH

MAXIMUM THRUST

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
FULL FLAPS, GEAR DOWN

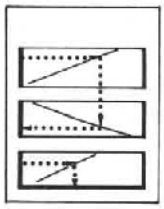
DRAG INDEX
ALL CONFIGURATIONS

REMARKS
ENGINE(S): (2) J57-P-13

Note

FOLLOWING LIFT-OFF, PULL UP AS REQUIRED TO MAINTAIN 230 KCAS.

GUIDE



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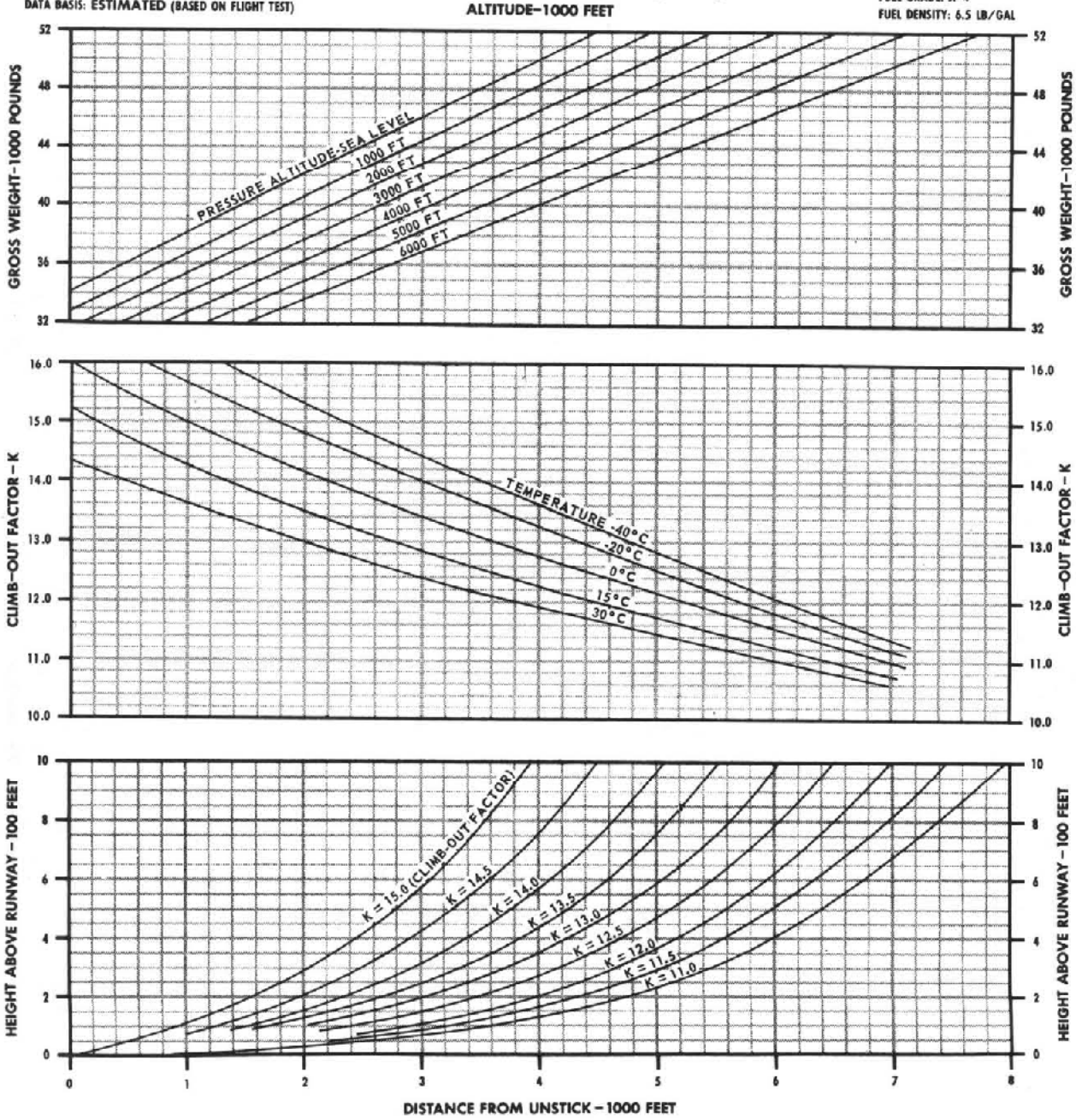
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P213

Figure A2-8

CLIMB-OUT FLIGHT PATH

MAXIMUM THRUST
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
FULL FLAPS, GEAR UP

DRAG INDEX

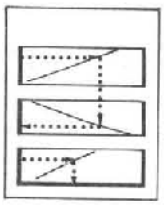
ALL CONFIGURATIONS

REMARKS
ENGINE(S): (2) J57-P-13

Note

FOLLOWING LIFT-OFF, RETRACT GEAR AND MAINTAIN LEVEL FLIGHT ACCELERATION TO 230 KCAS. THEN PULL UP AS REQUIRED TO MAINTAIN 230 KCAS.

GUIDE

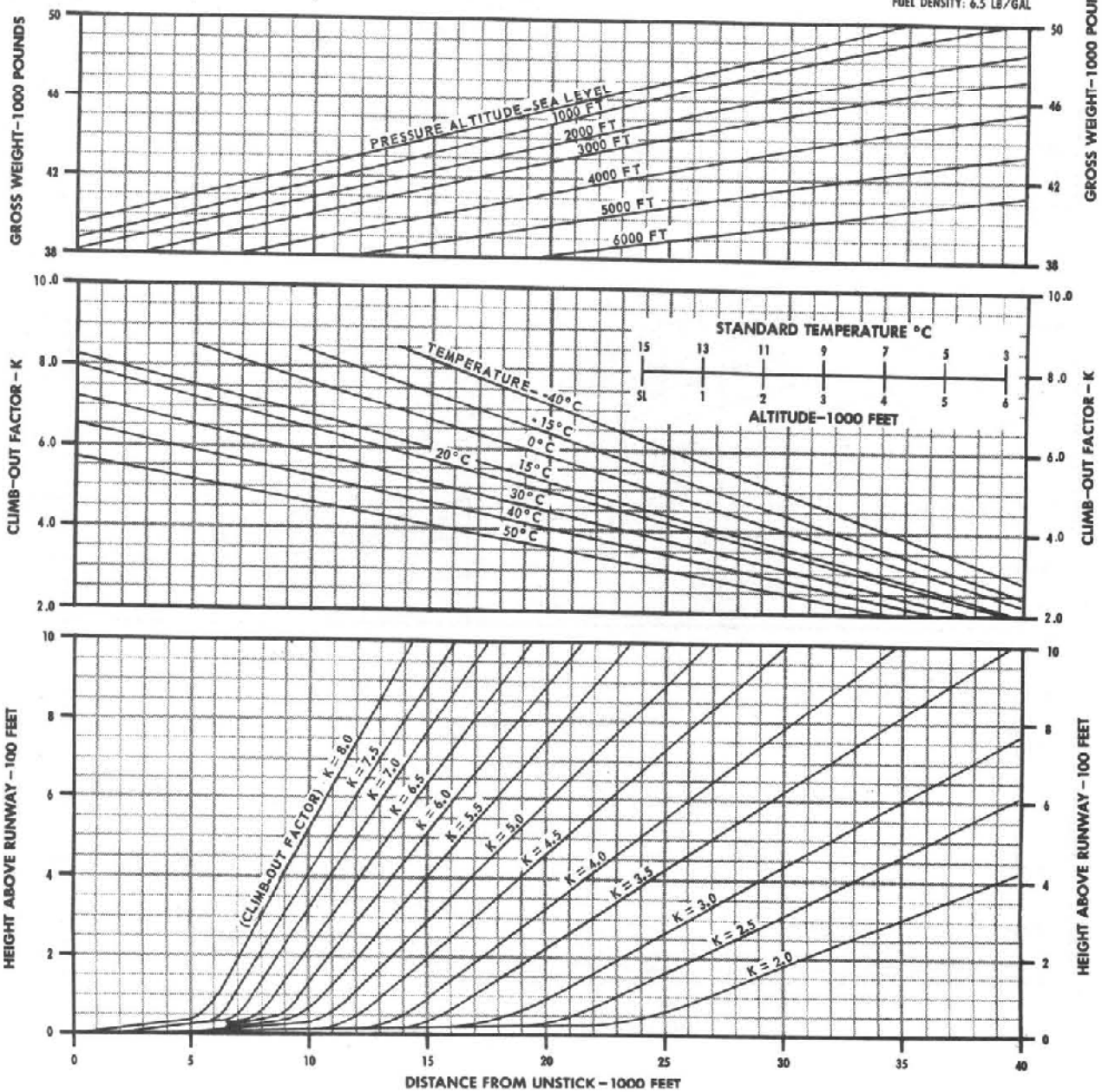


WARNING

GEAR MUST BE RETRACTED TO MAINTAIN SPEED

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



Part 3
CLIMB

TABLE OF CONTENTS

Charts

Climb Charts and Optimum Cruise Altitude Chart A3-3
Combat Ceiling A3-21

CLIMB CHARTS

Three series of climb charts are presented and include data for military and maximum thrust recommended climb, military thrust alternate climb and military thrust climb, one engine operating. The data is presented in both tabular and graphical form. Each series contains separate charts for speed, time, fuel and distance with the exception of the alternate climb series which do not include a speed chart since they are based on constant speed.

USE

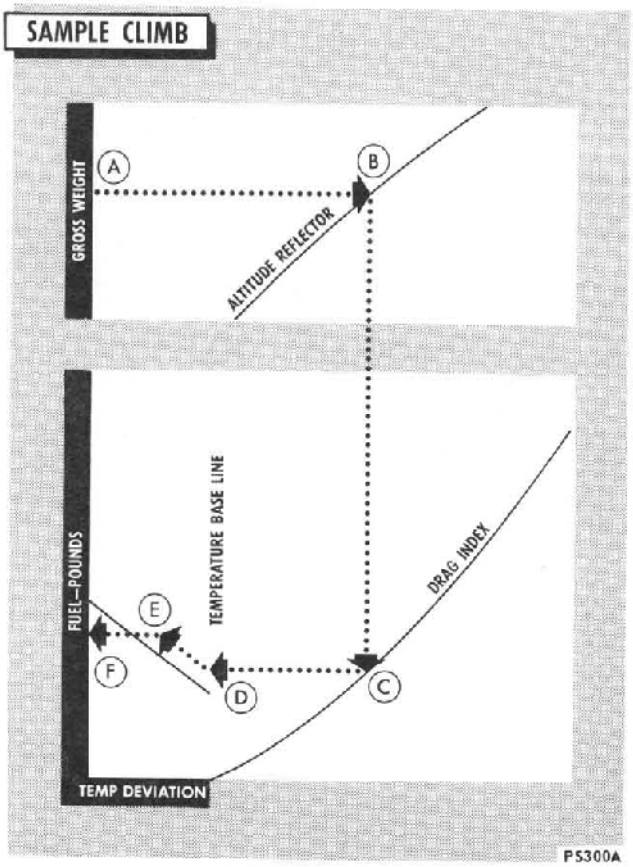
To obtain speed data for the recommended climb series, enter the speed schedule corresponding to the desired thrust with the computed drag index. Note the speed at each altitude check point up to the desired cruise altitude. The schedule may be entered at any altitude, as necessary. Additional data pertinent to the fuel used during start, taxi and acceleration, and the time and distance required to intercept the climb schedule are also included. To obtain speed data for the single engine climb series, and time, distance and fuel required for all the series, proceed as follows. Enter the charts with the sea level gross weight. Proceed horizontally to the right to the cruise altitude, then descend to the computed drag index curve. From this point proceed horizontally to the left to the temperature base line. Correct for temperature deviation as necessary and then continue on to the left to read the planning data.

To obtain time, distance and fuel required when the climb is to be commenced at altitudes above sea level, the gross weight must be corrected to sea level gross weight. This is accomplished by entering the "Fuel Required" chart at the desired climb series with the gross weight and proceeding to the right to the altitude corresponding to commence climb altitude. From this point proceed as previously described to obtain the fuel required to climb from sea level to the commence climb altitude. Add the fuel weight to the takeoff gross weight to obtain sea level gross weight. With sea level gross weight, proceed as previously described to obtain the planning data for (1) sea level to commence climb altitude and (2) sea level to cruise altitude. Subtract the data obtained in (1) from the data obtained in (2) to obtain the planning data for the climb from above sea level altitude to cruise altitude.

SAMPLE PROBLEM

Fuel Required - Military Thrust

A. Gross Weight	40,000 lbs.
B. Cruise Altitude	36,000 ft.
C. Drag Index	30
D. Temperature Base Line	
E. Temperature Deviation	+5°C
F. Fuel Required	1350 lbs.



COMBAT CEILING CHART

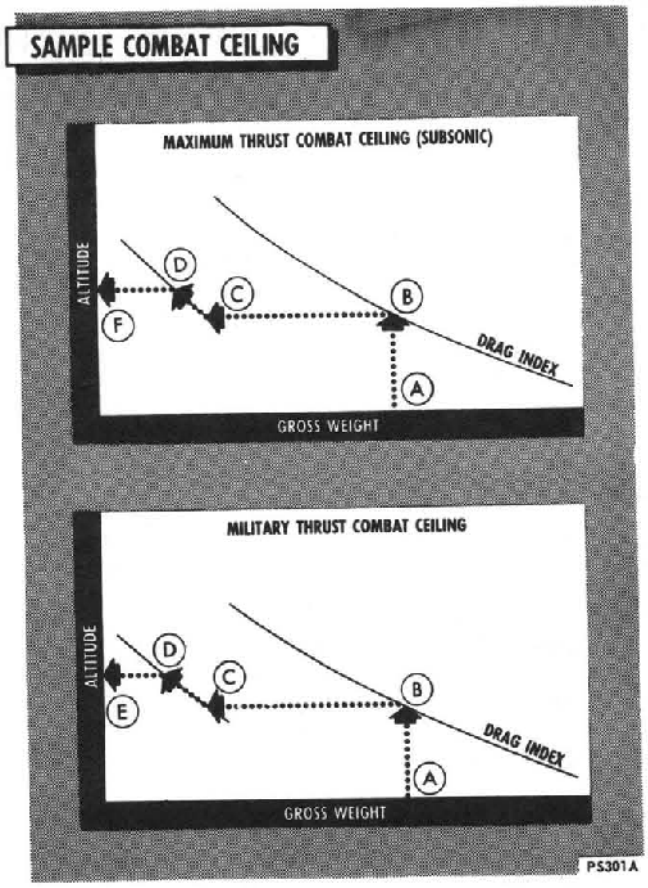
This chart presents two combat ceiling plots, one for military and one for maximum thrust. The complete range of operating gross weights and drag indexes are included.

USE

Enter the chart with the airplane gross weight corresponding to the fuel on board at the desired check point. Project vertically upward to intersect the applicable drag index reflectors on both plots. From these intersections, project horizontally to the left and read combat ceiling military thrust and combat ceiling maximum thrust.

SAMPLE PROBLEM

A. Airplane Gross Weight	45,000 pounds
B. Computed Drag Index	30
C. Temperature Base Line	
D. Temperature Deviation	+5°
E. Military Thrust Combat Ceiling	38,000 feet
F. Maximum Thrust Combat Ceiling	45,000 feet



AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

MAXIMUM THRUST RECOMMENDED CLIMB

AND OPTIMUM CRUISE ALTITUDE

SPEED SCHEDULE

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED
(BASED ON FLIGHT TEST)

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

ALTITUDE	DRAG INDEX 0 KCAS	0 MACH	10 KCAS	10 MACH	20 KCAS	20 MACH	30 KCAS	30 MACH	40 KCAS	40 MACH	50 KCAS	50 MACH	60 KCAS	60 MACH
S.L.	540	.822	535	.815	530	.807	527	.800	522	.794	517	.787	515	.782
5000	510	.839	505	.831	500	.823	498	.820	492	.813	490	.808	486	.802
10000	477	.854	472	.844	469	.836	467	.834	464	.828	461	.823	457	.816
15000	449	.866	442	.855	440	.847	436	.843	434	.838	430	.833	427	.827
20000	409	.867	403	.859	401	.854	400	.851	398	.845	395	.840	391	.834
25000	368	.867	365	.861	364	.857	363	.855	360	.849	359	.845	356	.839
30000	333	.868	330	.862	327	.858	325	.856	324	.852	323	.848	322	.843
35000	300	.869	298	.863	297	.859	296	.857	294	.853	293	.849	291	.845
40000	267	.870	265	.864	264	.860	263	.857	262	.853	261	.849	259	.845
45000	238	.870	237	.865	235	.860	233	.857	233	.853	231	.849	230	.845
50000	209	.870	208	.865	208	.860	207	.857	205	.853	204	.849	203	.845
55000	188	.870	187	.865	185	.860	184	.857	183	.853	182	.849	182	.845

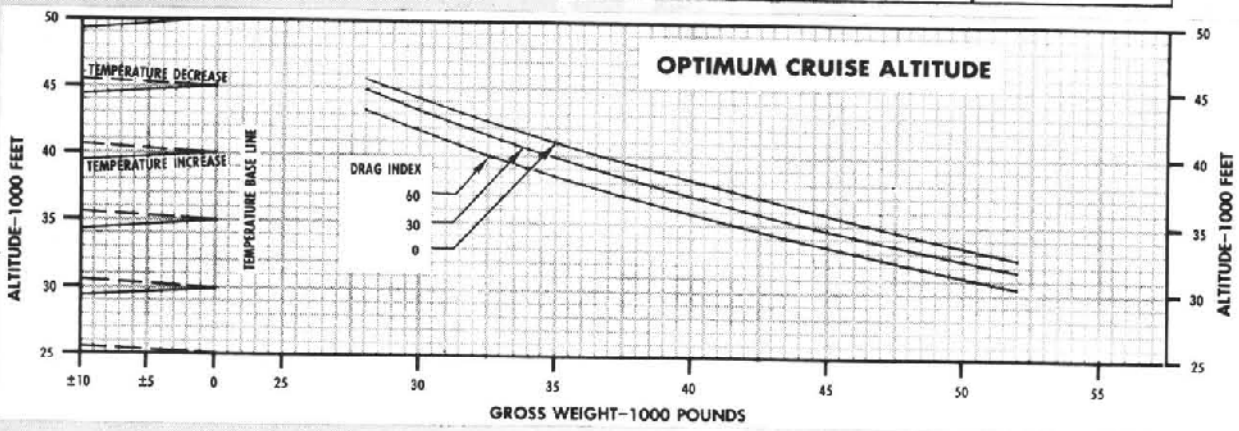
TAKE-OFF ALLOWANCES & ACCELERATION TO CLIMB SPEED

START - 55 LBS.

TAXI - 35 LB./MIN.

	BRAKE RELEASE TO CLIMB SPEED MAX. T. O. MAX. ACCEL. TO MAX. PWR. CLIMB SPEED	
DRAG INDEX	0	60
FUEL - LBS.	1100	1270
DIST. - NA. MI.	4	5
TIME - MIN.	.9	1.1

GUIDE



RFG-P312

Figure A3-1

MAXIMUM THRUST RECOMMENDED CLIMB

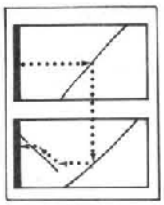
TIME REQUIRED

AIRPLANE CONFIGURATION
RF-101G OR RF-101 H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

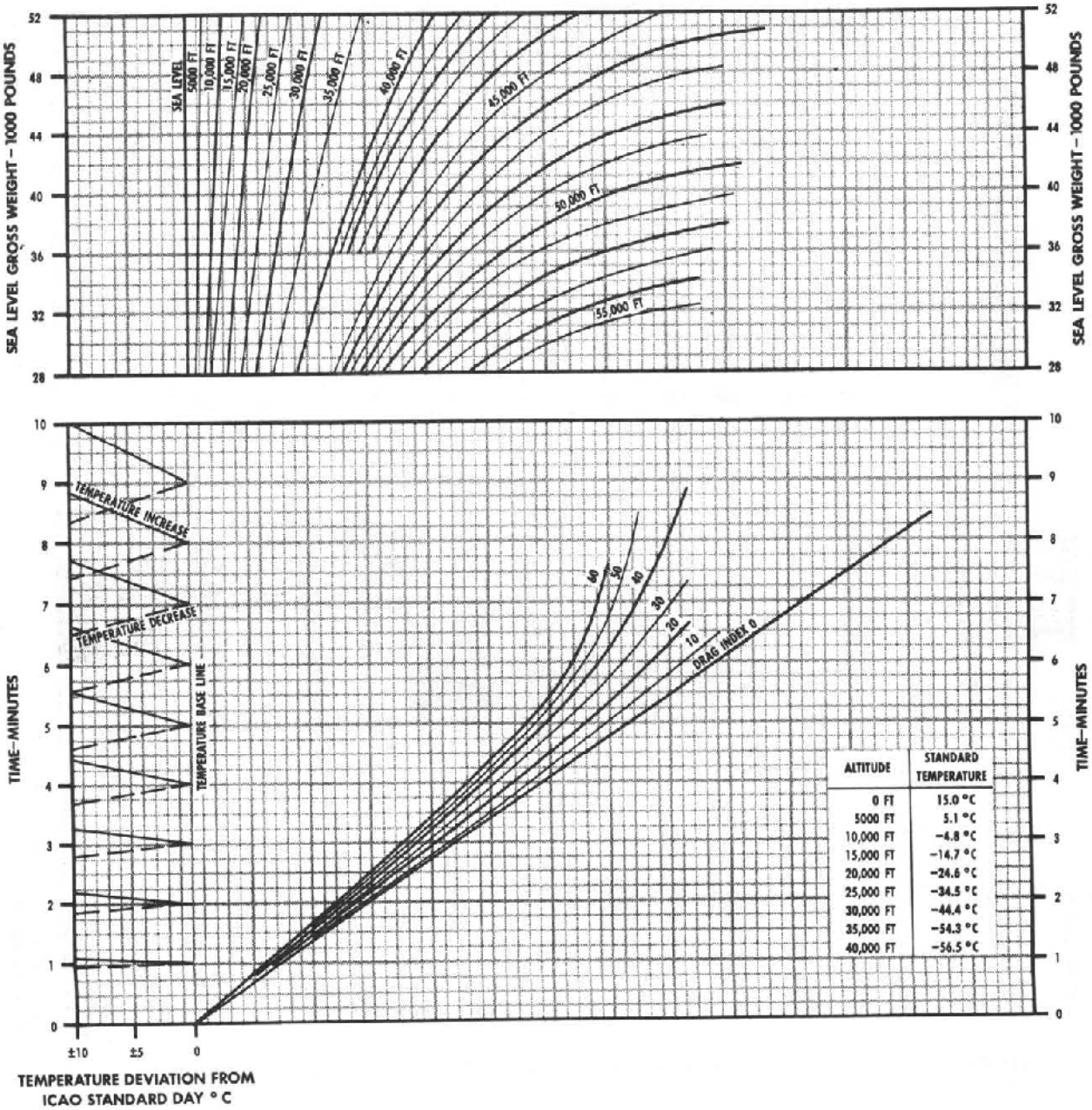
REMARKS
ENGINE(S): (2) J57-P-13
STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG–P313

Figure A3-2

MAXIMUM THRUST RECOMMENDED CLIMB

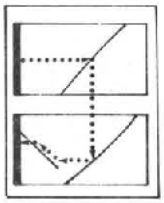
FUEL REQUIRED

AIRPLANE CONFIGURATION
RF-101 G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

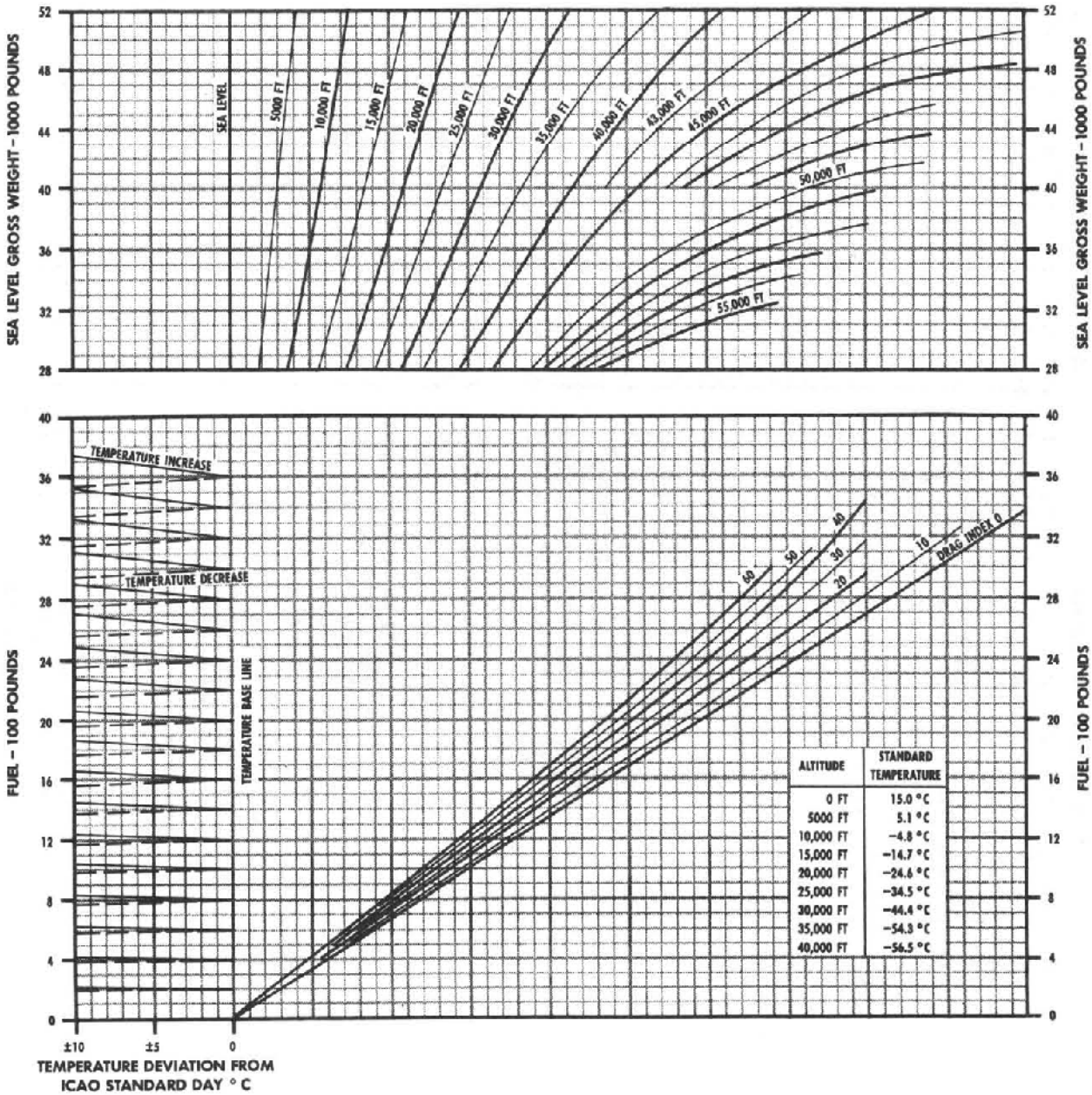
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG-P314

Figure A3-3

MAXIMUM THRUST RECOMMENDED CLIMB

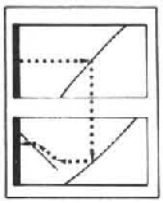
DISTANCE REQUIRED

AIRPLANE CONFIGURATION
RF-101 G OR RF-101 H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

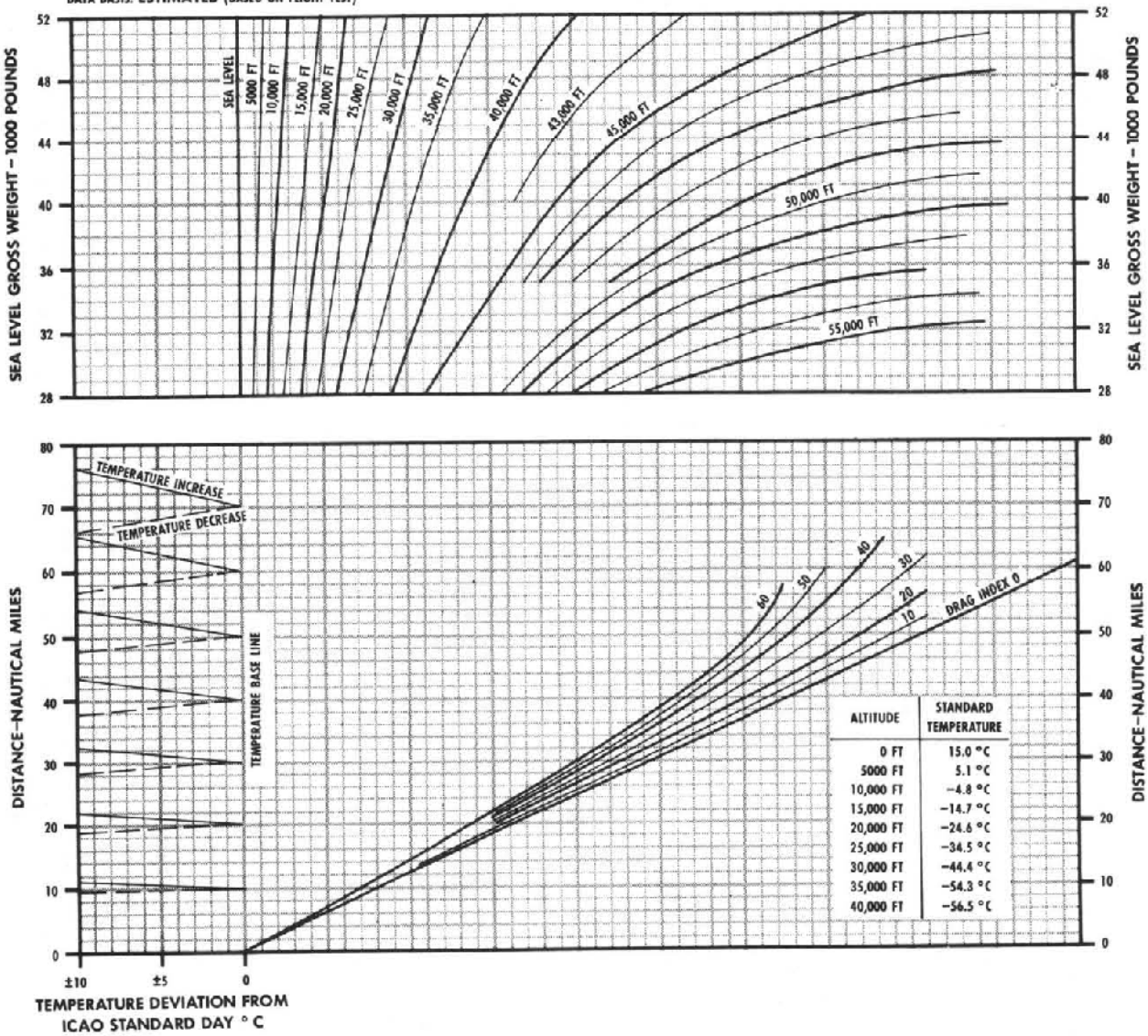
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB./GAL



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG–P315

Figure A3-4

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

MILITARY THRUST RECOMMENDED CLIMB

AND OPTIMUM CRUISE ALTITUDE

SPEED SCHEDULE

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED
(BASED ON FLIGHT TEST)

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

ALTITUDE	DRAG INDEX 0 KCAS	0 MACH	10 KCAS	10 MACH	20 KCAS	20 MACH	30 KCAS	30 MACH	40 KCAS	40 MACH	50 KCAS	50 MACH	60 KCAS	60 MACH
S.L.	436	.665	420	.629	398	.601	381	.576	365	.552	352	.531	341	.515
5000	426	.700	410	.673	392	.643	373	.612	359	.588	343	.566	334	.549
10000	415	.740	400	.716	385	.683	363	.649	349	.626	335	.604	325	.585
15000	400	.776	386	.752	371	.721	353	.689	339	.664	326	.642	319	.625
20000	375	.799	366	.783	304	.760	343	.741	329	.712	321	.695	313	.677
25000	345	.817	340	.803	335	.792	332	.785	325	.771	315	.751	311	.738
30000	318	.829	314	.821	309	.811	305	.804	303	.800	301	.792	298	.785
35000	289	.838	286	.832	284	.825	281	.819	279	.816	277	.809	276	.805
40000	257	.839	255	.835	253	.829	251	.823	249	.820	248	.815	247	.808
45000	229	.840	227	.835	225	.829	224	.823	222	.820	–	–	–	–
50000	203	.841	201	.835	–	–	–	–	–	–	–	–	–	–

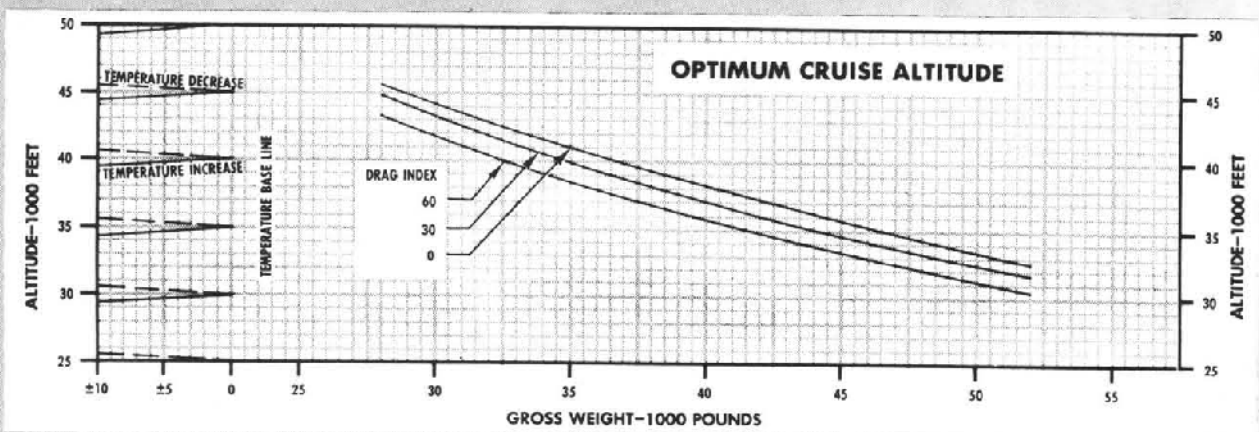
TAKE-OFF ALLOWANCES & ACCELERATION TO CLIMB SPEED

START – 55 LBS.

TAXI – 35 LB./MIN.

	BRAKE RELEASE TO CLIMB SPEED			
	MIL. T. O. MIL. ACCEL. TO MIL. CLIMB SPEED	MAX. T. O. MIL. ACCEL. TO MIL. CLIMB SPEED	MAX. T. O. MAX. ACCEL. TO MIL. CLIMB SPEED	
DRAG INDEX	ALL	ALL	0	60
FUEL – LBS.	550	750	1100	1270
DIST. – NA. MI.	8	6	4	5
TIME – MIN.	1.7	1.4	.9	1.1

GUIDE



RFG–P324

Figure A3-5

MILITARY THRUST RECOMMENDED CLIMB

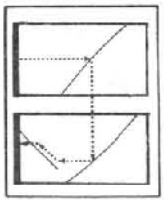
TIME REQUIRED

AIRPLANE CONFIGURATION
RF-101G OR RF-101 H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

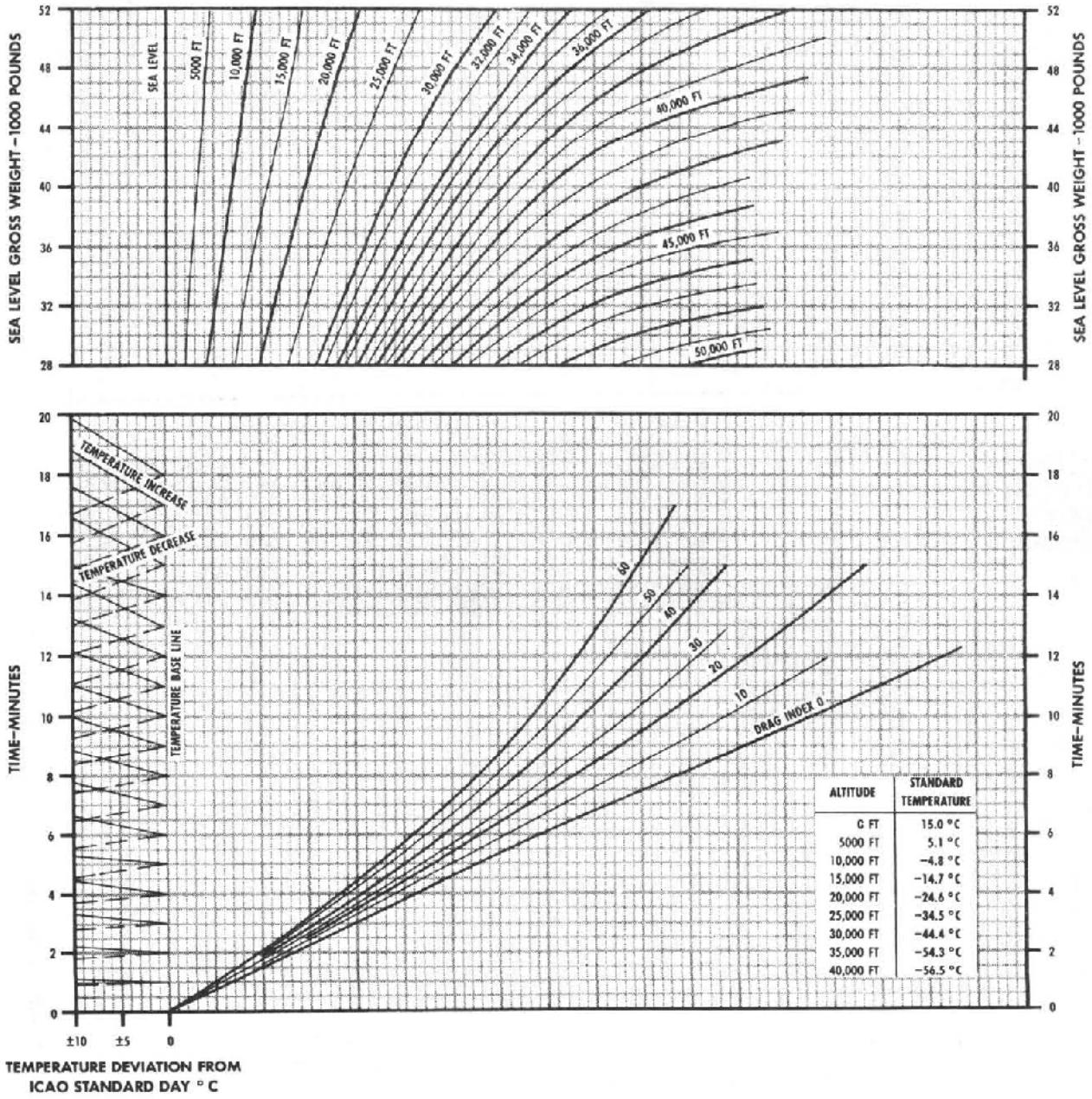
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG-P325

Figure A3-6

MILITARY THRUST RECOMMENDED CLIMB

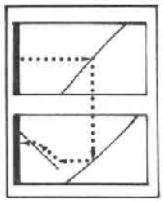
FUEL REQUIRED

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

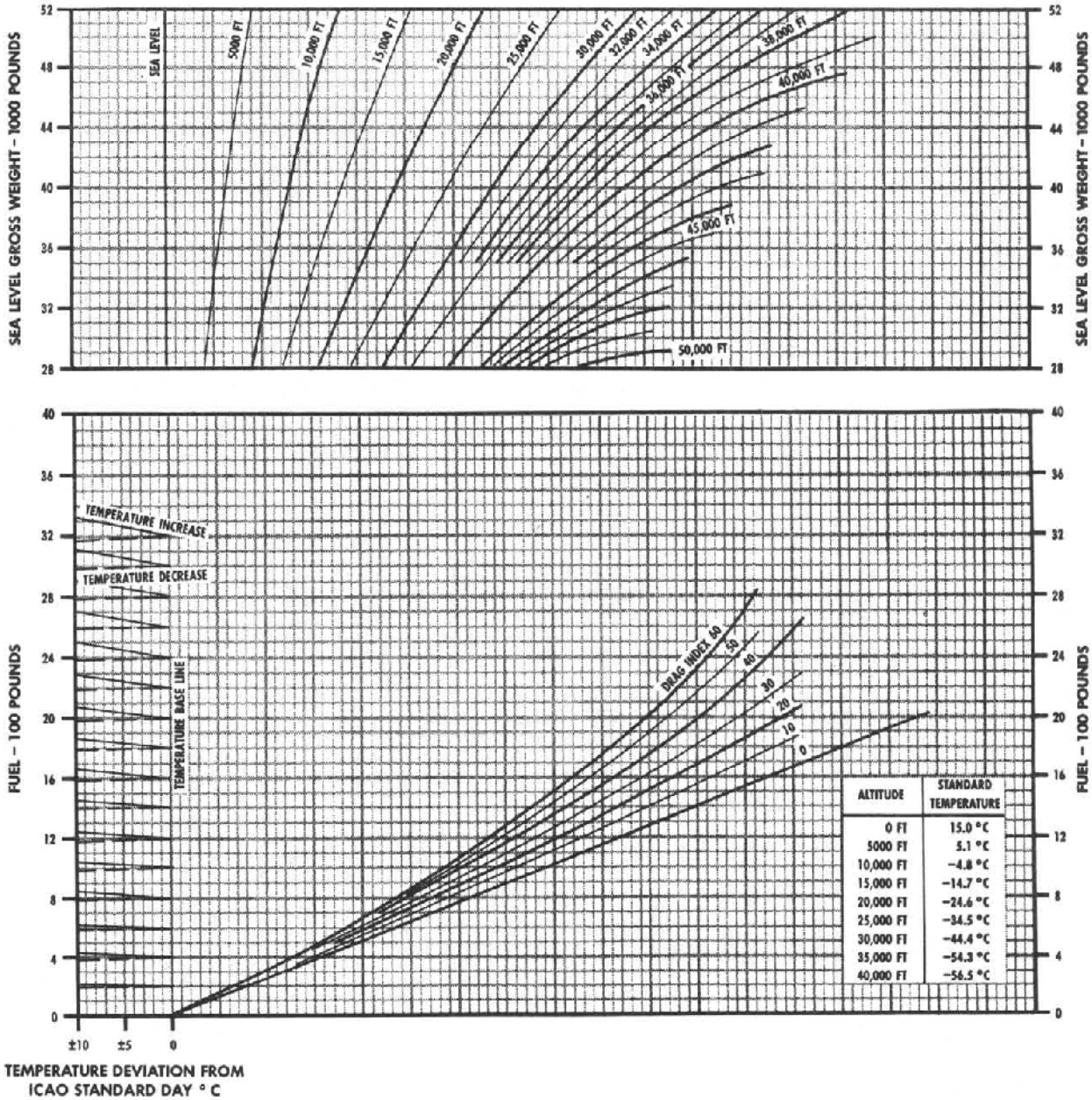
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG-P326

Figure A3-7

MILITARY THRUST RECOMMENDED CLIMB

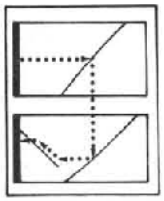
DISTANCE REQUIRED

AIRPLANE CONFIGURATION
RF-101 G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

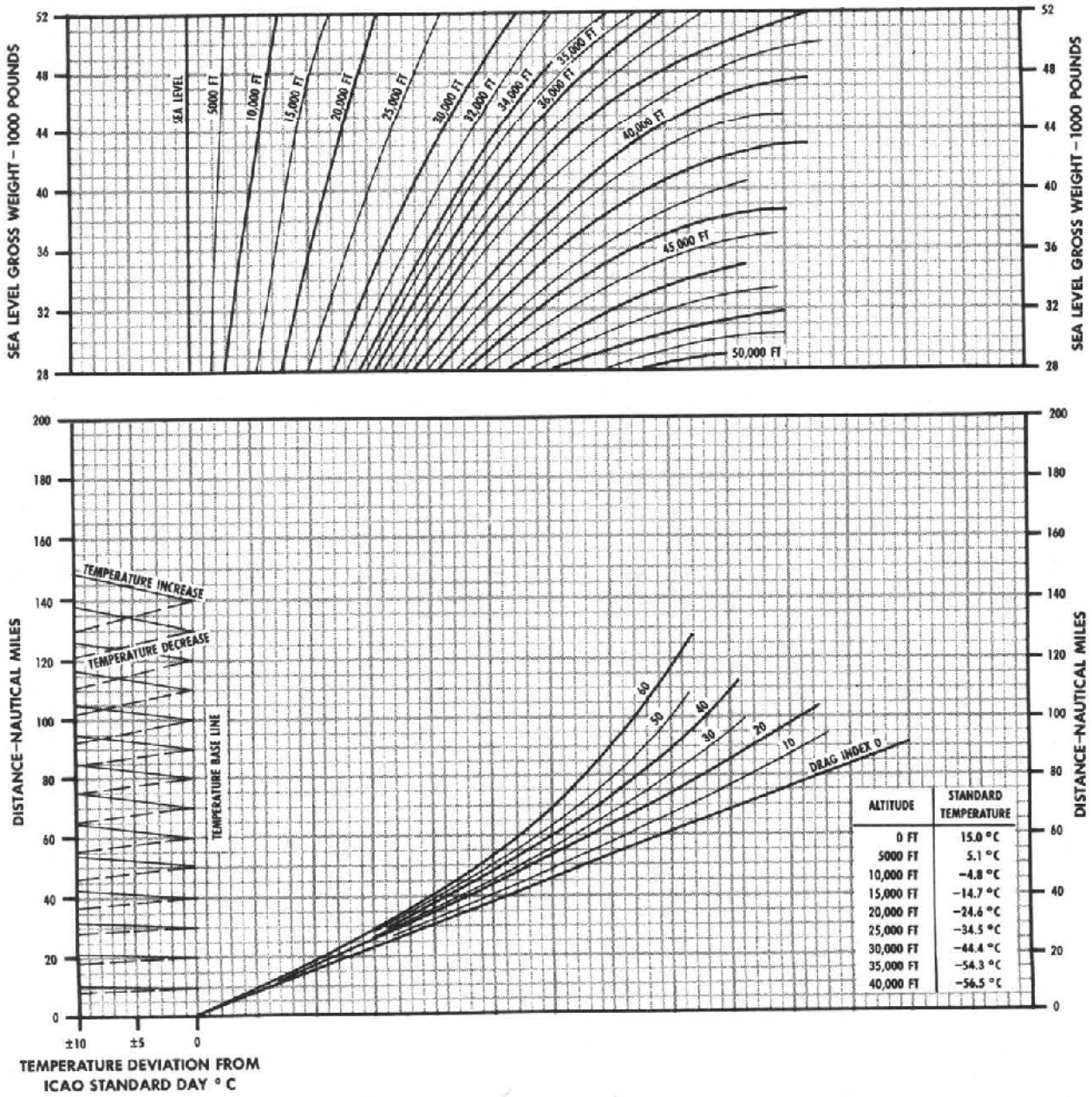
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG–P327

Figure A3-8

MILITARY THRUST ALTERNATE CLIMB

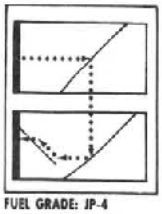
CONSTANT SPEED
TIME REQUIRED

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

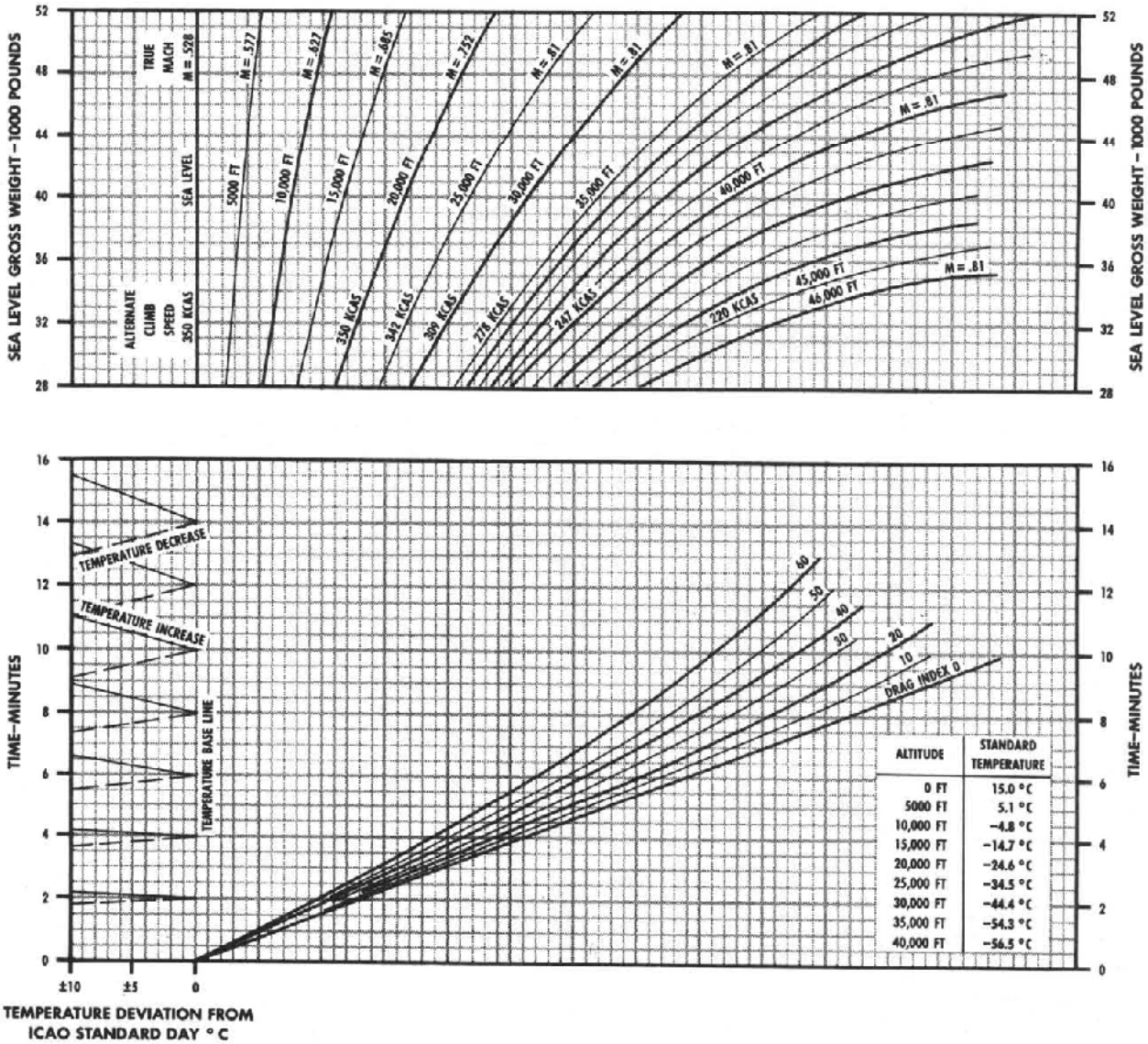
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
350 KNOTS CAS MAXIMUM OR MACH = .81

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG-P3/20

Figure A3-9

MILITARY THRUST ALTERNATE CLIMB

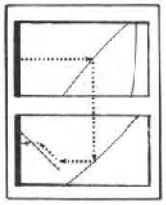
CONSTANT SPEED
FUEL REQUIRED

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

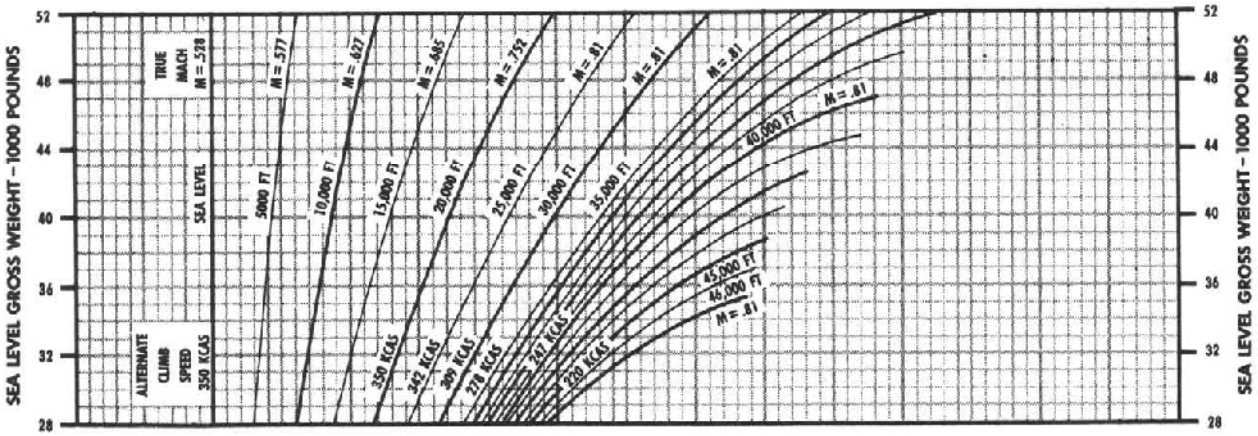
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

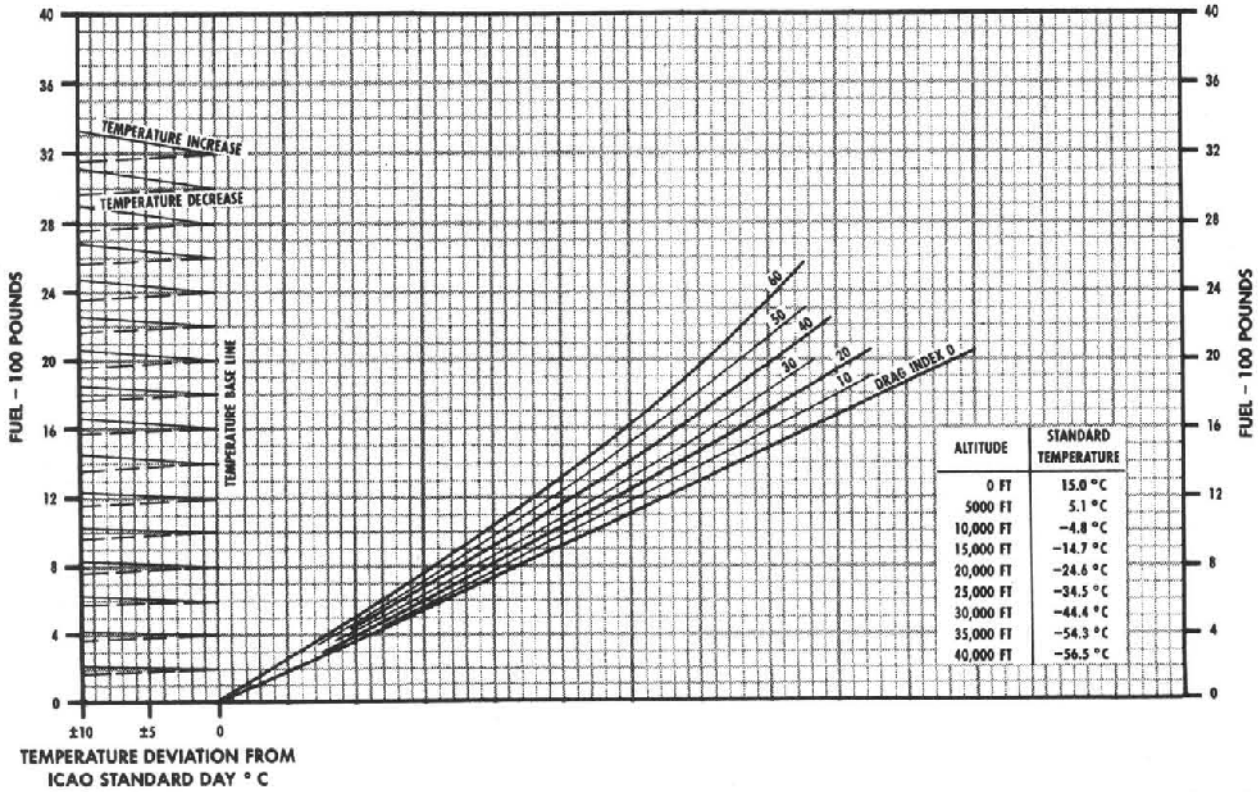
GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)





ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG-P321

Figure A3-10

MILITARY THRUST ALTERNATE CLIMB

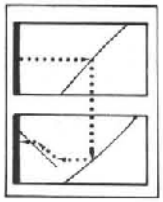
CONSTANT SPEED DISTANCE REQUIRED

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

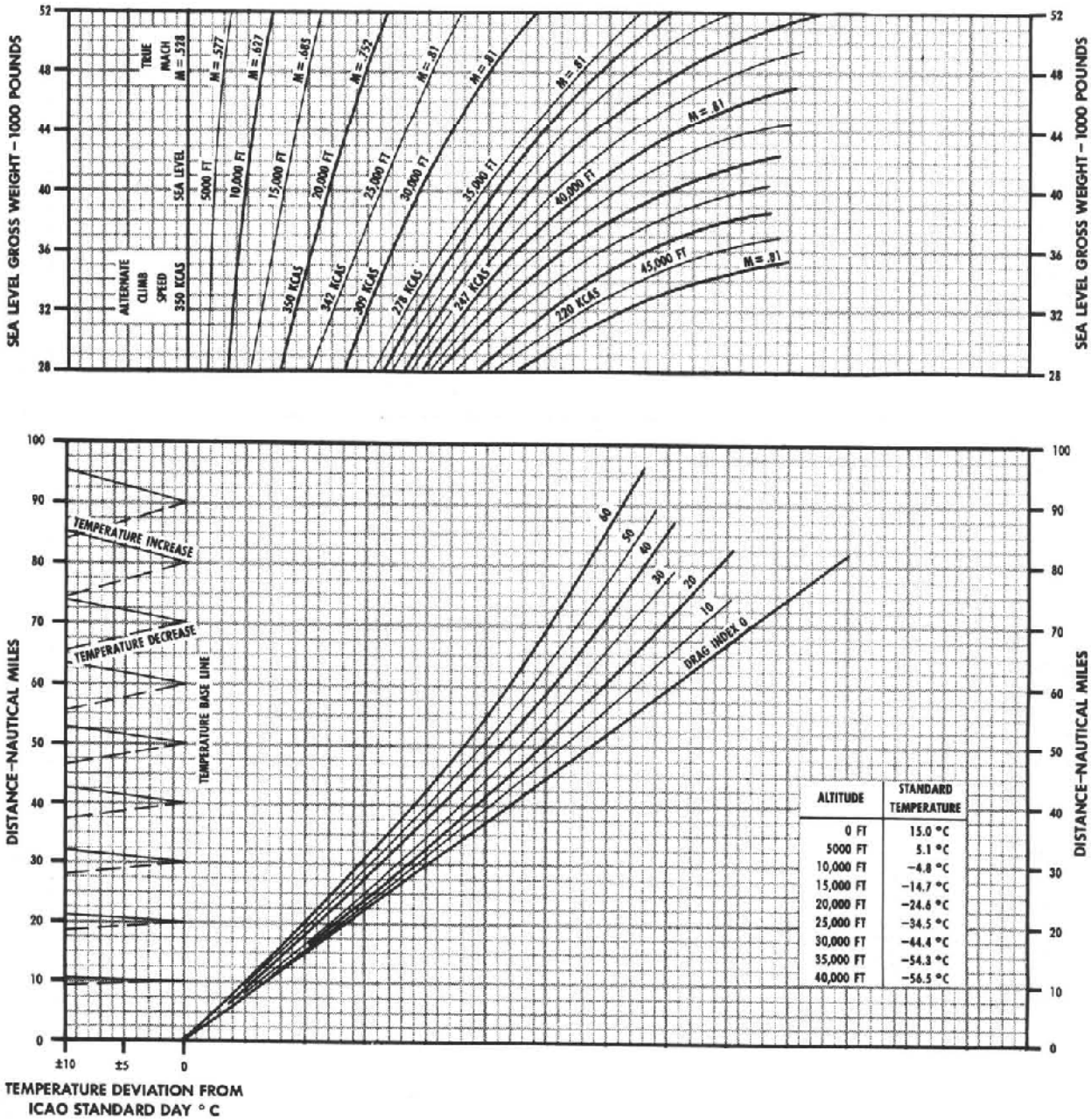
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
350 KNOTS CAS MAXIMUM OR MACH = .81

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG–P328

Figure A3-11

MILITARY THRUST CLIMB

SPEED

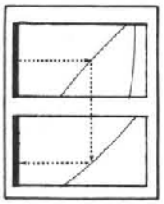
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

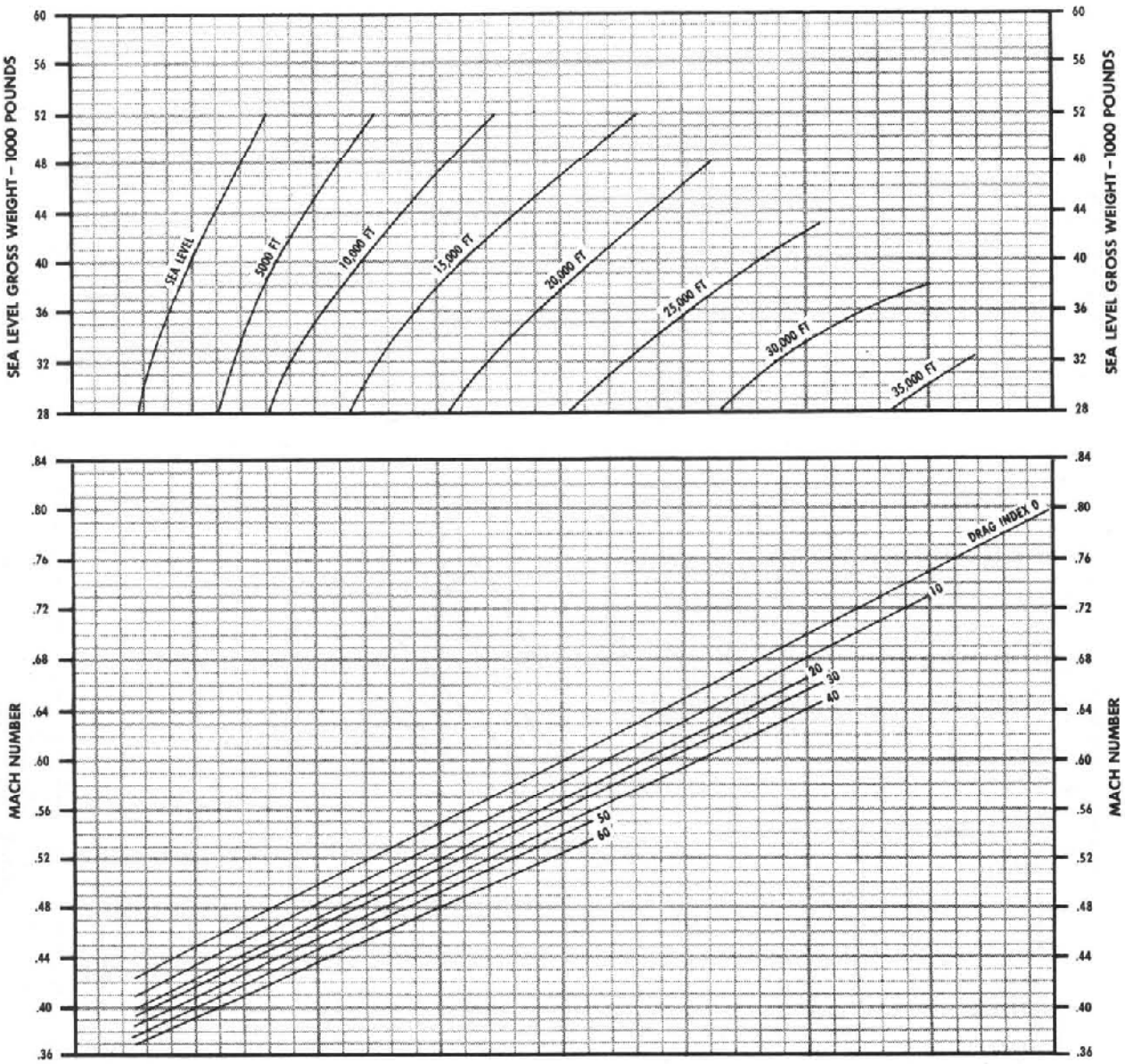
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P329

Figure A3-12

MILITARY THRUST CLIMB

TIME REQUIRED

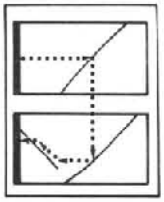
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-30

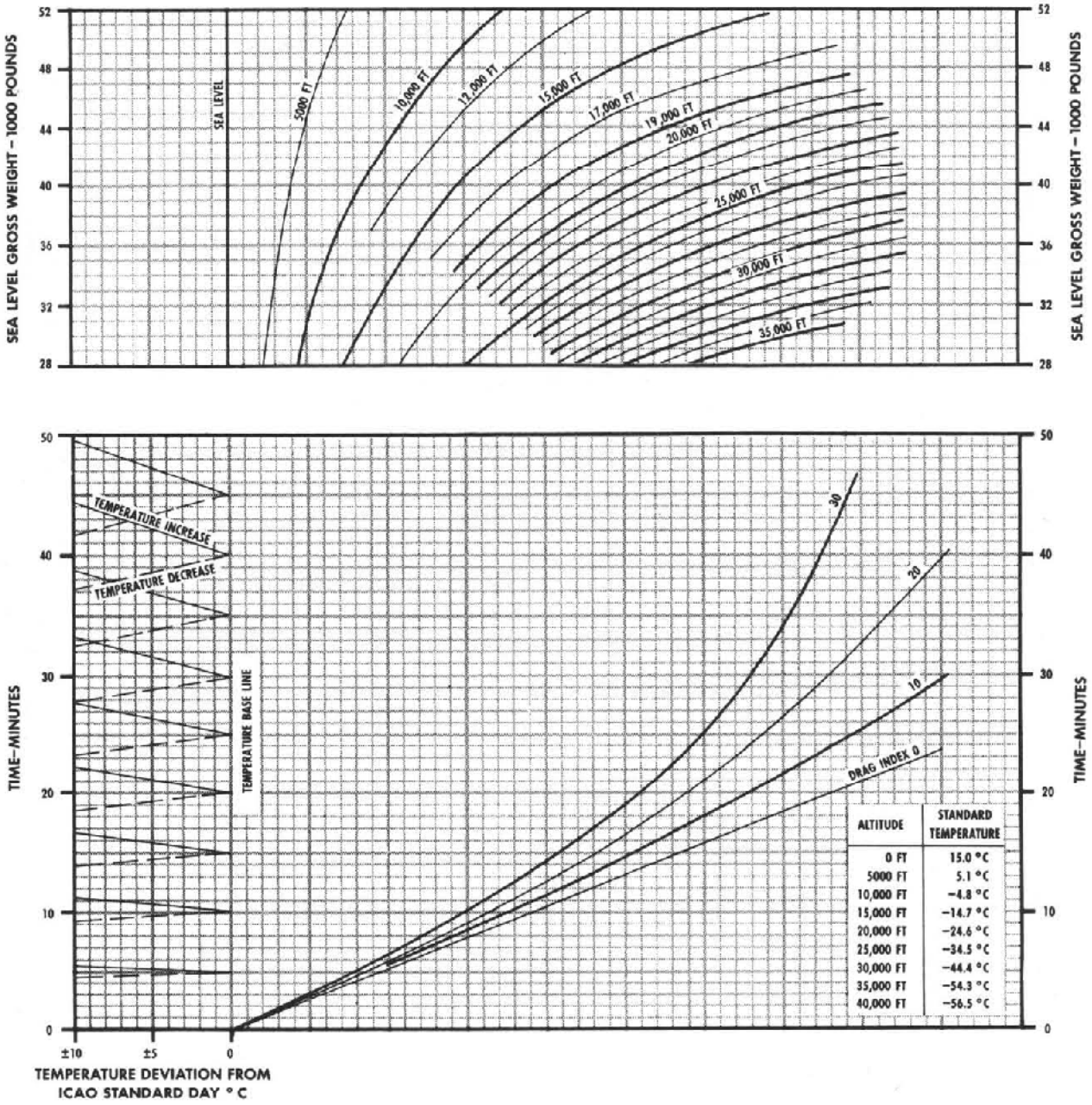
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG–P330

MILITARY THRUST CLIMB

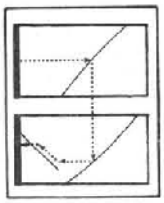
TIME REQUIRED
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
40-60

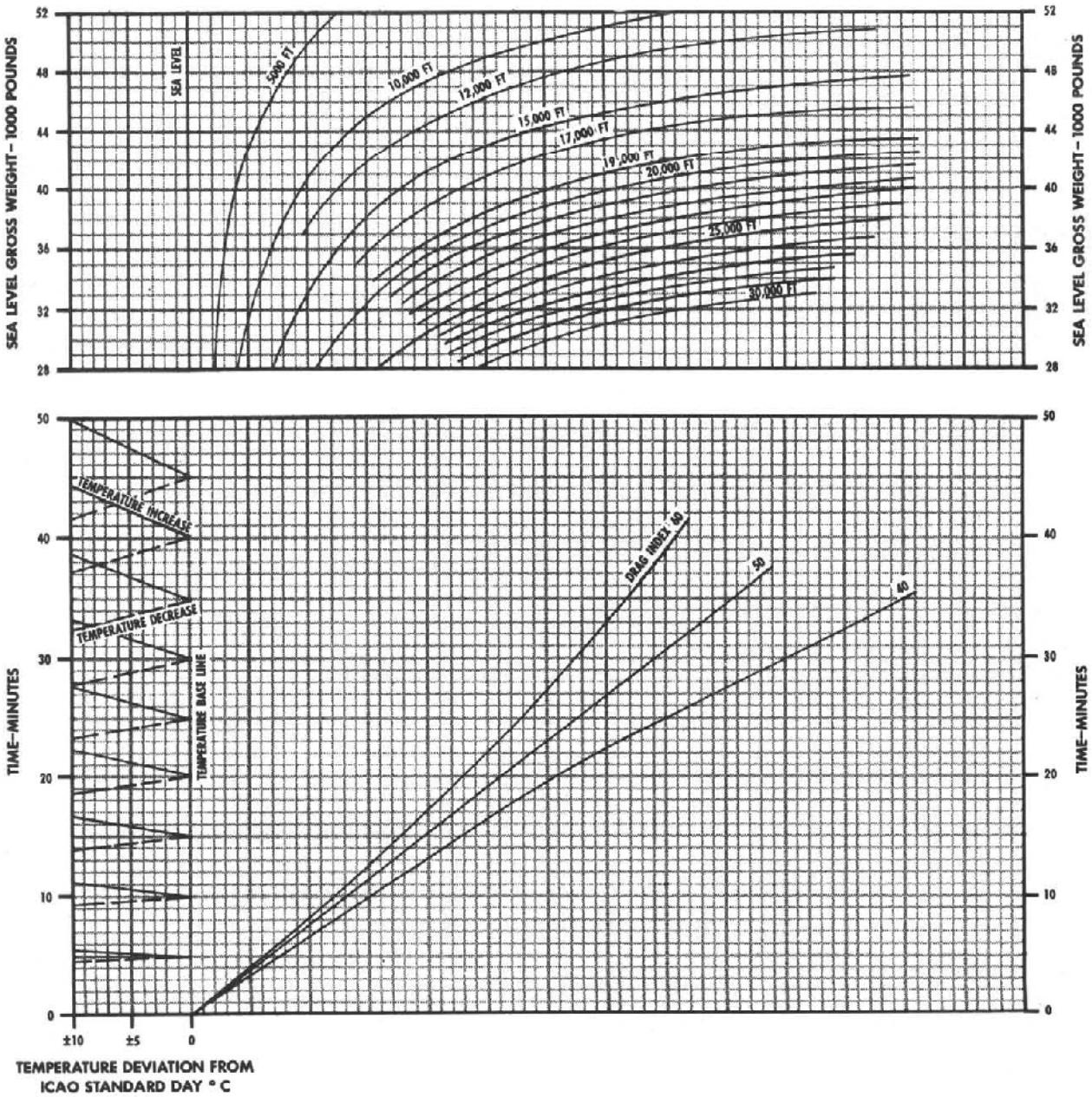
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



RFG–P331

MILITARY THRUST CLIMB

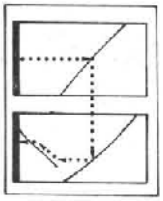
FUEL REQUIRED
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101 G OR RF-101 H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-30

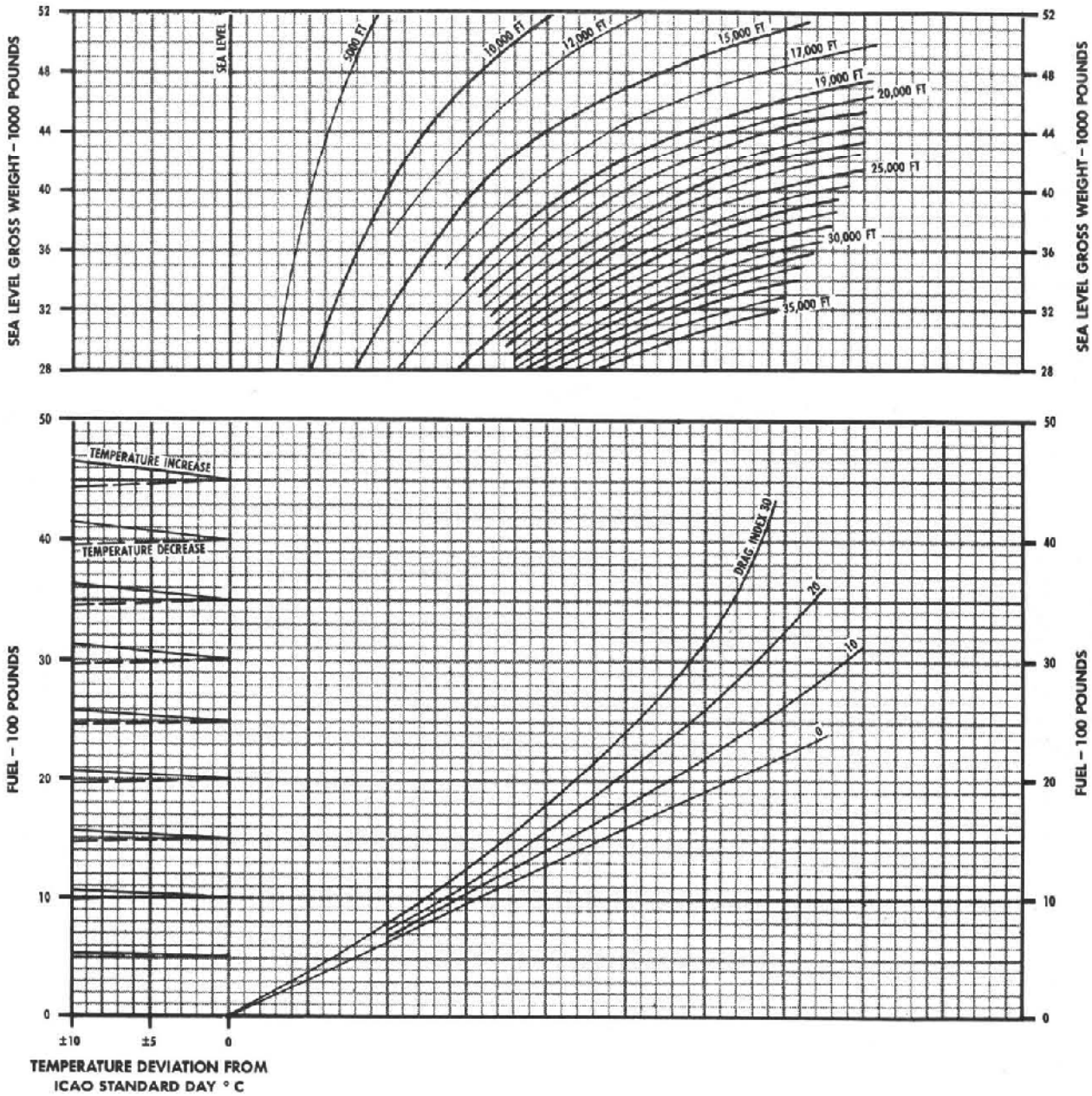
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



RFG–P332

MILITARY THRUST CLIMB

FUEL REQUIRED

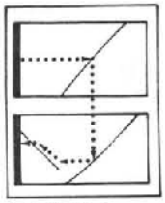
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101 G OR RF-101 H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
40-60

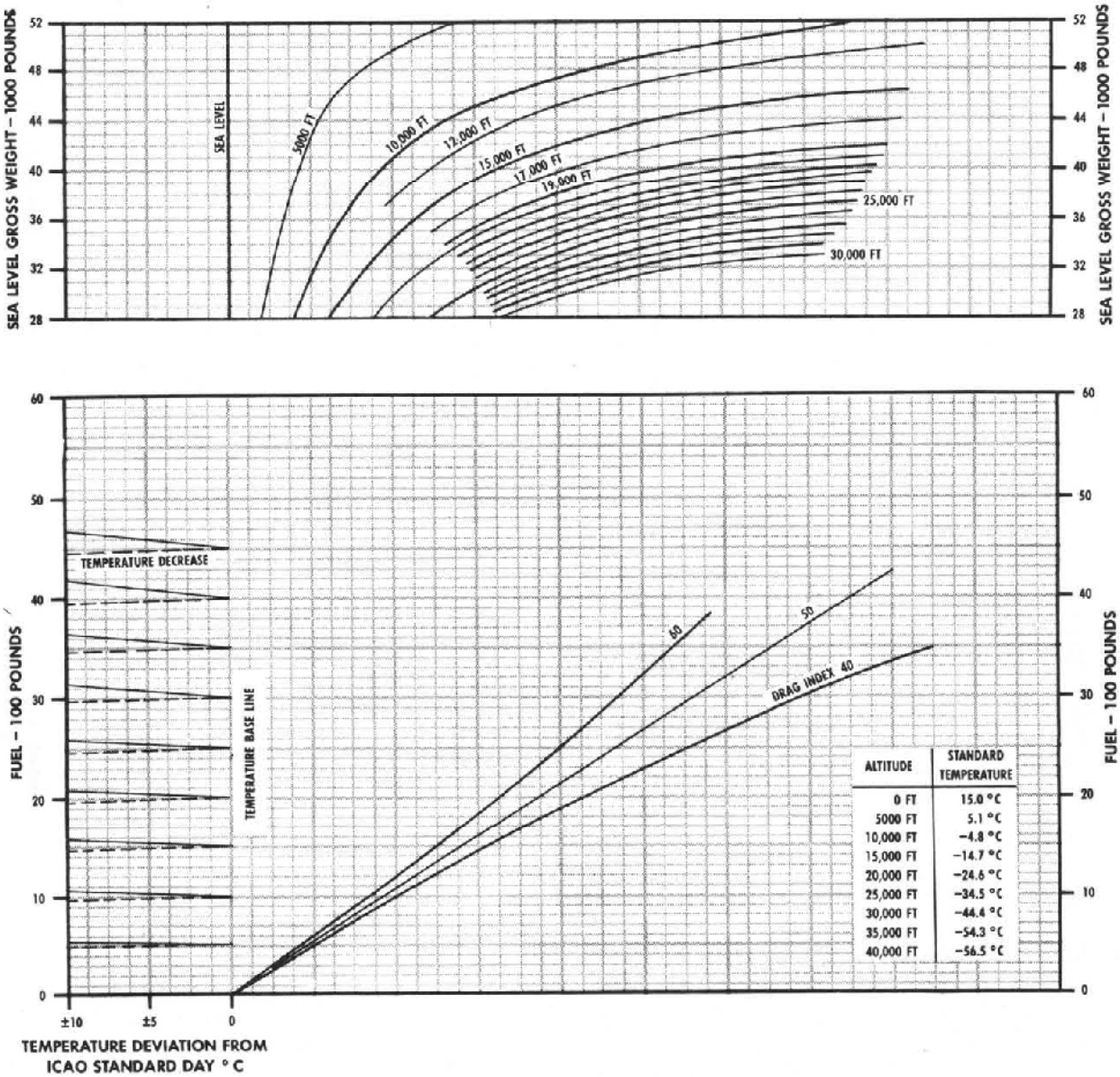
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)



ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

RFG–P333

MILITARY THRUST CLIMB

DISTANCE REQUIRED

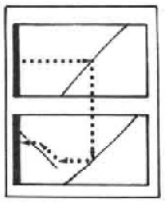
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-30

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



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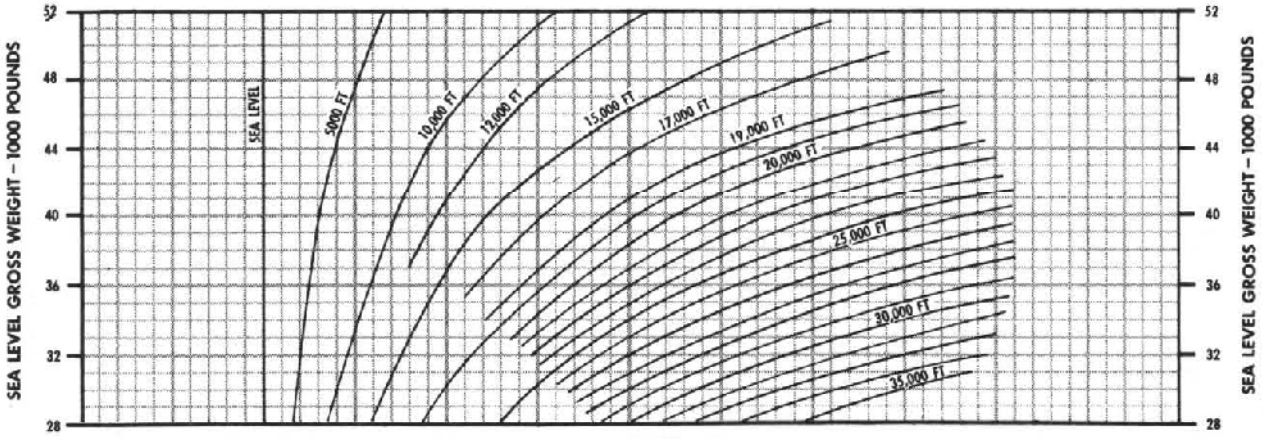
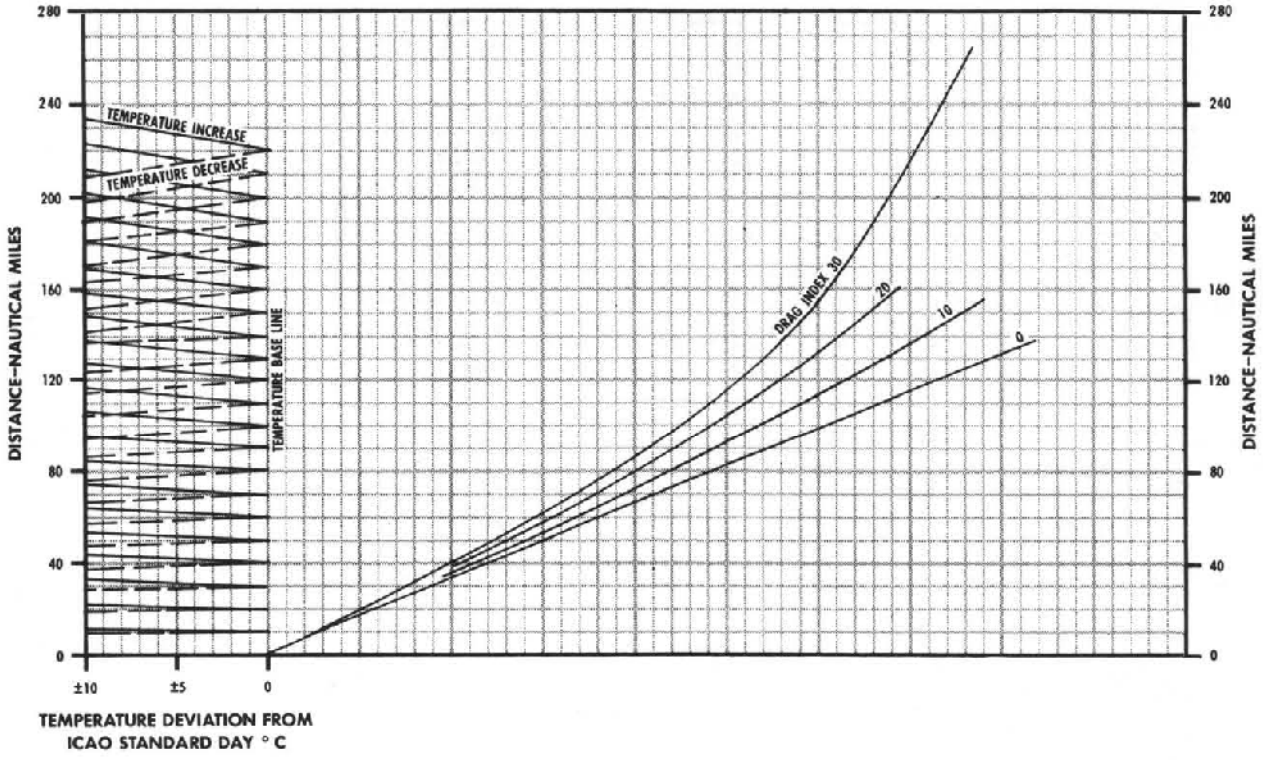
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFG–P334

MILITARY THRUST CLIMB

DISTANCE REQUIRED

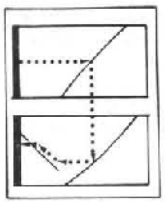
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101 G OR RF-101 H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
40-60

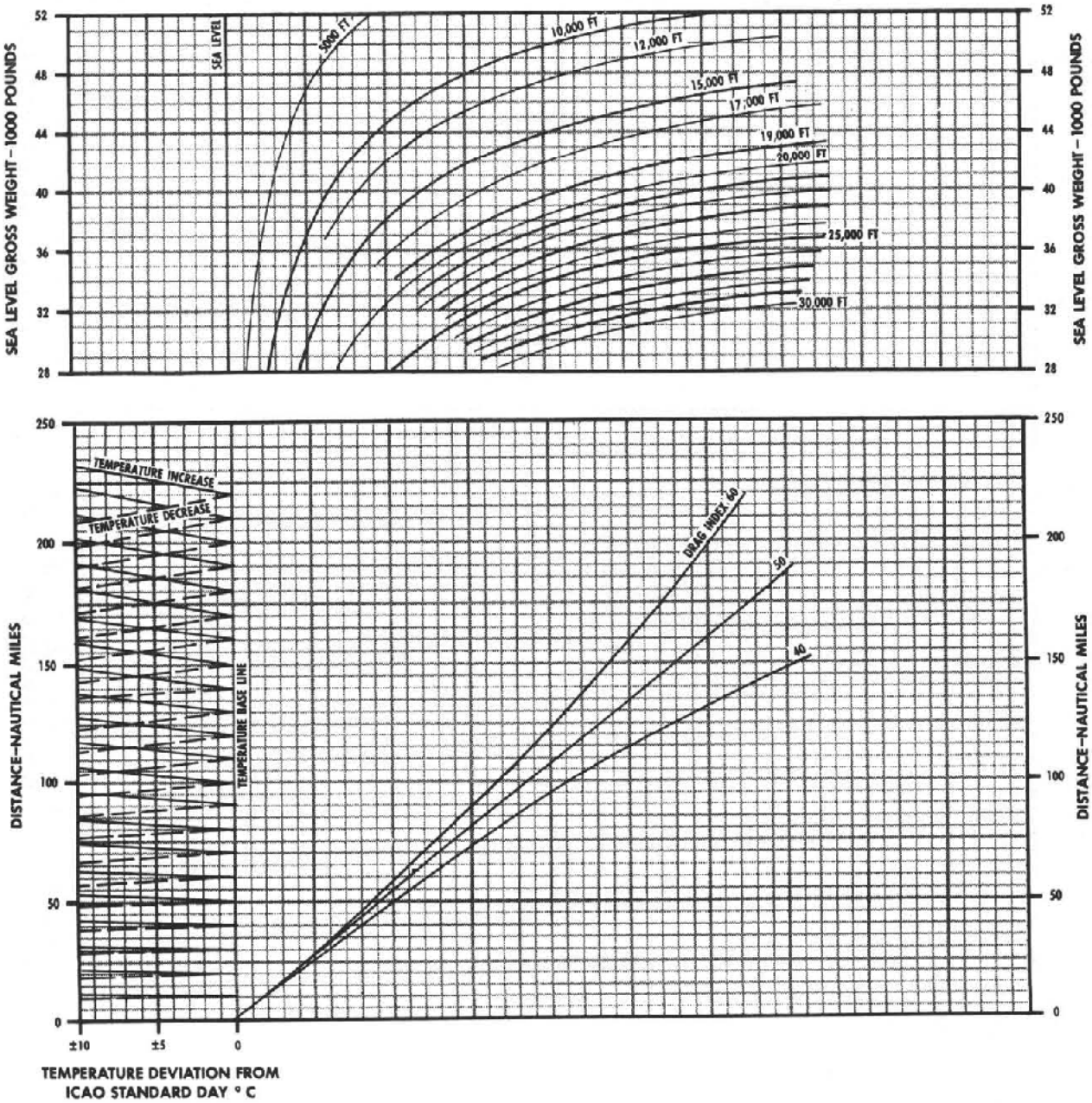
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG–P335

Figure A3-18

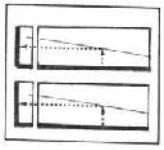
COMBAT CEILING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



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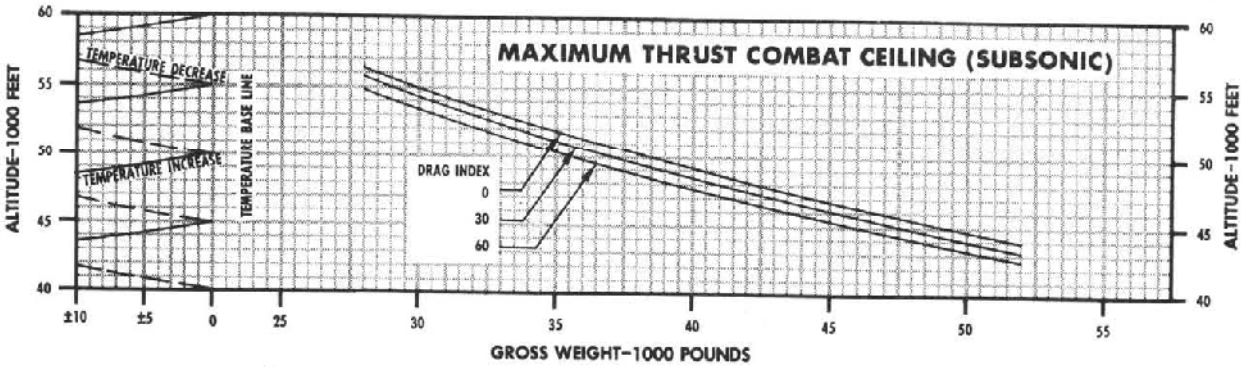
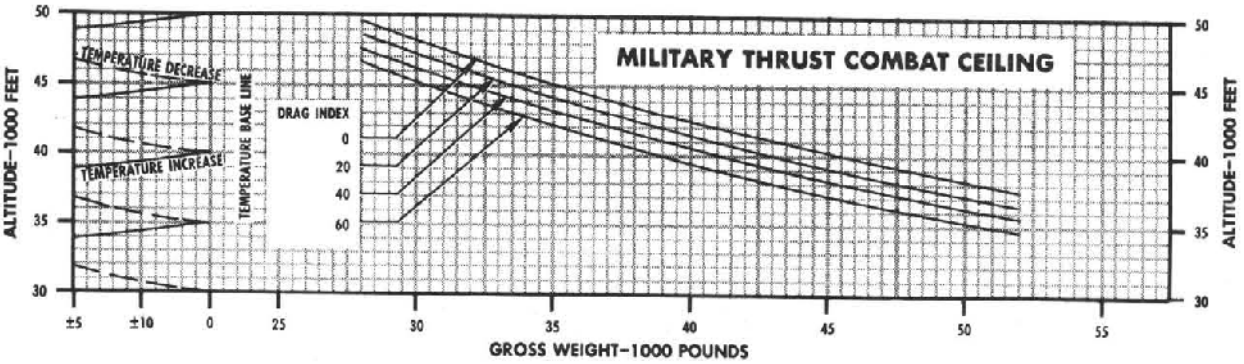
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFG-P336

Figure A3-19

Part 4
RANGE

TABLE OF CONTENTS

Charts

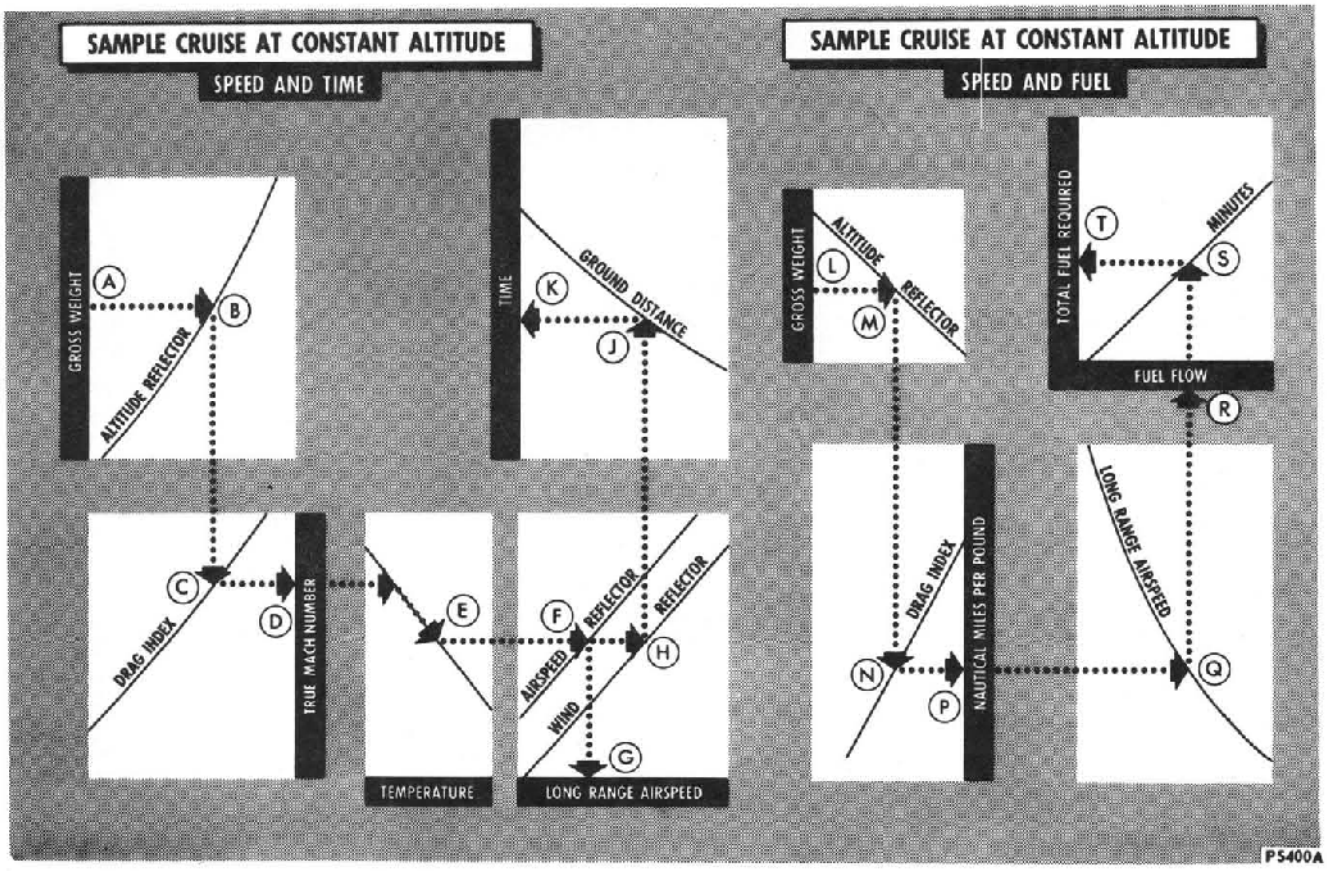
Optimum Cruise at Constant Altitude 4-4
Optimum Altitude for Short Range Cruise 4-8
Diversion Range Summary Table 4-9
Nautical Miles per Pound. 4-10

OPTIMUM CRUISE AT CONSTANT ALTITUDE

These charts present the necessary planning data to set up both two engine and single engine cruise schedules for a constant altitude. The recommended procedure is to use an average gross weight for a given leg of the mission. It is possible, however, to obtain instantaneous data if desired. The user must know the aircraft gross weight, the computed drag index, the cruise altitude, the forecast wind and the distance to be covered. It is then possible to obtain from the charts true Mach number, true airspeed, time enroute, nautical miles per pound, fuel flow and total fuel required. The data is based on long range speeds.

USE

Enter the appropriate chart, (Long Range Speed and Time, sheet 1) with the average gross weight, project horizontally to the right and intersect the applicable pressure altitude reflector. Project vertically downward to intersect the drag index, and then horizontally to the right to intersect and read true Mach number. The project horizontally further to the right to the temperature base line. Project parallel along the guide lines to intersect the vertical projection of the temperature. From this point, project horizontally to the right to intersect the true airspeed (zero wind) reflector, and the effective wind reflector. From the intersection with the true airspeed reflector, project vertically downward to intersect and read true airspeed. From the intersection with the wing reflector, project vertically upward to the applicable distance reflector. From this intersection, project horizontally to the left to intersect and read time. Enter the second half of the chart (Long Range Speed and Fuel, sheet 2) with the average gross weight, project horizontally to the right to the pressure altitude, vertically downward to the applicable drag index re-



flector, then horizontally to the right to intersect and read nautical miles per pound. From this point, continue horizontally to the right to intersect the applicable true airspeed reflector, then vertically upward to intersect and read fuel flow. Continue vertically upward to the intersect the applicable time reflector, then project horizontally to the left to intersect and read total fuel required.

SAMPLE PROBLEM

Two Engine Operation

A. Average Gross Weight for First Leg	40,000 Lbs.
B. Cruise Altitude	20,000 Ft.
C. Computed Drag Index	10.0
D. True Mach Number	0.74 Mach
E. Temperature at Flight Altitude	-24.6°C
F. True Airspeed Reflector	
G. True Airspeed	450 Knots
H. Tailwind	50 Knots
J. Distance	500 Miles
K. Time	60 Minutes
L. Average Gross Weight	40,000 Lbs.
M. Cruise Altitude	20,000 Ft.
N. Computed Drag Index	10.0
P. Specific Range	0.10 NMPP
Q. True Airspeed	450 Knots
R. Fuel Flow	2250 PPH/Eng.
S. Time Enroute	60 Minutes
T. Total Fuel Required	4500 Lbs.

OPTIMUM ALTITUDE FOR SHORT RANGE CRUISE

This chart (figure A4-3) provides the pilot with the optimum cruise altitude for missions involving relatively short ranges.

USE

Enter the chart with the computed drag index. Proceed upward to the desired range and then horizontally to the right to the climb base line. From the base line, proceed parallel to the guide lines to intercept a vertical line rising from the initial climb gross weight. From this intersection, proceed horizontally to the right to read the pressure altitude corresponding to the optimum short range cruise altitude. If the range exceeds 200 miles, obtain the optimum cruise altitude from the Combat Ceiling and Optimum Cruise Altitude chart, Part 3 of this appendix.

SAMPLE PROBLEM

A. Drag Index	30
B. Range	70 Miles
C. Initial Climb Gross Weight	40,000 Lbs.
D. Pressure Altitude	17,500 Ft.

DIVERSION RANGE SUMMARY TABLE

The diversion range summary table (figure A4-4) provides the pilot in an emergency low fuel state condition (1000 pounds remaining) with range and time enroute information corresponding to three alternate courses of action. The three courses of action include: (a) remain at initial altitude and proceed to base, (b) climb to optimum altitude, then descend on course to base, (c) descend on course to sea level and proceed at sea level to base. In terms of maximum range, it may be seen that it is more advantageous to climb to optimum altitude and then descend on course to base. However, weather or other extenuating circumstances may make one of the alternatives more desirable. All climbs are made at military thrust. All descents are made at idle thrust, 300 KCAS or Mach .85, whichever is less. The range shown is accomplished on 500 pounds of fuel, so that there will be 500 pounds remaining for landing. Cruise speeds may be found in the Optimum Cruise at Constant Altitude Charts.

USE

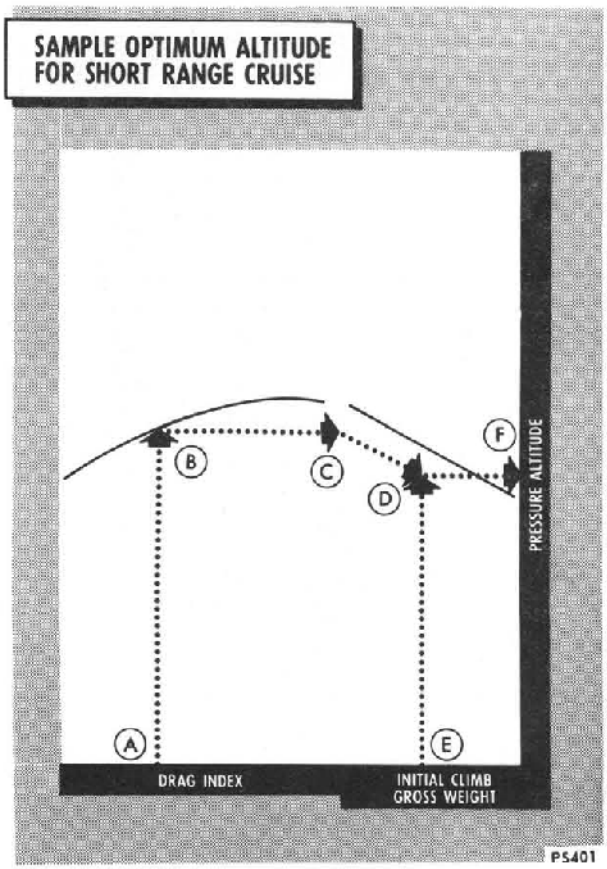
Enter the table at the initial altitude. Select the best course of action for the prevailing circumstances. Descend down the column corresponding to the initial altitude and read range in nautical miles and time in minutes. If the decision is made to climb, also read the optimum altitude.

SAMPLE PROBLEM

A. Initial Altitude	20,000 Ft.

Case I, Remain at Initial Altitude.

B. Range	36 Miles
C. Time to Base	5.5 Minutes
D. Time to Base and Descend	11 Minutes



Case II, Climb to Optimum Altitude

E. Optimum Altitude	30,000 Ft.
F. Range	73 Miles
G. Time	11 Minutes

Case III, Descend on Course to Sea Level.

H. Range	54 Miles
J. Time	10 Minutes

NAUTICAL MILES PER POUND CHART

Nautical miles per pound charts are provided for each drag index interval of 10 units for two engine operation, and 0 drag only for single engine operation. The charts graphically present cruise data throughout the gross weight/speed range of the airplane. Use the chart whose drag index is closest to that computed. If the computed drag falls halfway between two charts, use both charts and average the data. For single engine operation, use the single engine chart only. By entering the charts with the average airplane gross weight, true Mach number, and cruising altitude, it is possible to obtain true airspeed, fuel flow and nautical miles per pound for any speed desired. Maximum endurance data is also available on these charts.

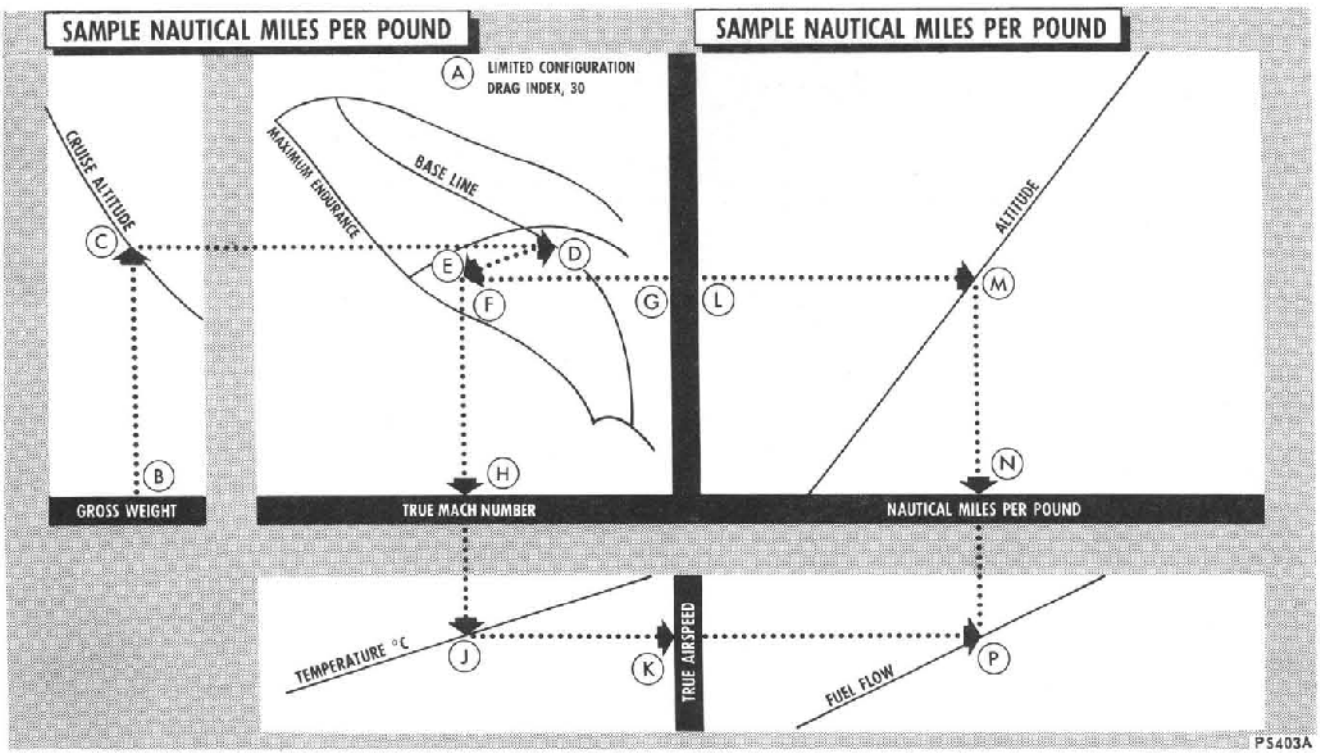
USE

Compute the airplane drag index and the average gross weight. Enter the first page of the chart, whose drag index is closest to the computed index, with the gross weight. Project vertically upward to the desired altitude reflector, then horizontally to the right to intersect the Long Range Speed base line. From this intersection, follow the contour of the closest guide line, right or left, to intersect the desired true Mach number. Then project horizontally to the right edge of the plot and note the position in relation to the alphabetically marked grid lines. From the Mach number, project vertically downward and intersect the forecast temperature for the flight. Then project horizontally to the right to intersect and read true airspeed. Enter the second page of the chart at the alphabetically marked grid and project horizontally to the right to the correct altitude. From this point, project vertically downward to intersect and read nautical miles per pound. Continue vertically downward to intersect the true airspeed line and read fuel flow.

SAMPLE PROBLEM

Two Engine Operation

A. Computed Drag Index	4
B. Average Gross Weight (first leg)	40,000 Lbs.
C. Cruise Altitude	20,000 Ft.
D. Intersect Base Line	
E. Proceed Parallel to Contour	
F. Intersect Desired Mach Line	0.70
G. Intersect Plot Edge Reference	
H. True Mach Number	0.70
J. Flight Level Temperature	-24.61°C
K. True Airspeed	430 Knots
L. Plot Edge Reference	
M. Altitude	20,000 Ft.
N. Specific Range	.083 NMPP
P. Fuel Flow	5200 PPH



OPTIMUM CRUISE AT CONSTANT ALTITUDE

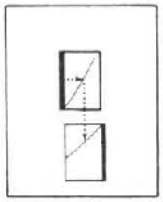
OPTIMUM CRUISE SPEED AND TIME

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

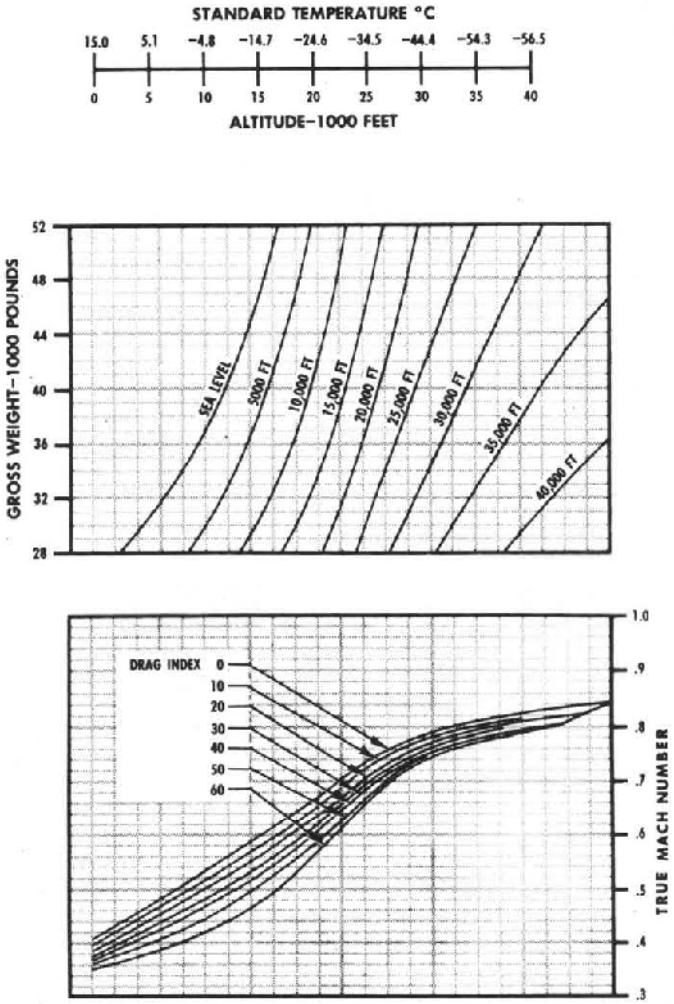
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RF -P401-1

Figure A4-1

OPTIMUM CRUISE AT CONSTANT ALTITUDE

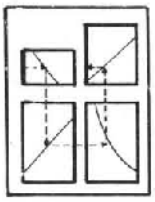
FUEL CONSUMPTION

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

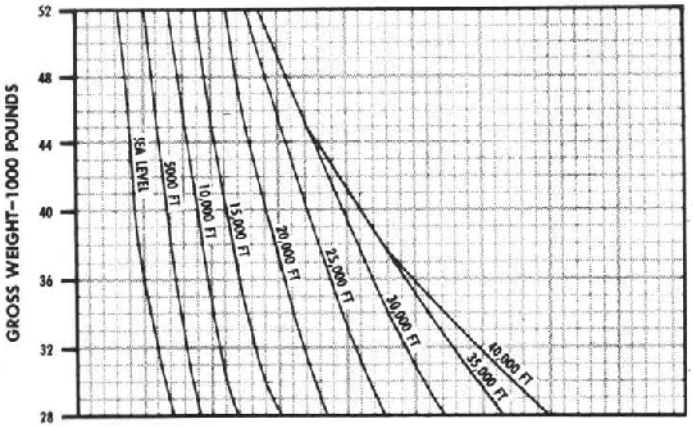
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

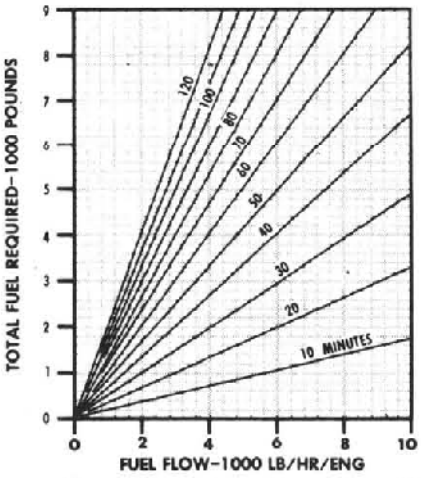
GUIDE

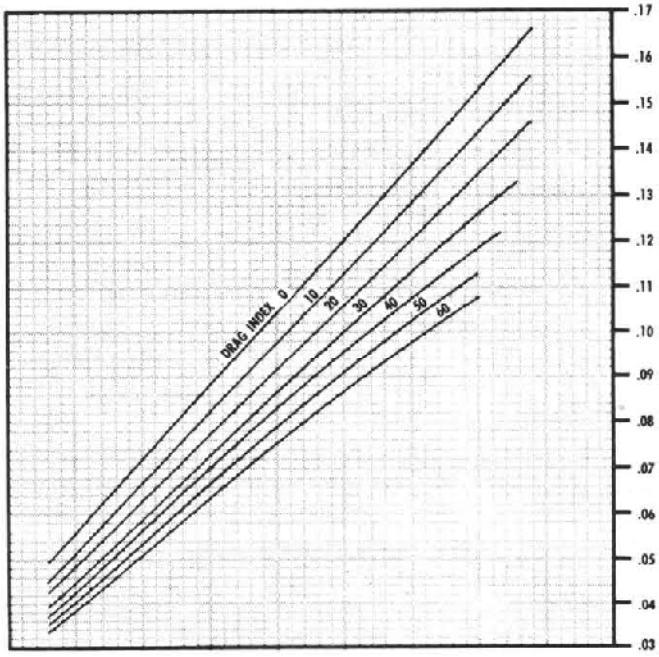


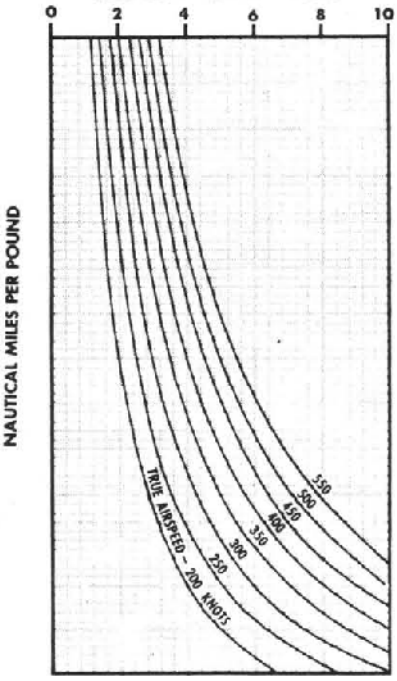
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)









RF -P401-2

OPTIMUM CRUISE AT CONSTANT ALTITUDE

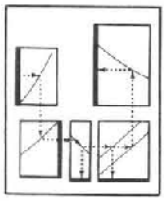
OPTIMUM CRUISE SPEED AND TIME
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-40

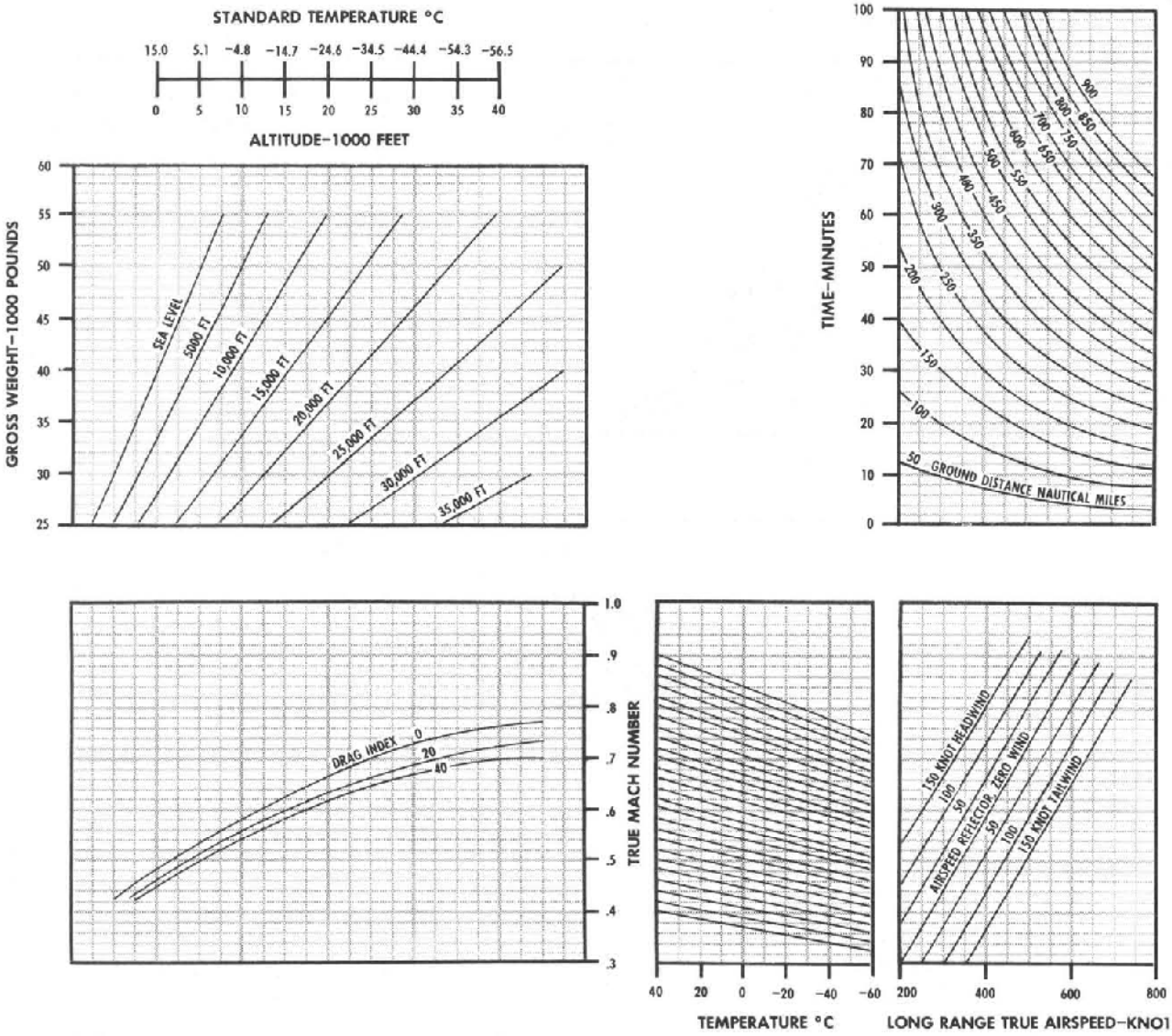
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
INOPERATIVE ENGINE WINDMILLING

GUIDE



DATE: 1 JANUARY 1966
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



REG-P411-1
Figure A4-2

OPTIMUM CRUISE AT CONSTANT ALTITUDE

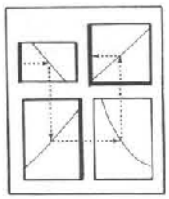
FUEL CONSUMPTION
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-40

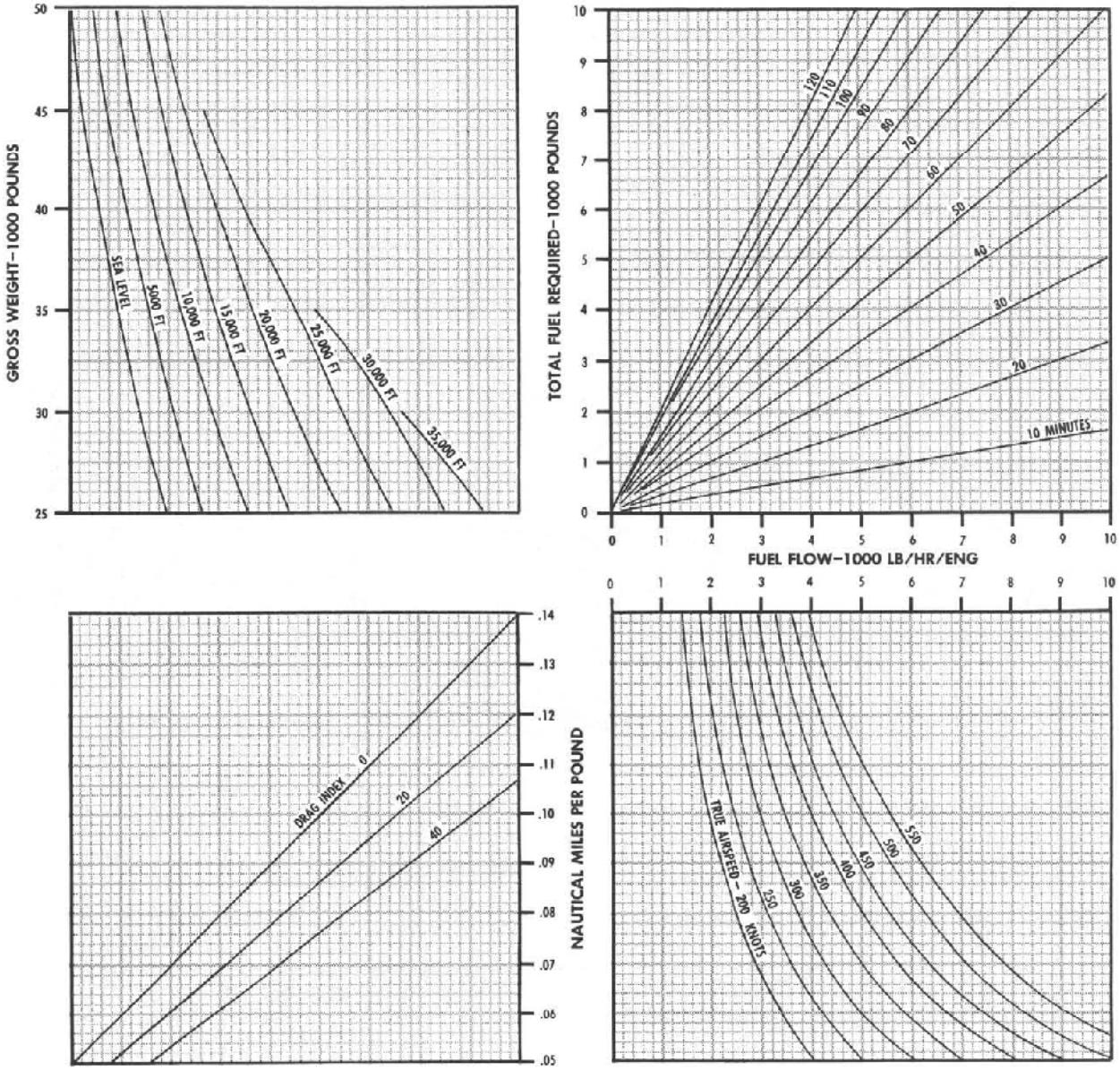
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
INOPERATIVE ENGINE WINDMILLING

GUIDE



DATE: 1 JANUARY 1966
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P411-2

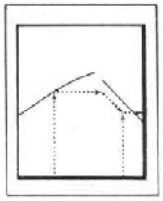
OPTIMUM ALTITUDE FOR SHORT RANGE CRUISE

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

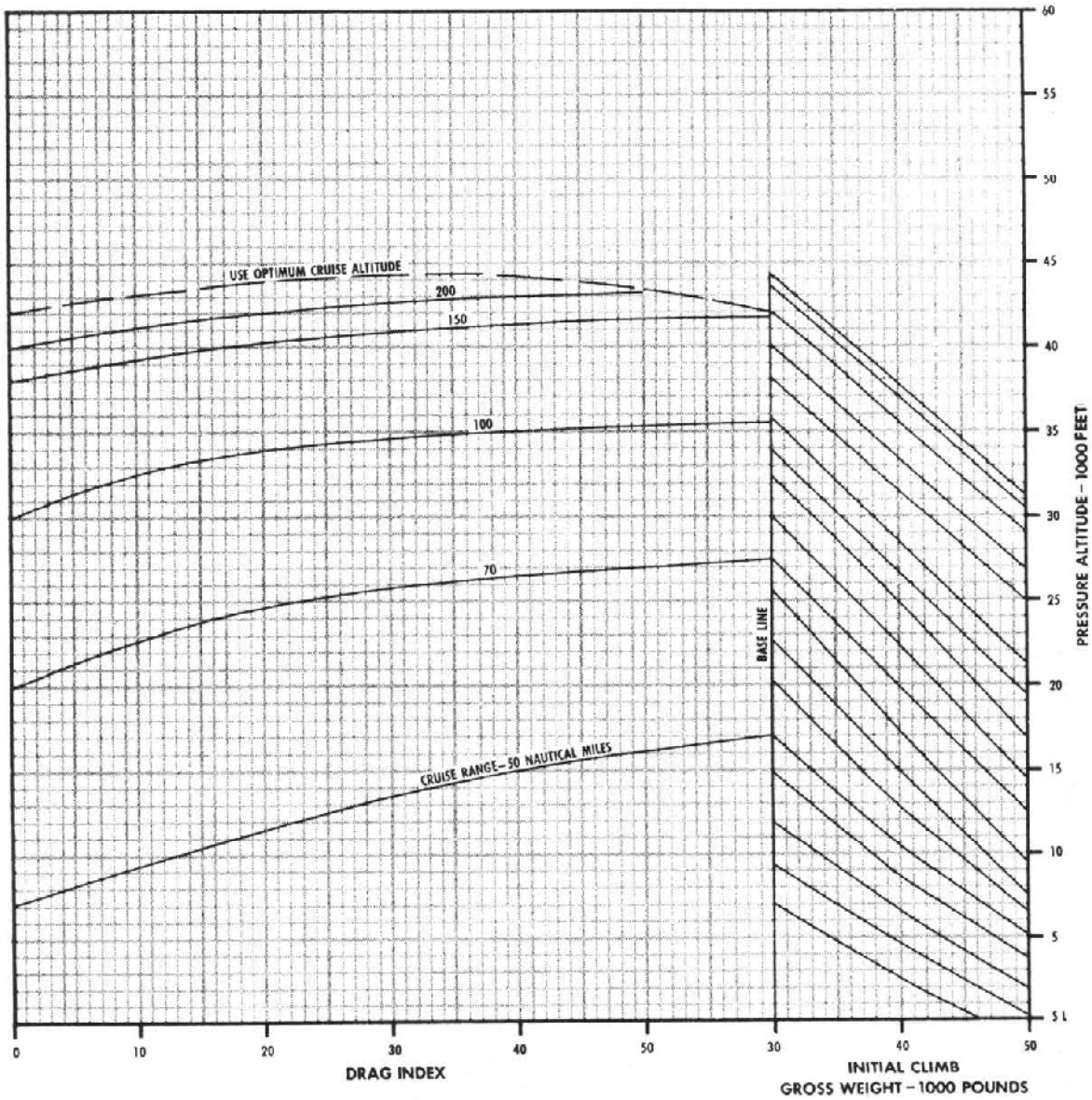
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB./GAL

DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)



RF -P402

Figure A4-3

DIVERSION RANGE SUMMARY TABLE

1000 POUNDS FUEL REMAINING NO WIND

AIRPLANE CONFIGURATION
RF-101 G OR RF-101H
ALL CONFIGURATIONS

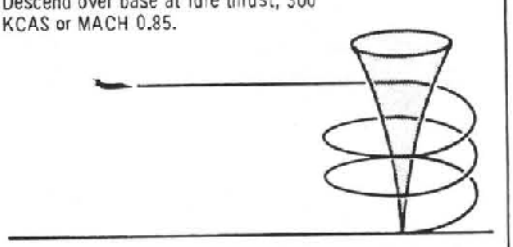
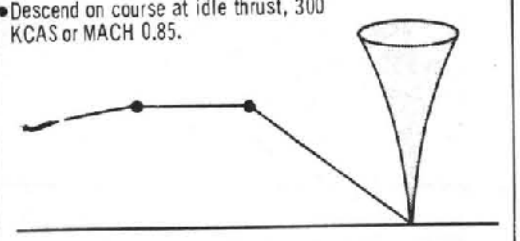
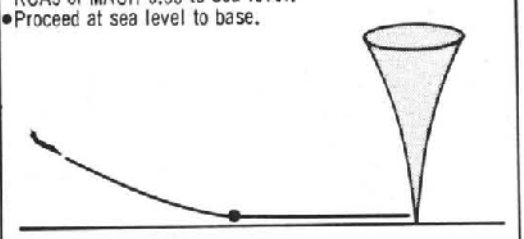
DRAG INDEX
0

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

DATE: 1 JULY 1964
DATA BASIS: FLIGHT TEST

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

RANGE AND TIME ENROUTE —— 500 POUND RESERVE AT SEA LEVEL

INITIAL ALT 1000 FEET		SL	5	10	15	20	25	30	35	40	COURSE OF ACTION
RANGE NAUTICAL MILES	NOTE 1	31	32	33	35	36	37	38	38	37	•Constant altitude cruise at initial altitude to base. •Descend over base at idle thrust, 300 KCAS or MACH 0.85.
TIME MINUTES	NOTE 1	6	6	5.5	5.5	5.5	5	5	5	5	
	NOTE 2	6	7	8.5	9.5	11	11.5	13	14	15	
OPTIMUM ALT 1000 FEET		15	15	25	30	30	35	35	35	40	•Military thrust climb to optimum altitude. •Constant altitude cruise at optimum altitude. •Descend on course at idle thrust, 300 KCAS or MACH 0.85.
RANGE NAUTICAL MILES	NOTE 3	38	43	55	62	73	82	90	99	106	
TIME MINUTES		7	7	8	9.5	11	12.5	13	14	15	
RANGE NAUTICAL MILES	NOTE 3	31	36	42	48	54	61	70	78	85	•Descend on course at idle thrust, 300 KCAS or MACH 0.85 to sea level. •Proceed at sea level to base.
TIME MINUTES		6	7.3	8.2	9.2	10.0	10.9	12.0	12.9	13.5	

Notes

1. NO CREDIT ALLOWED FOR DESCENT TIME, FUEL OR DISTANCE.
2. CREDIT ALLOWED FOR DESCENT TIME AND FUEL ONLY.
3. ALL CREDIT ALLOWED FOR TIME FUEL AND DISTANCE TO CLIMB ON COURSE TO OPTIMUM ALTITUDE, AND / OR TO DESCEND ON COURSE TO BASE.

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Figure A4-4

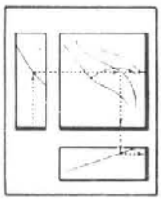
NAUTICAL MILES PER POUND

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
LIMITED CONFIGURATIONS

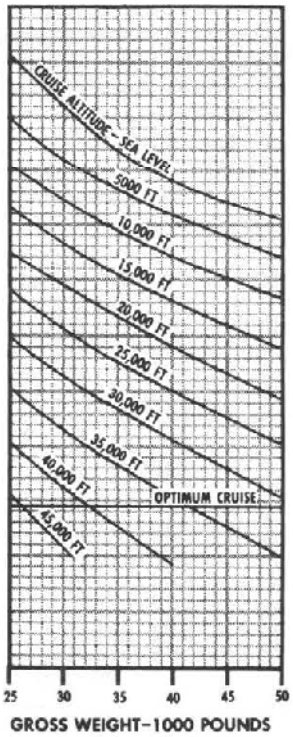
DRAG INDEX
0

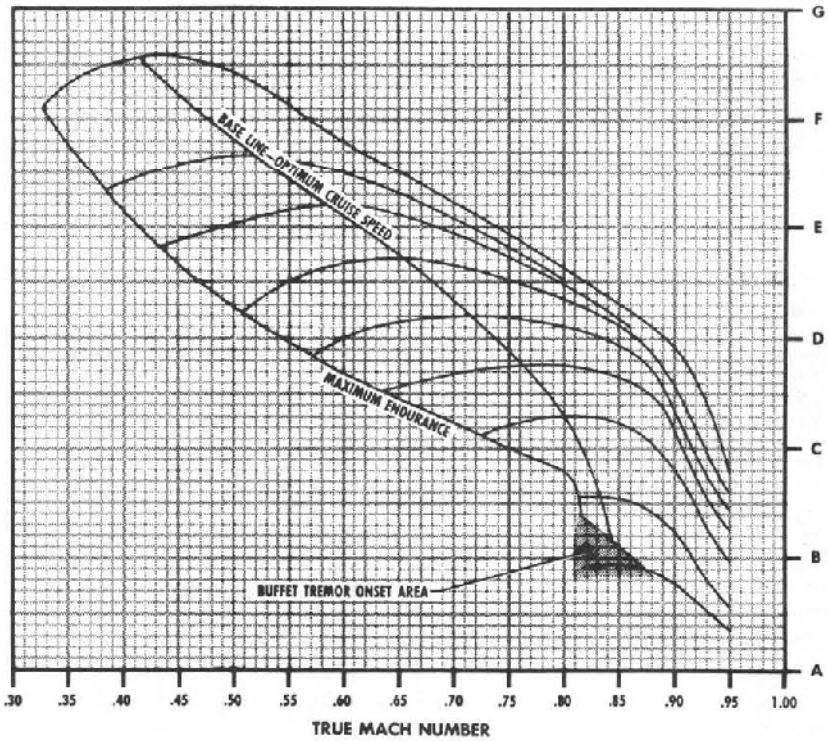
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE

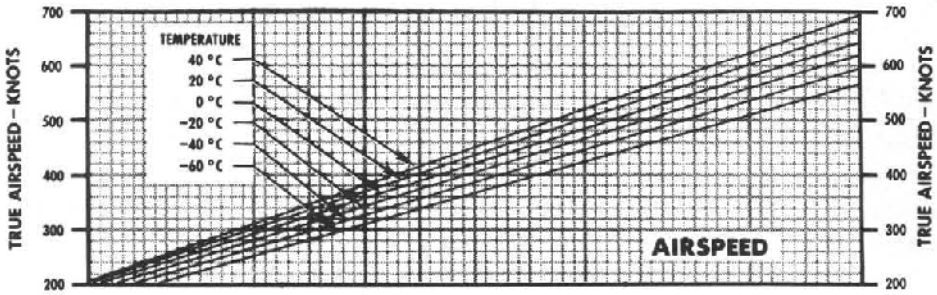


DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)





ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

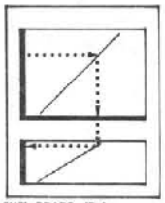


RFG-P403-1

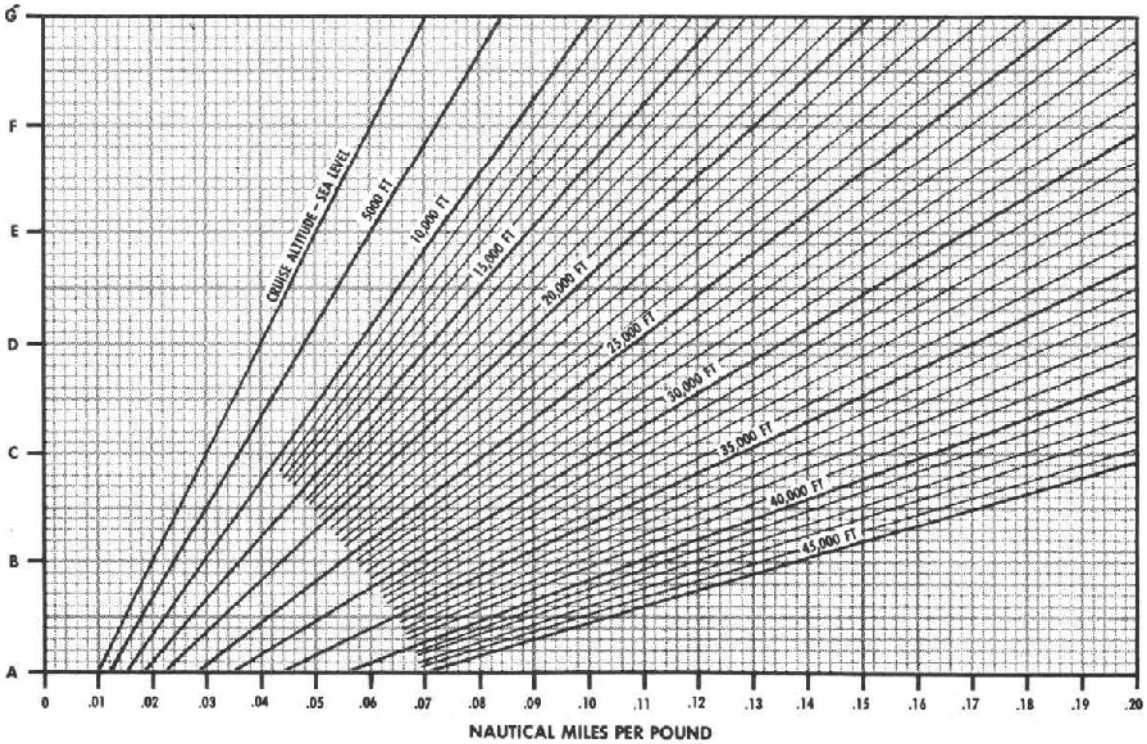
Figure A4-5

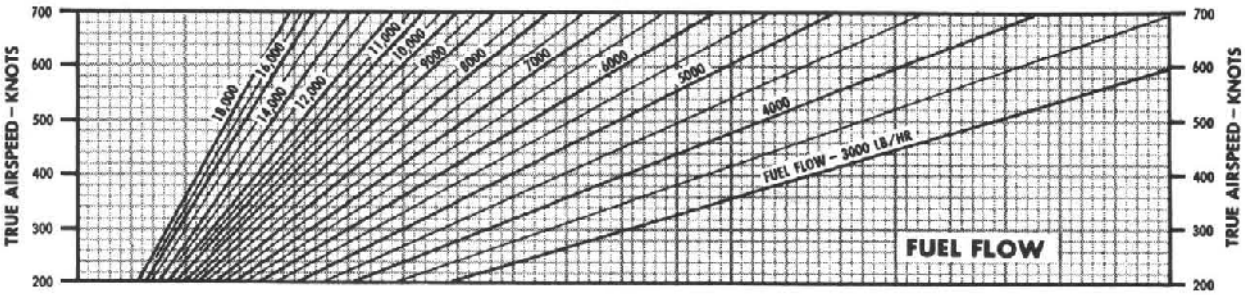
NAUTICAL MILES PER POUND

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFA/C20-P403-2

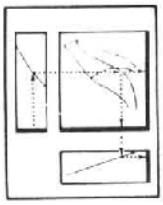
NAUTICAL MILES PER POUND

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
LIMITED CONFIGURATIONS

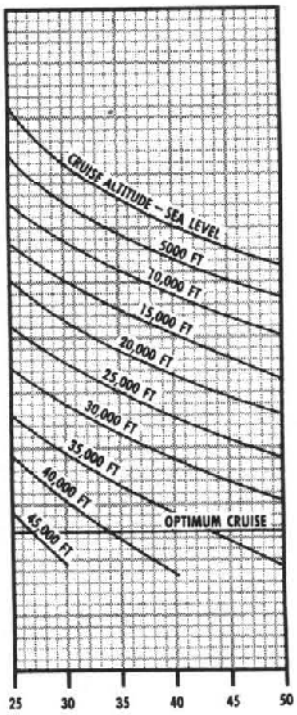
DRAG INDEX
10

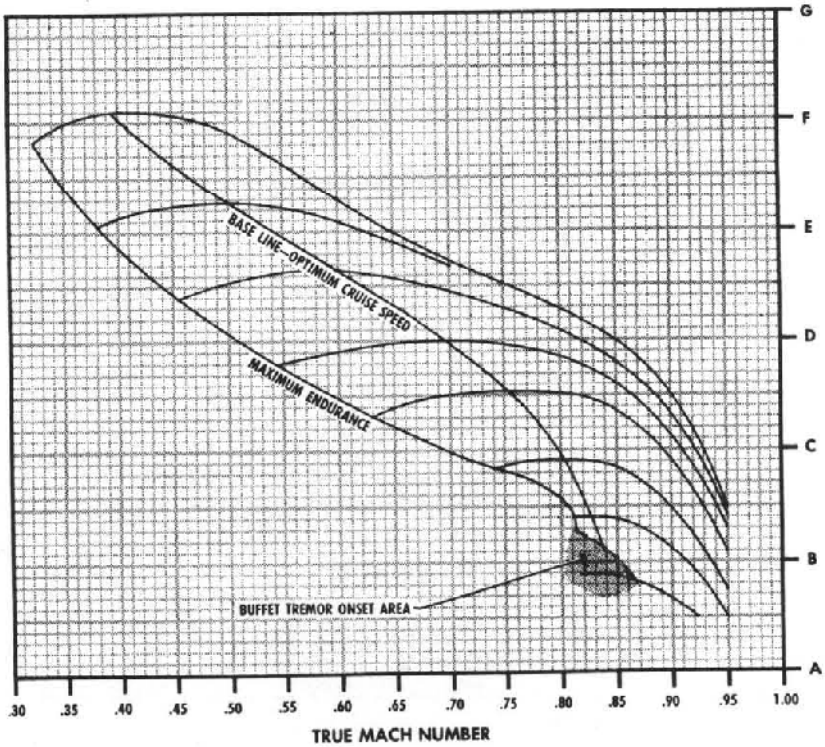
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)





ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

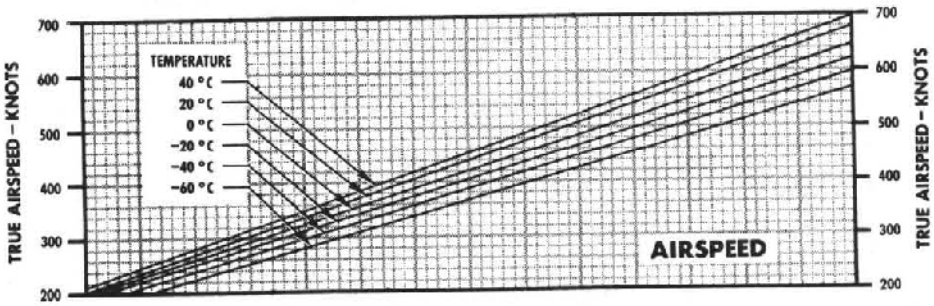


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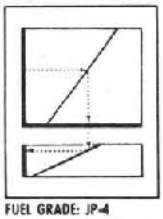
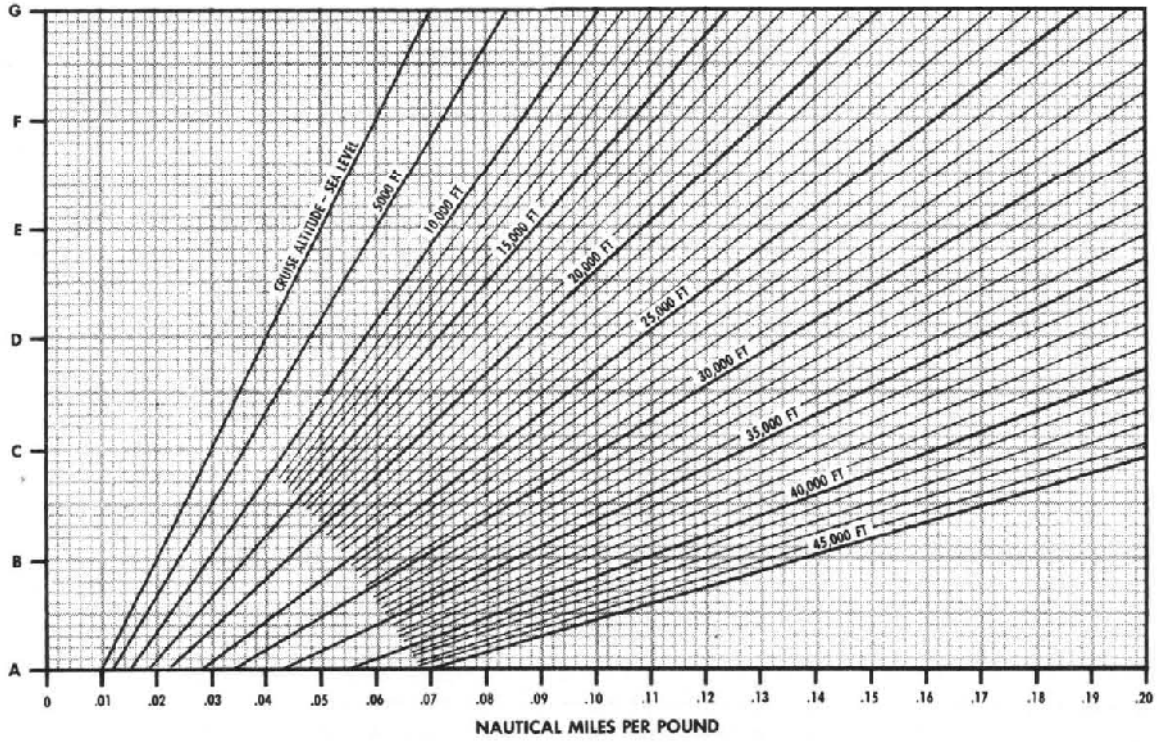
Figure A4-6

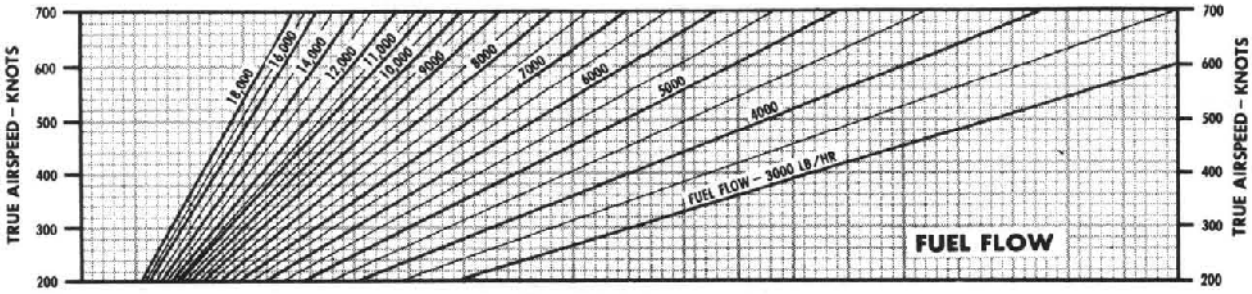
NAUTICAL MILES PER POUND

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFA/C20-P404-2

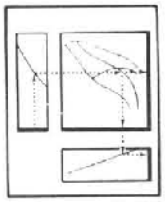
NAUTICAL MILES PER POUND

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
LIMITED CONFIGURATIONS

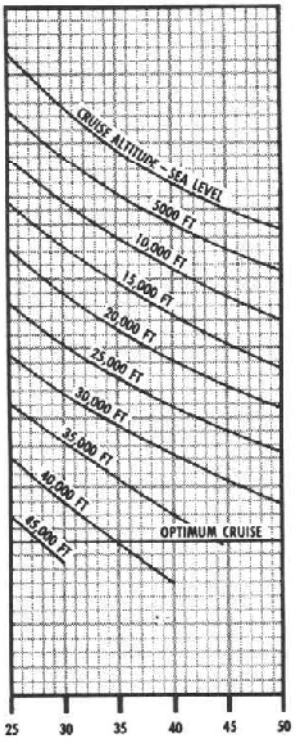
DRAG INDEX
20

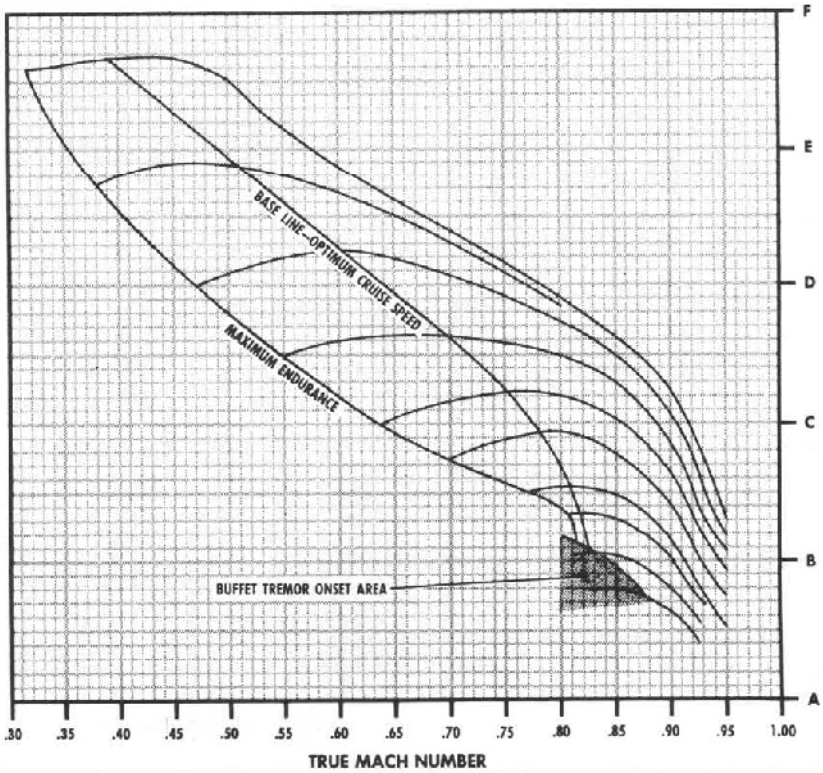
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE

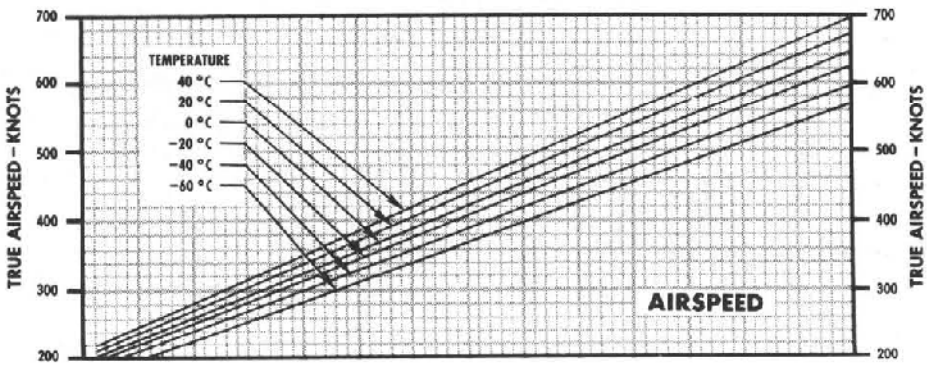


DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)





ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

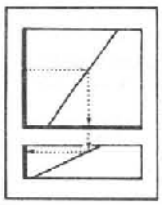


RFG-P405-1

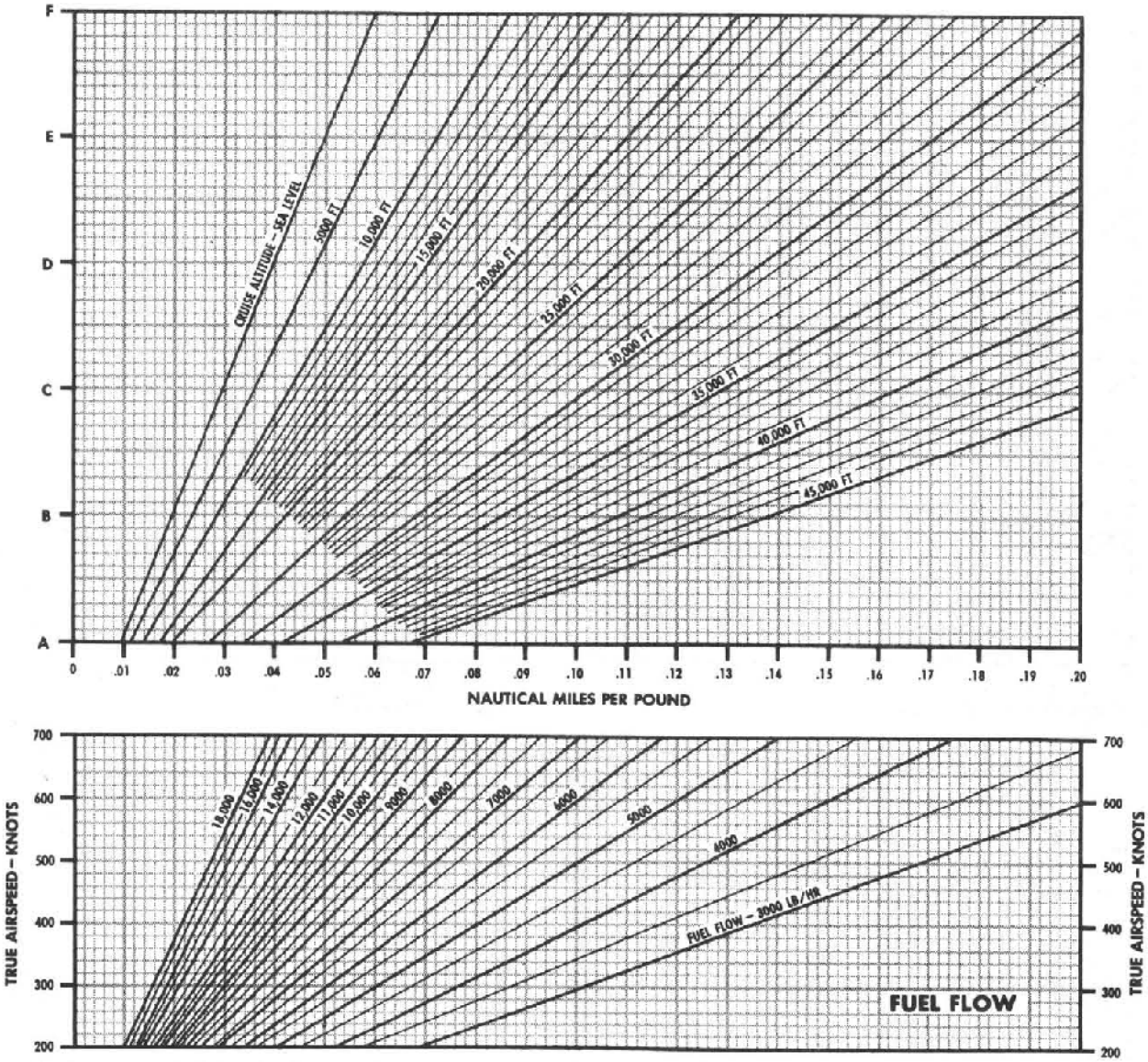
Figure A4-7

NAUTICAL MILES PER POUND

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



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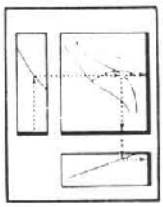
NAUTICAL MILES PER POUND

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
LIMITED CONFIGURATIONS

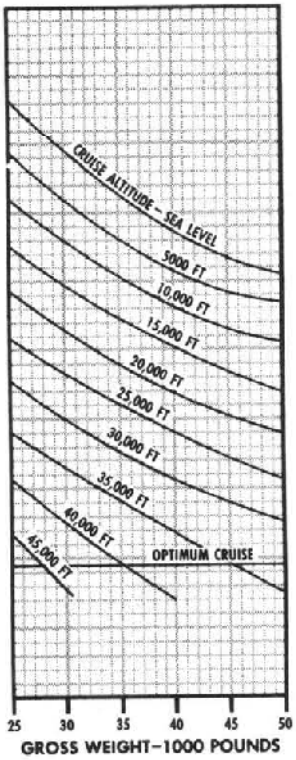
DRAG INDEX
30

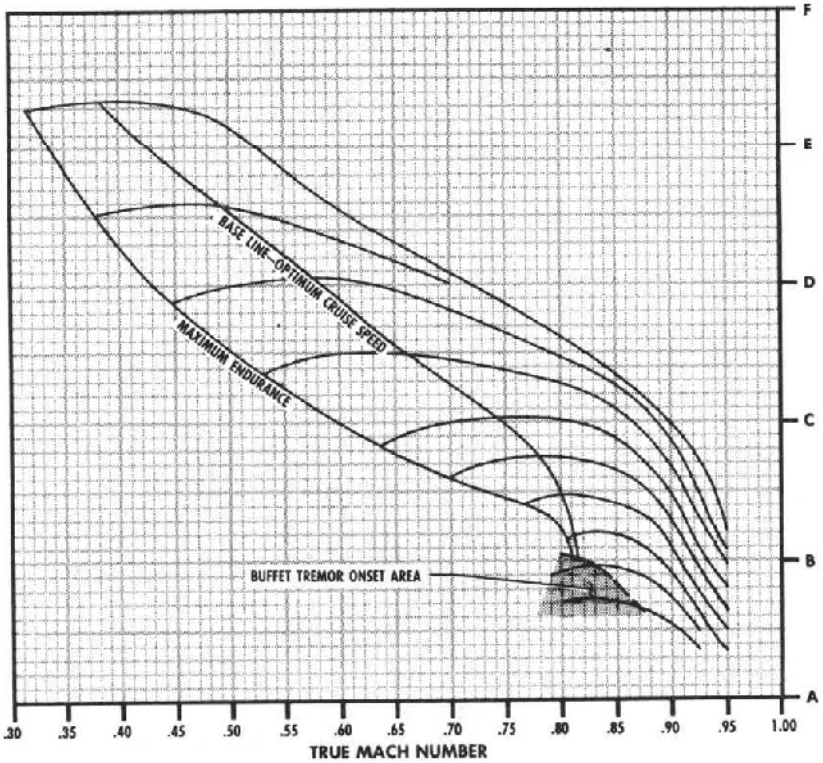
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE

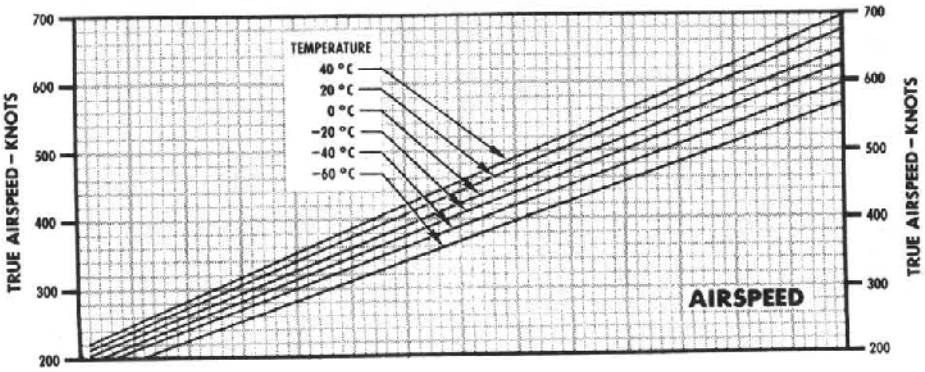


DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)





ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

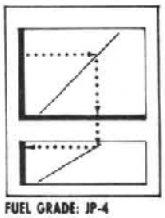


RFG–P406–1

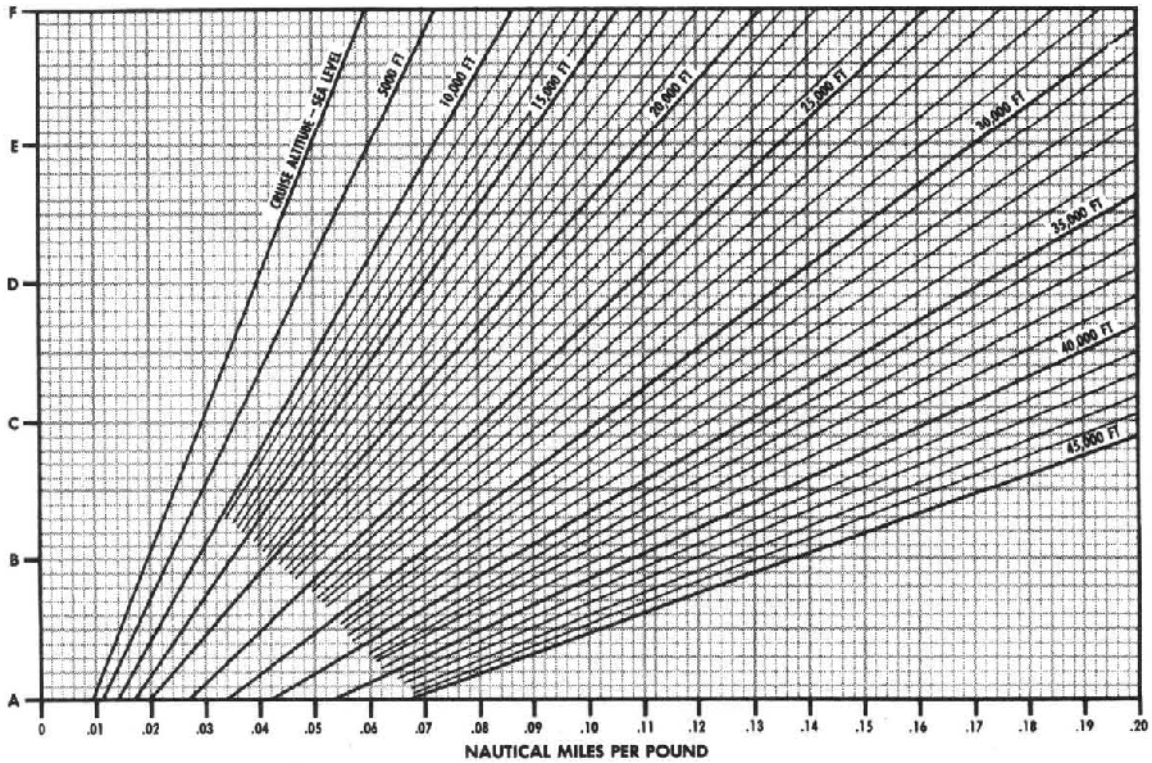
Figure A4-8

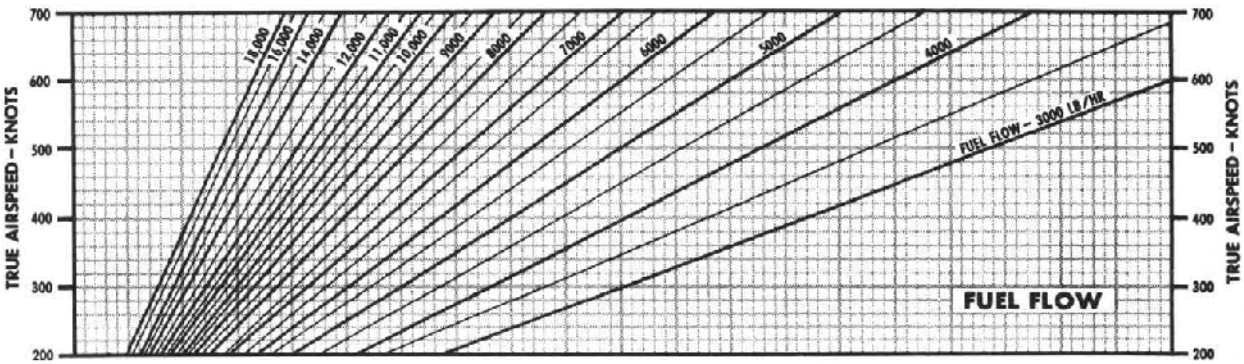
NAUTICAL MILES PER POUND

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFA/C20-P406-2

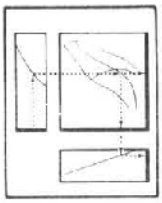
NAUTICAL MILES PER POUND

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
LIMITED CONFIGURATIONS

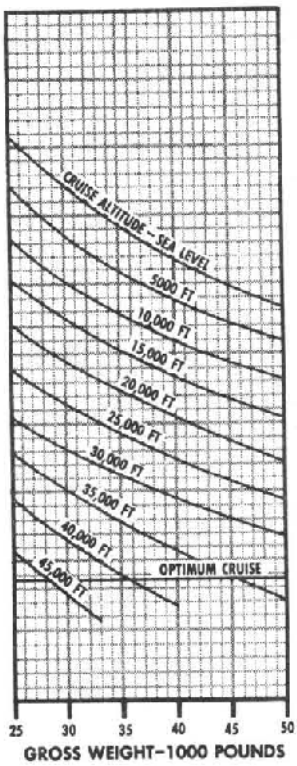
DRAG INDEX
40

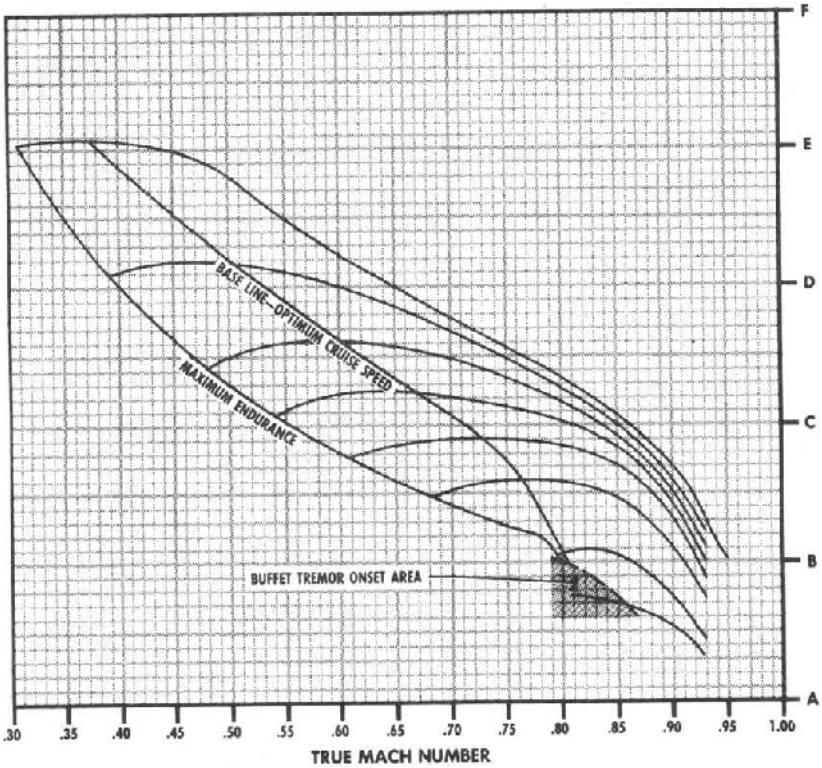
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE

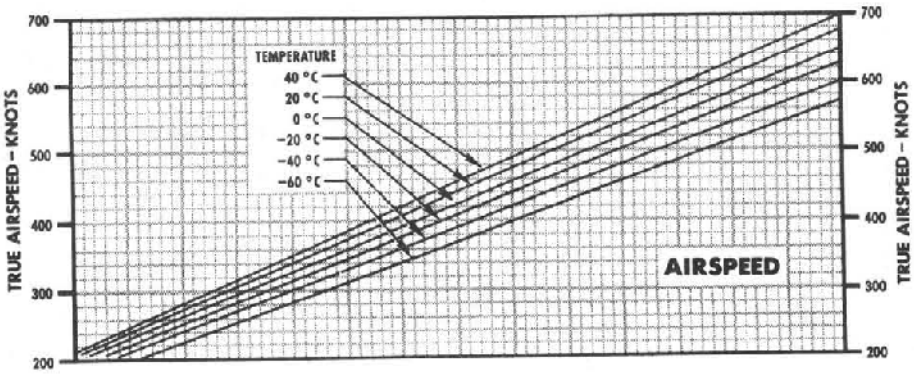


DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)





ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C



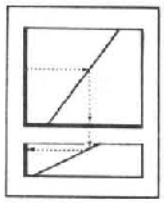
UNCLASSIFIED

RFG–P407–1

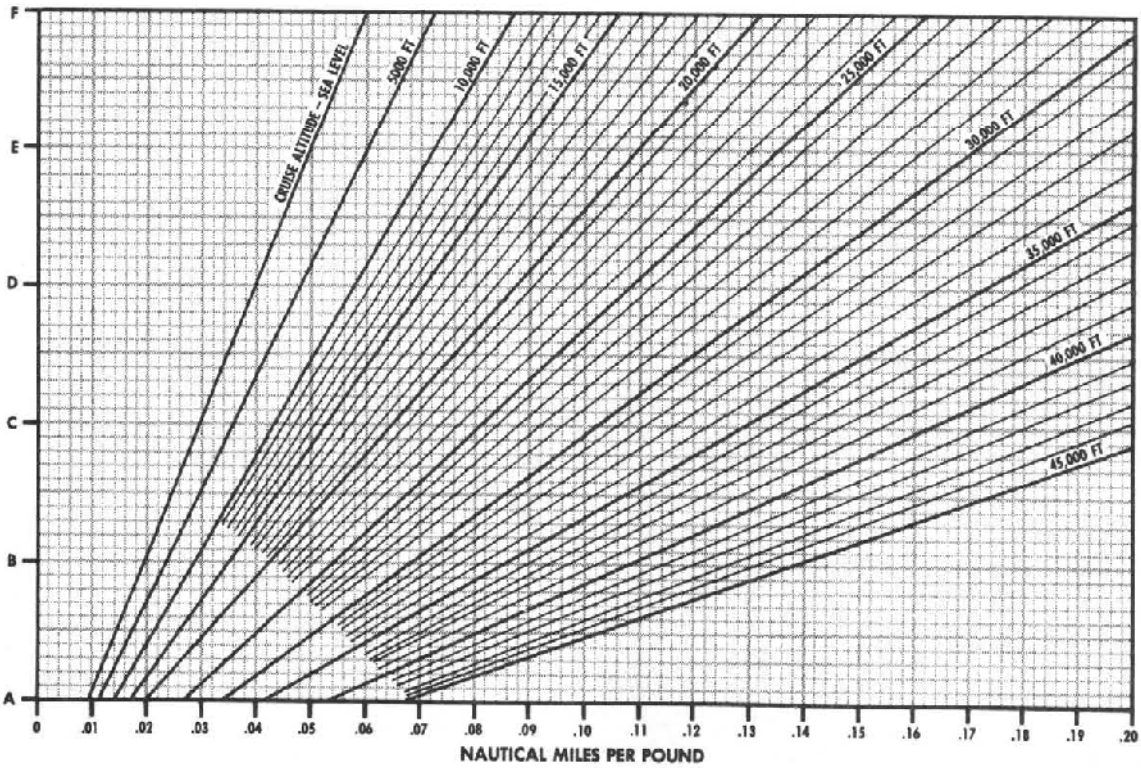
Figure A4-9

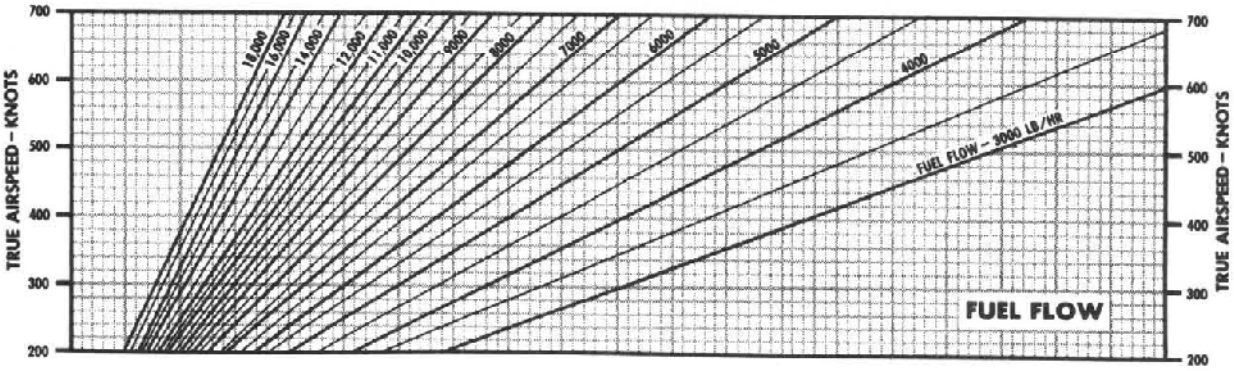
NAUTICAL MILES PER POUND

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFA/C20-P407-2

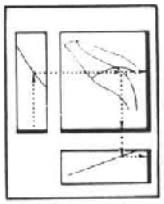
NAUTICAL MILES PER POUND

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
LIMITED CONFIGURATIONS

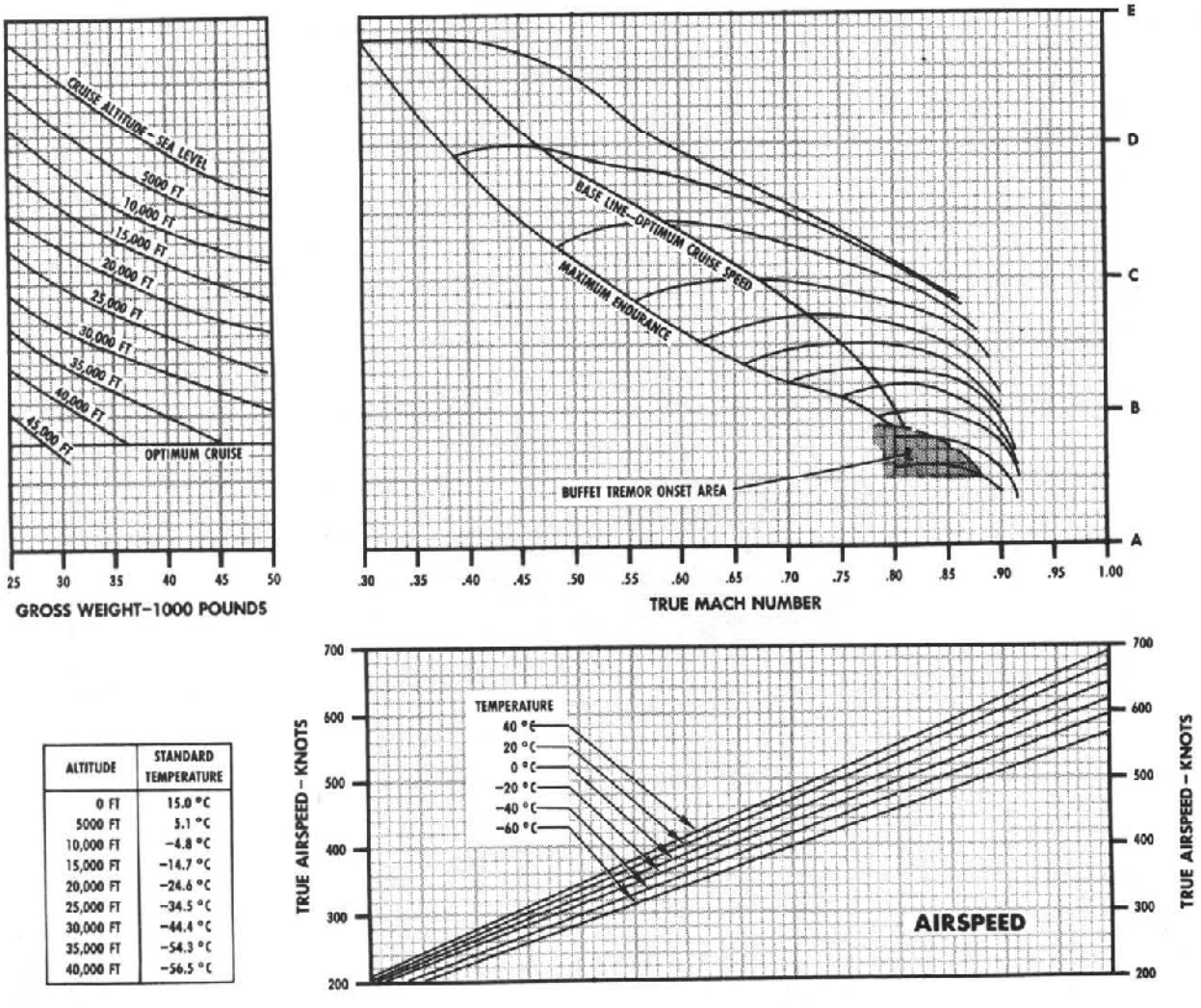
DRAG INDEX
50

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



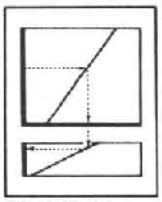
ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	-4.8 °C
15,000 FT	-14.7 °C
20,000 FT	-24.6 °C
25,000 FT	-34.5 °C
30,000 FT	-44.4 °C
35,000 FT	-54.3 °C
40,000 FT	-56.5 °C

RFG-P408-1

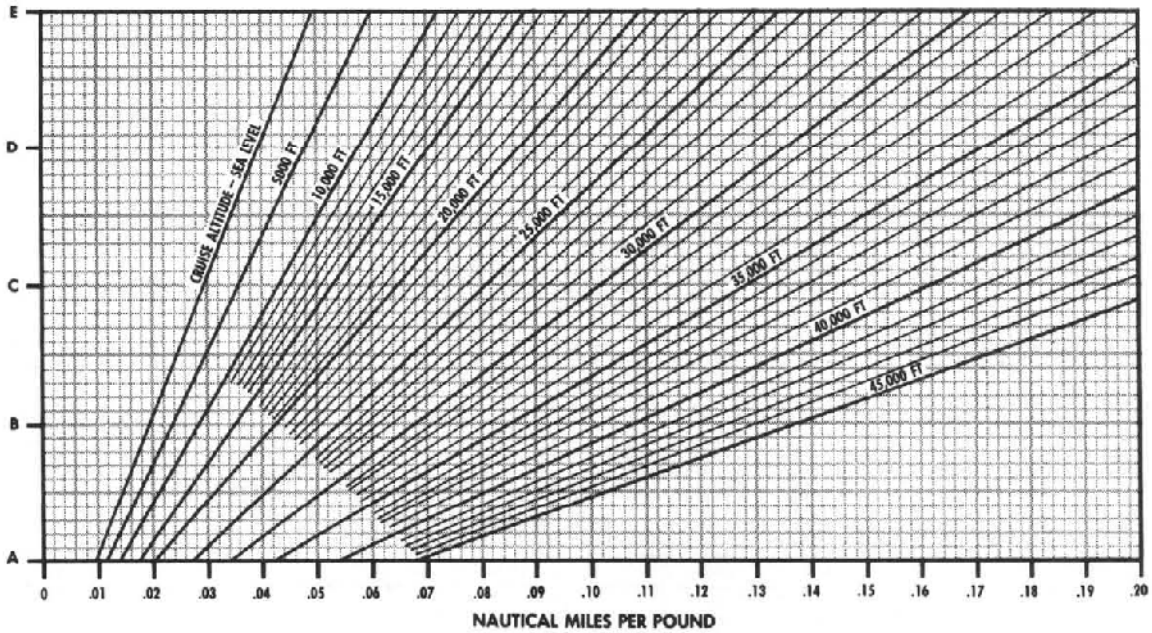
Figure A4-10

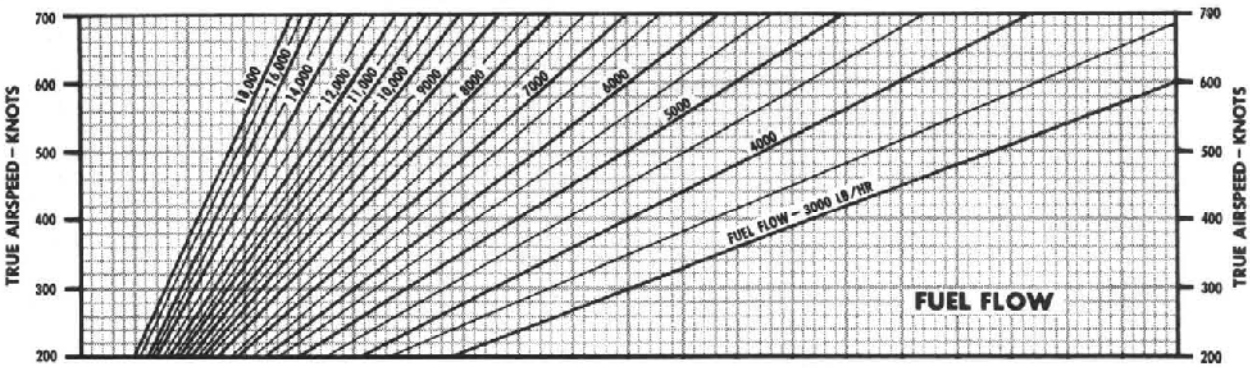
NAUTICAL MILES PER POUND

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFA/C20-P408-2

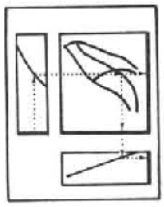
NAUTICAL MILES PER POUND

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
LIMITED CONFIGURATIONS

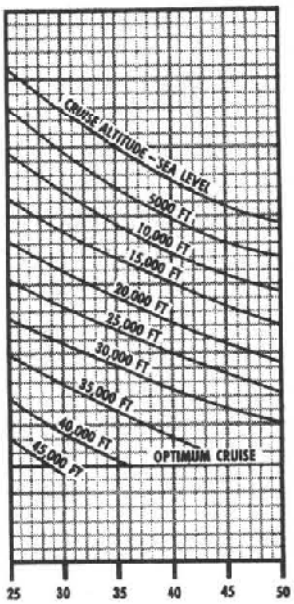
DRAG INDEX
60

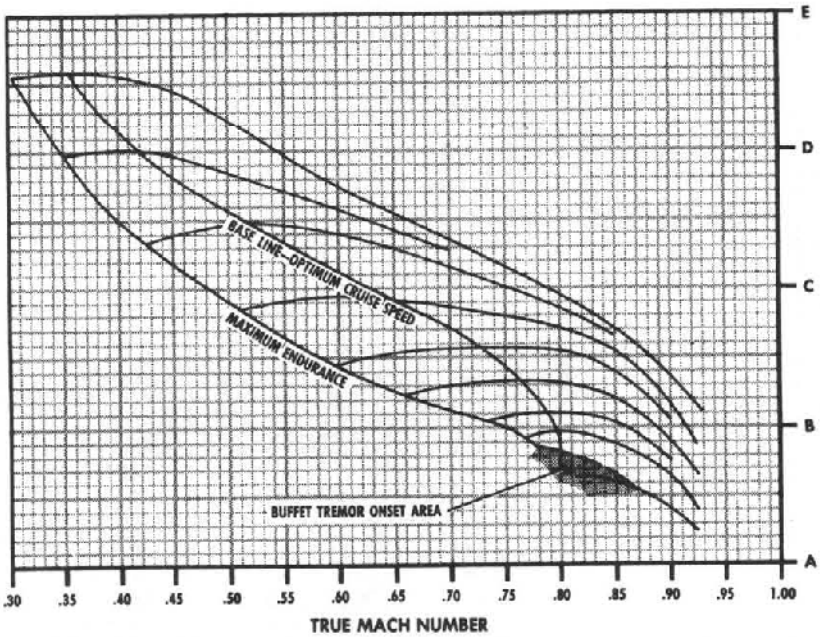
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE

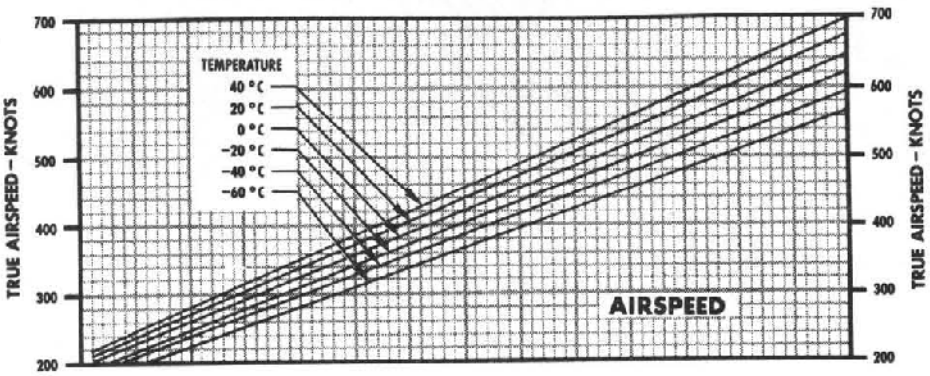


DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)





ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C

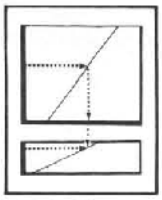


RFG–P409–1

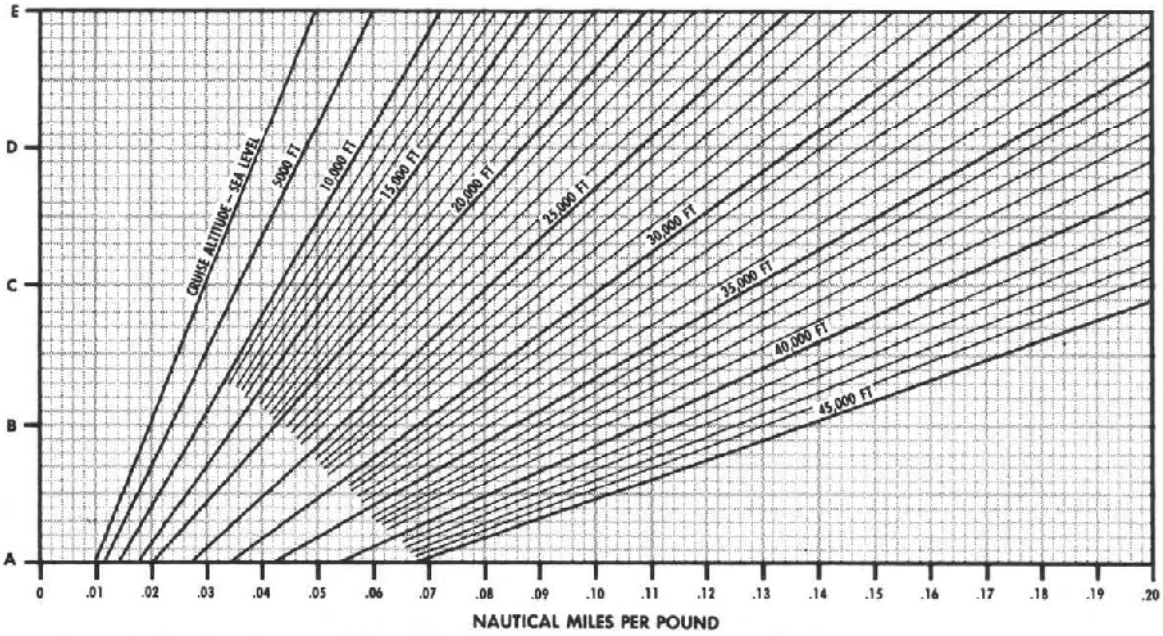
Figure A4-11

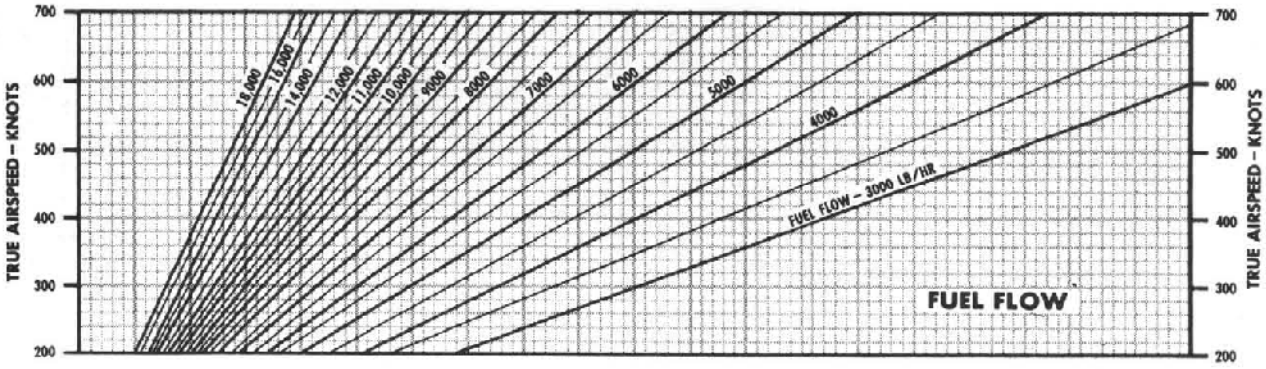
NAUTICAL MILES PER POUND

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFA/C20-P409-2

NAUTICAL MILES PER POUND

SINGLE ENGINE

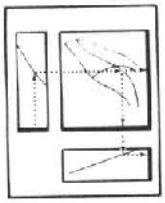
AIRPLANE CONFIGURATION
RF-101G OR RF-101H
LIMITED CONFIGURATIONS

DRAG INDEX

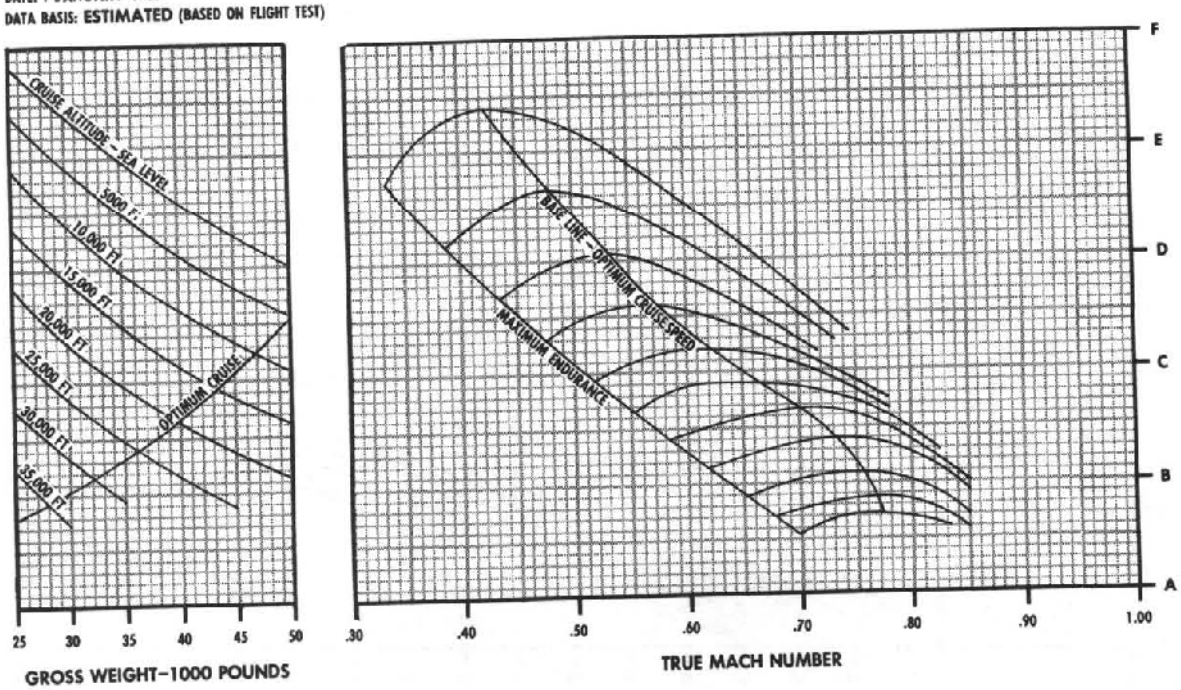
0

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
INOPERATIVE ENGINE WINDMILLING
FOR 50 KNOT HEADWIND CONDITION:
RECOMMENDED CRUISE MACH NUMBER REMAINS THE SAME.
RANGE DECREASES 14%.

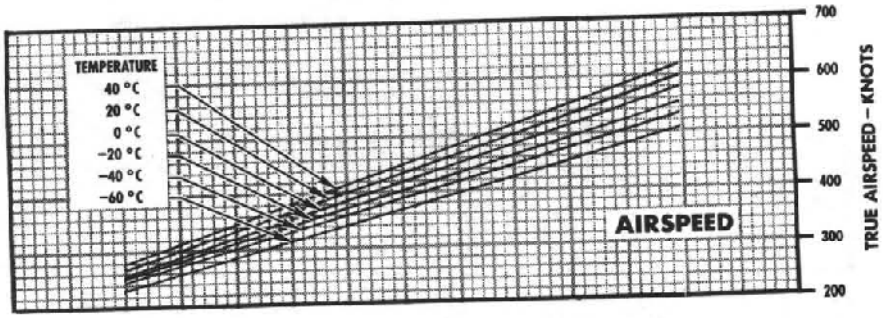
GUIDE



DATE: 1 JANUARY 1966
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)



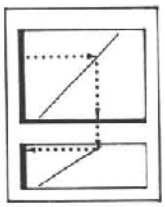
ALTITUDE	STANDARD TEMPERATURE
0 FT	15.0 °C
5000 FT	5.1 °C
10,000 FT	−4.8 °C
15,000 FT	−14.7 °C
20,000 FT	−24.6 °C
25,000 FT	−34.5 °C
30,000 FT	−44.4 °C
35,000 FT	−54.3 °C
40,000 FT	−56.5 °C



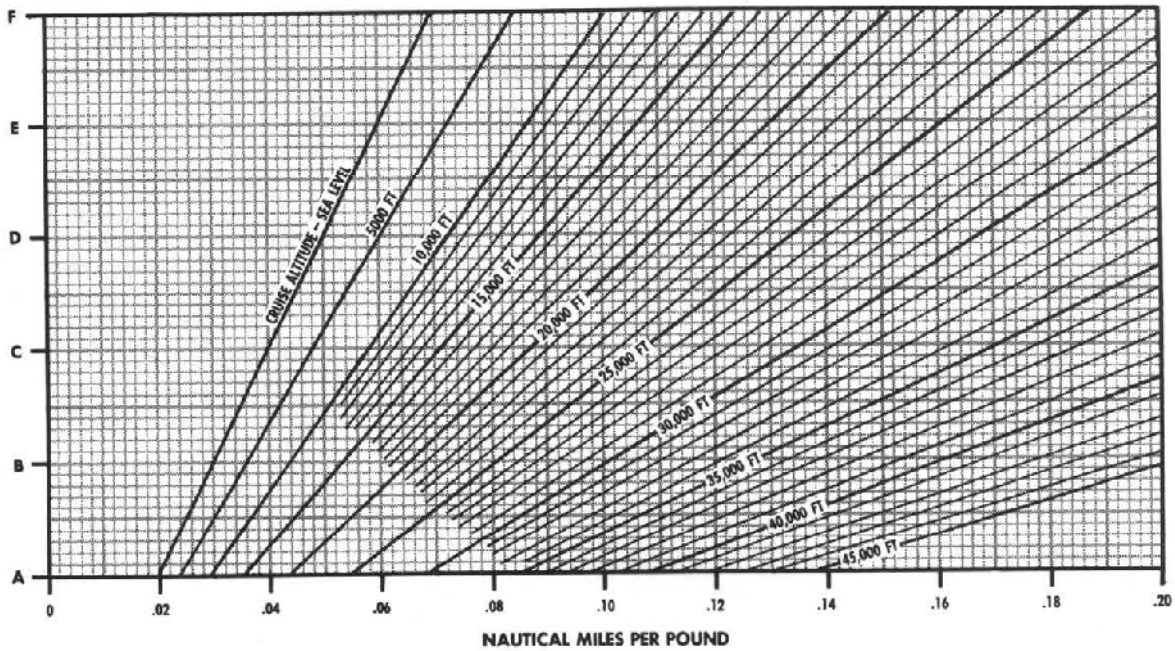
RFG-P412-1
Figure A4-12

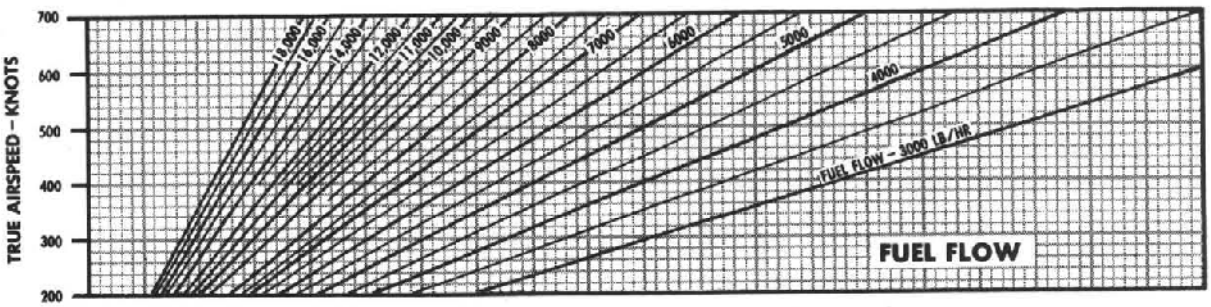
NAUTICAL MILES PER POUND
SINGLE ENGINE

GUIDE



FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





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Part 5
ENDURANCE

TABLE OF CONTENTS

Charts

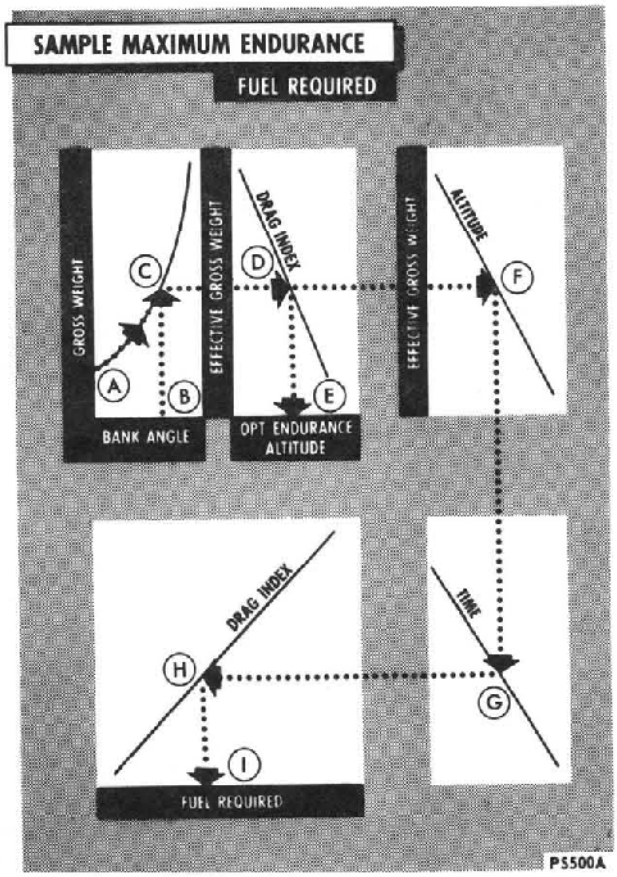
Maximum Endurance Fuel Required A5-4
Maximum Endurance Mach Number
and Fuel Flow A5-5

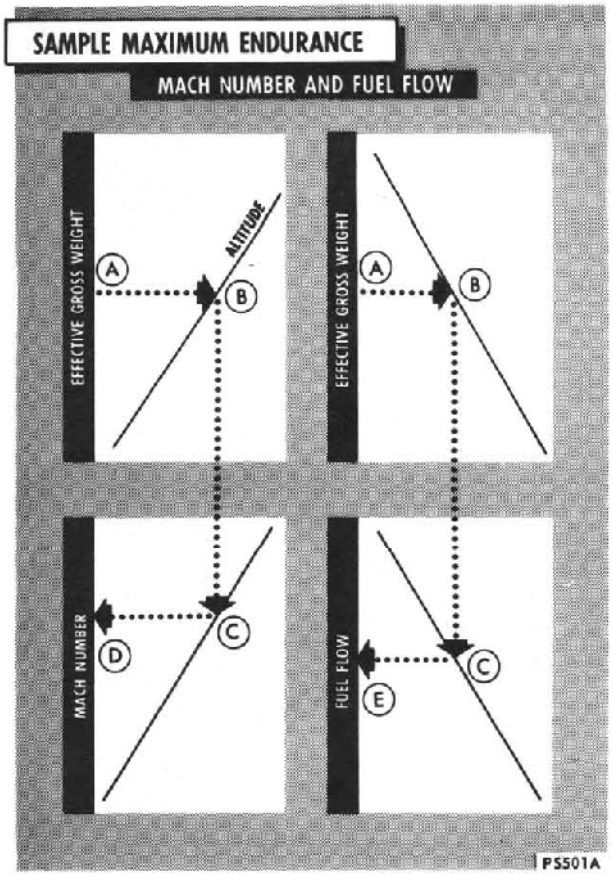
MAXIMUM ENDURANCE CHARTS

Maximum endurance data is presented on the Maximum Endurance Fuel Required and Maximum Endurance, Mach Number and Fuel Flow charts. The data are provided for two engine and single engine operation. It is possible to obtain effective gross weight as a function of bank angle, optimum cruise altitude, total fuel required, optimum cruise Mach number, and optimum cruise fuel flow.

USE

Enter the appropriate (two engine or single engine) Fuel Required chart with the average gross weight for the period that maximum endurance is to be used. Follow the gross weight curve until it intersects the bank angle to be used. From this point, proceed horizontally to the right and intersect the computed drag index. Descend and read optimum endurance altitude. From the previous intersection with the drag index, proceed further to the right, note the effective gross weight, and intersect the altitude at which the endurance is to be flown (either optimum or desired). From this point, descend to the time line corresponding to the expected time in maximum endurance. Proceed horizontally to the left to intersect the computed drag index, then descend and read fuel required. Enter the Mach and fuel flow plots with the effective gross weight, proceed to the correct altitude line, descend to the computed drag index and then proceed horizontally to read the required data.





SAMPLE PROBLEM

Maximum Endurance Fuel Required

A. Gross Weight	40,000 Lbs.
B. Bank Angle	20°
C. Effective Gross Weight	42,500 Lbs.
D. Drag Index	40.0
E. Optimum Endurance Altitude	33,000 Ft.
F. Intersect Optimum Endurance Altitude	
G. On-Station Time	120 Min.
H. Drag Index	40
I. Fuel Required	10,750 Lbs.

Maximum Endurance Mach Number and Fuel Flow

A. Effective Gross Weight	42,500 Lbs.
B. Optimum Cruise Altitude	33,000 Ft.
C. Drag Index	40.0
D. Mach Number	0.785
E. Fuel Flow	5590 P.P.H.

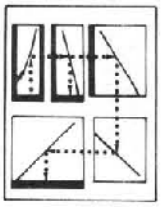
MAXIMUM ENDURANCE
FUEL REQUIRED

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

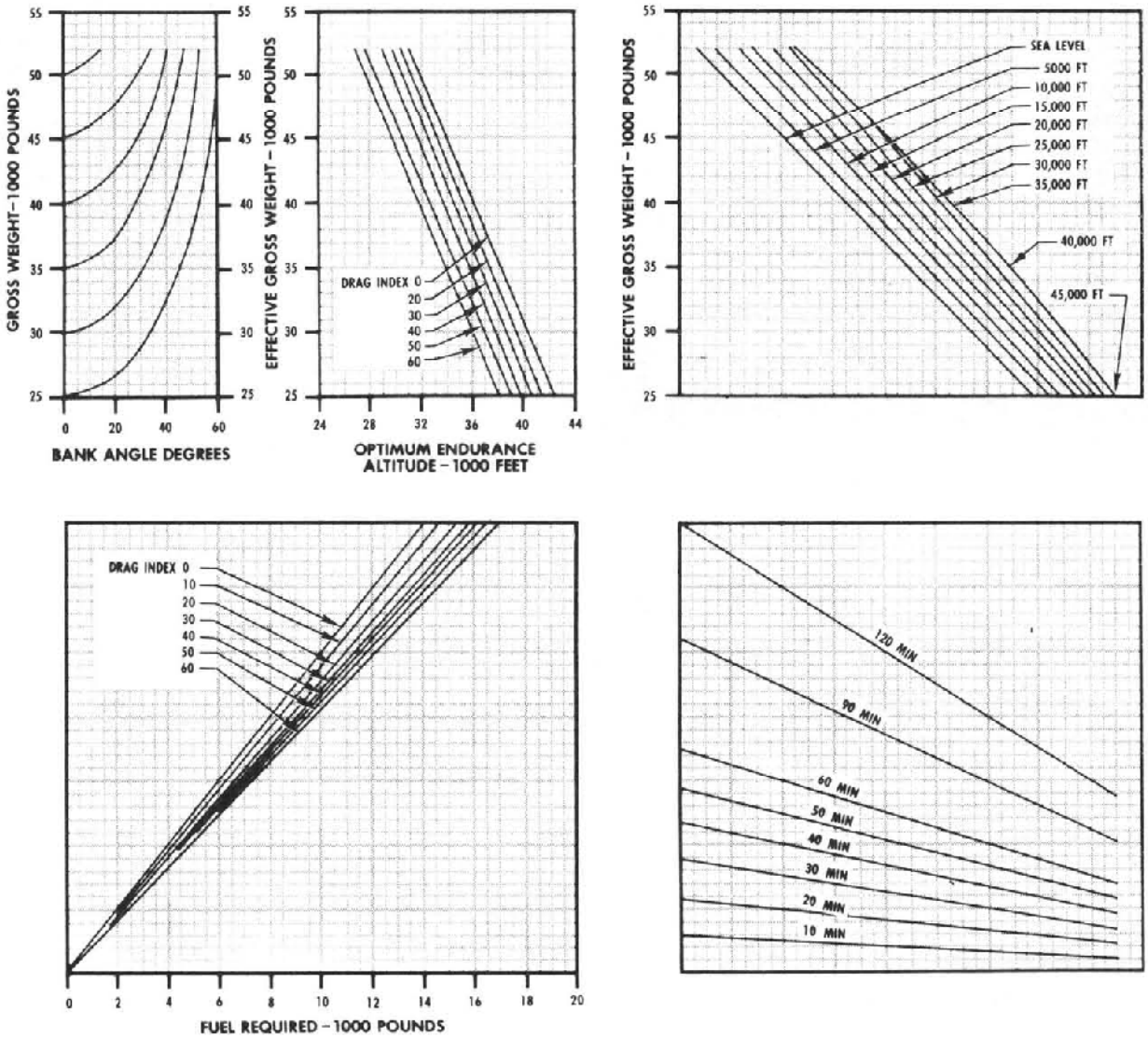


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Figure A5-1

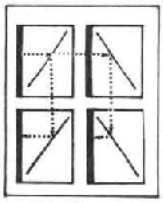
MAXIMUM ENDURANCE
MACH NUMBER AND FUEL FLOW

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

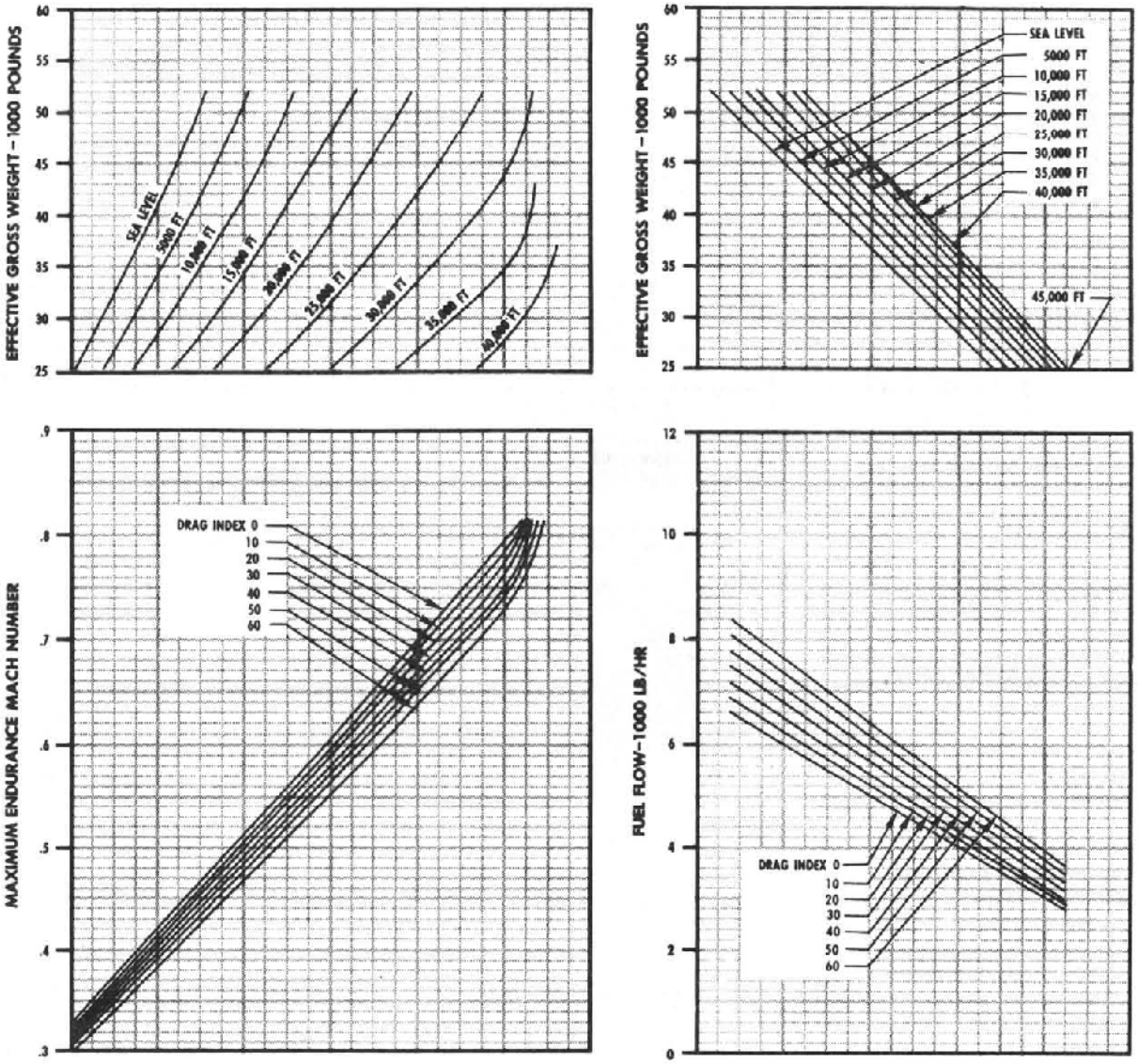


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Figure A5-2

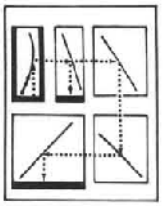
MAXIMUM ENDURANCE
FUEL REQUIRED
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-40

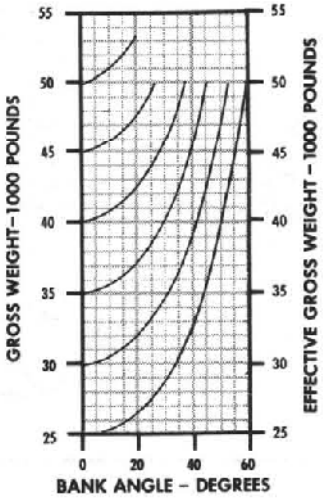
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
INOPERATIVE ENGINE WINDMILLING

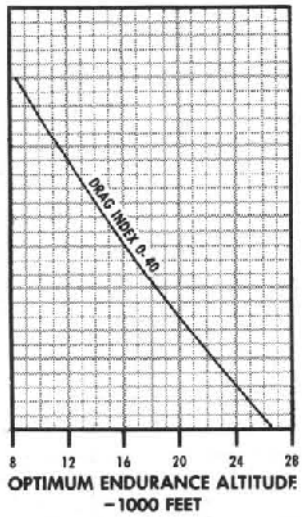
GUIDE

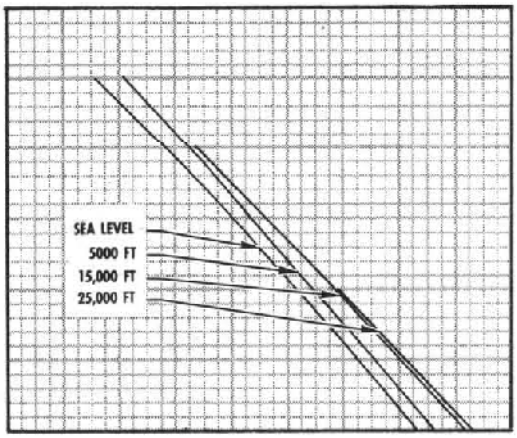


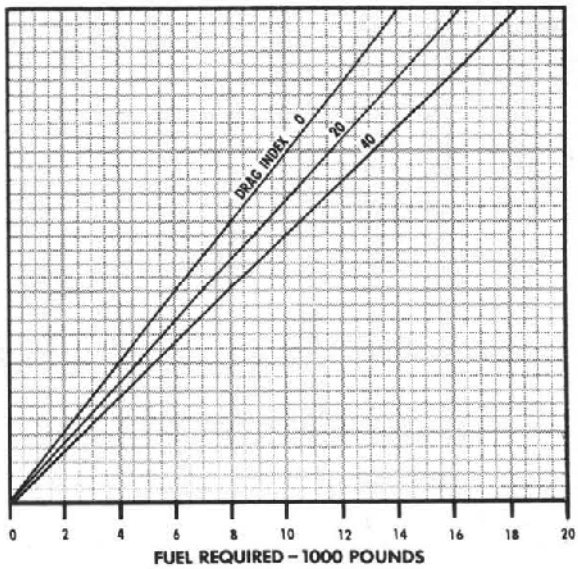
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

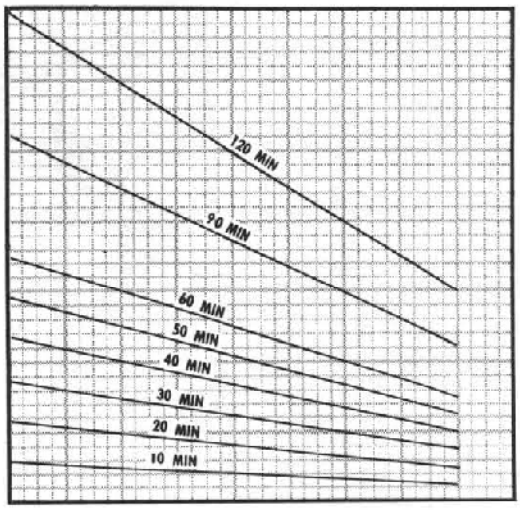
DATE: 1 JANUARY 1966
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)











RFG–P509

Figure A5-3

MAXIMUM ENDURANCE

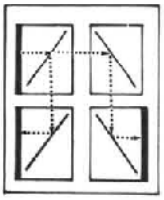
MACH NUMBER AND FUEL FLOW
ONE ENGINE OPERATING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-40

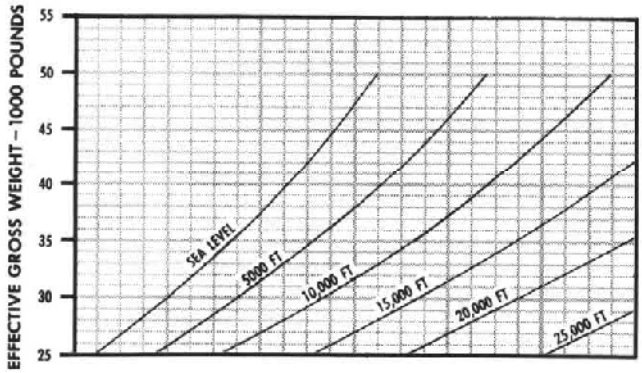
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
INOPERATIVE ENGINE WINDMILLING

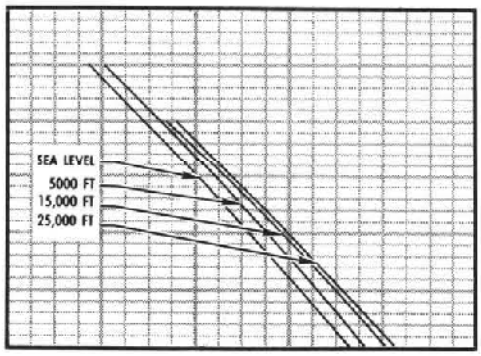
GUIDE

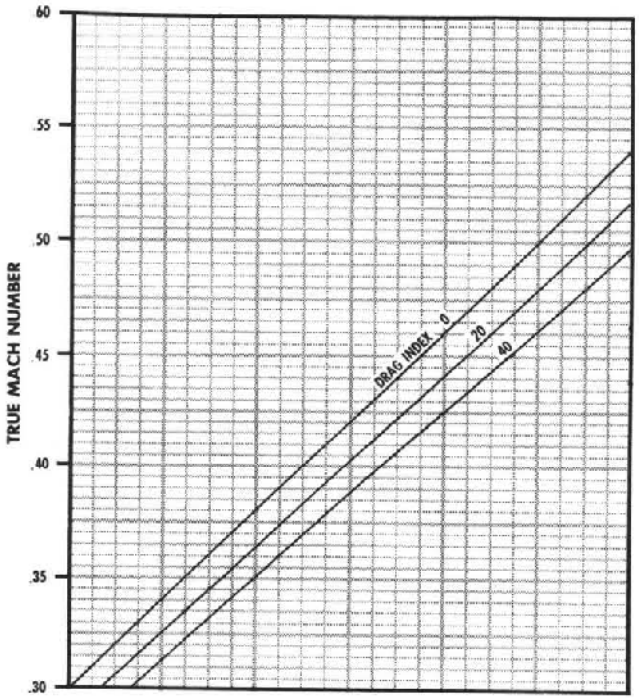


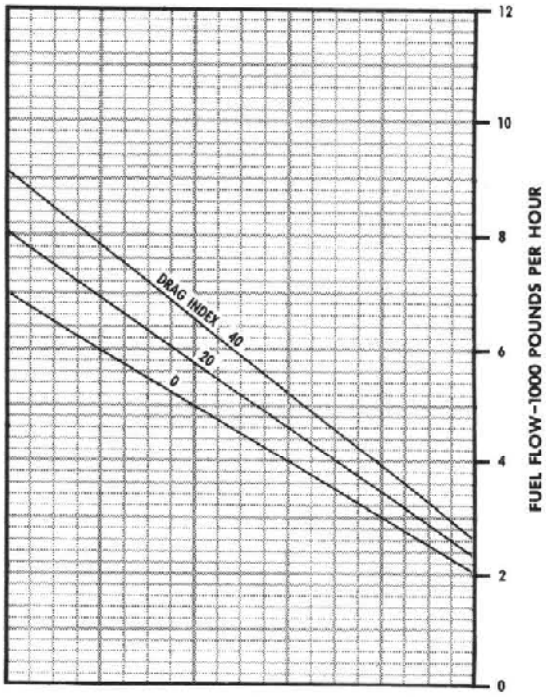
DATE: 1 JANUARY 1966
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL









RFG-P510

Figure A5-4

Part 6
AIR REFUELING

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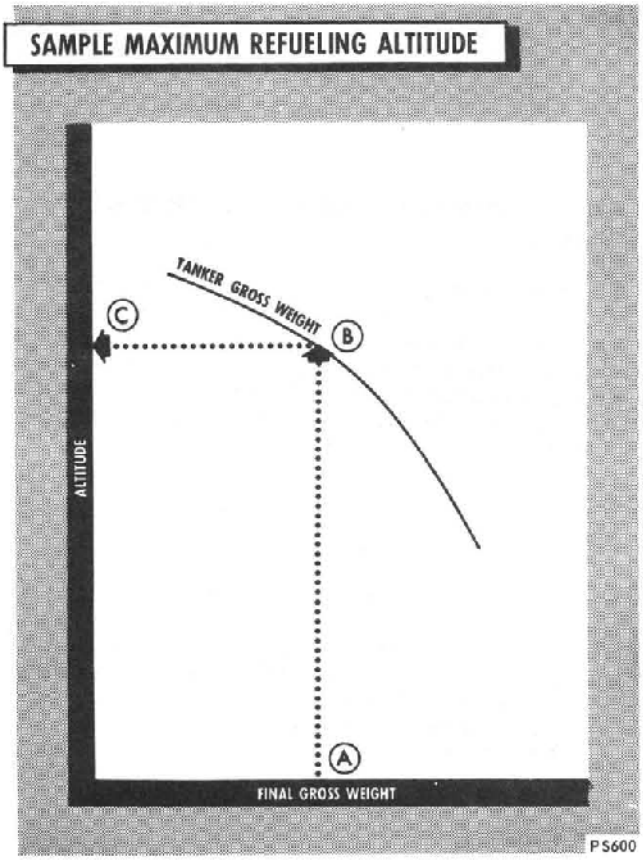
Fuel Consumption During Air Refueling . . . A6-21
Air Refueling Transfer Time A6-27
Air Refueling Profiles A6-28
Descent from Optimum Cruise Altitude to
Refuel Altitude. A6-32

MAXIMUM REFUELING ALTITUDE CHARTS

These charts (figures A6-1 through A6-14) provide maximum altitude values for the complete weight range of the receiver airplane and the KC-97E, KC-97G, or KC-135A tanker. Figures A6-1 thru A6-4 provide data for the KC-135A tanker, based on drag index at various gross weights and speeds.

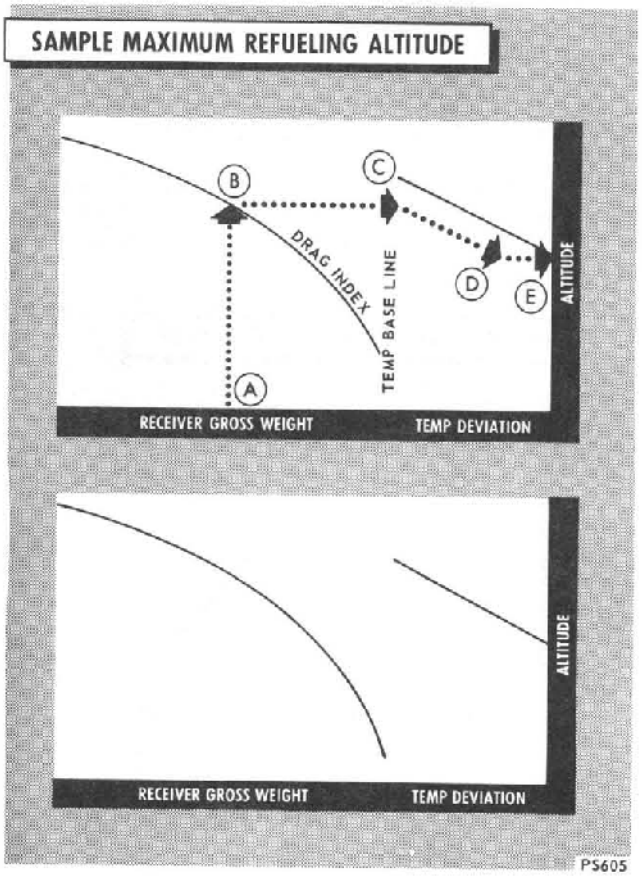
SAMPLE MAXIMUM REFUELING ALTITUDE



USE

Enter the applicable chart with the receiver gross weight and approximate tanker gross weight after refueling. From the receiver gross weight, proceed vertically upward to the applicable drag index, then horizontally to the right to the temperature base line. From this point, parallel the temperature deviation guide lines to the temperature deviation from standard day. Then continue horizontally to the right to read the maximum refueling altitude.

SAMPLE MAXIMUM REFUELING ALTITUDE



To establish the highest constant altitude for refueling, enter the chart at the receiver airplanes gross weight after refueling (this weight will usually be the tank-off gross weight if the receiver airplane is to be refueled to capacity). Proceed vertically upward to the interpolated gross weight of the tanker after refueling. From this point proceed horizontally to the left scale and read maximum refuel altitude.

SAMPLE PROBLEM

(C-135A)

Configuration: 285 KCAS, Tanker Weight = 140,000 Lbs.

A. Receiver Gross Weight After Refueling	50,000 Lbs.
B. Drag Index	20
C. Temperature Base Line	
D. Temperature Deviation	+10°C
E. Maximum Refueling Altitude	31,000 Ft.

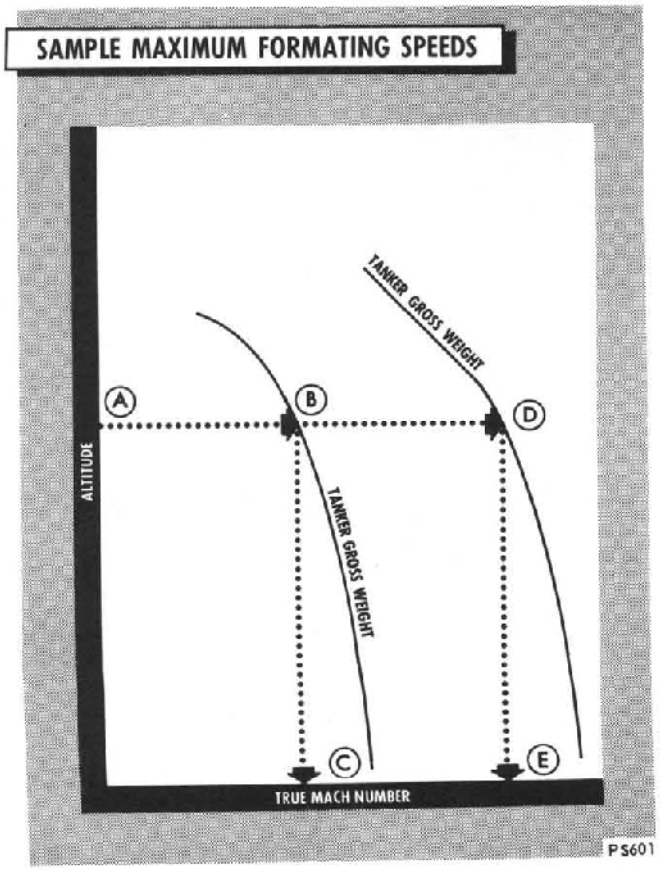
(KC-97E)

Configuration: Airplane with 2 (450) Gallon Tanks

A. Maximum Receiver Weight After Refueling	48,829 Lbs.
B. Tanker Weight After Refueling	87,000 Lbs.
C. Maximum Altitude For Constant Refueling	18,000 Ft.

MAXIMUM FORMATING SPEED CHARTS

These charts (figures A6-11 through A6-16) present the altitude and speed capability during air refueling (with boom in contact position) for the complete weight ranges of the receiver airplane and the KC-97E, KC-97G and KC-135A tankers. The refueling flight envelopes shown, present tanker level flight high speeds with maximum continuous thrust. With an established rate of descent, the speed capabilities of the tanker can be increased in accordance with the figures presented in the tanker Flight Manual. The speed at the beginning of refueling can be read for a constant refuel altitude from the interpolated initial refuel weight of the tanker. The final refueling speed can be read for the post refuel weight of the tanker.



USE

Enter the chart at the established refueling altitude and proceed horizontally to the weights of the tanker at the beginning and at the end of refueling. Descend to the base of the chart and read the speeds at the beginning and end of refueling for the corresponding tanker weights.

SAMPLE PROBLEM (KC-97E)

Configuration: Airplane with 2 (450) Gallon Tanks

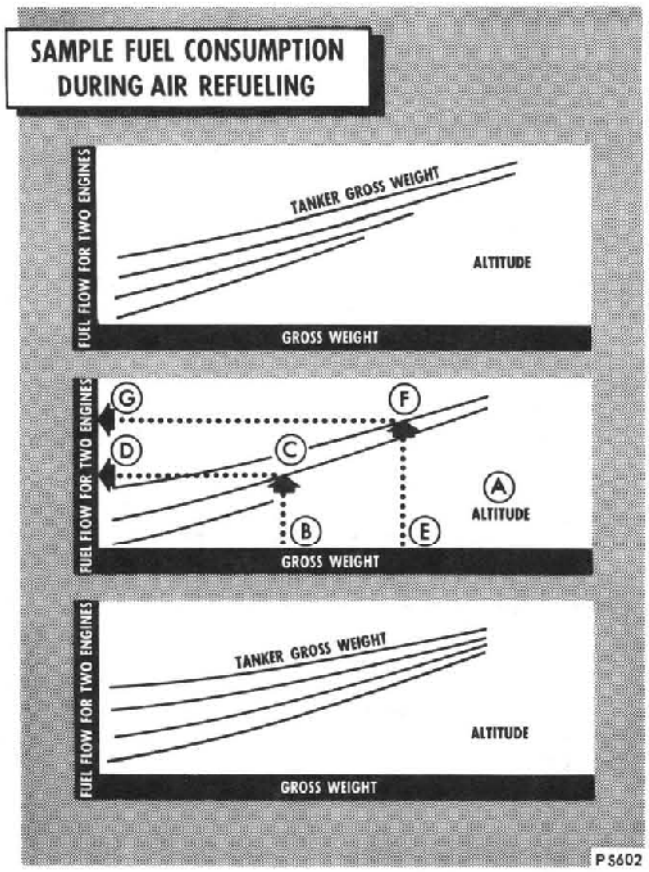
A. Formating Altitude	18,000 Ft.
B. Initial Tanker Weight	100,000 Lbs.
C. Initial Refueling Speed	228 Kts.
D. Final Tanker Weight	87,000 Lbs.
E. Final Refueling Speed	231 Kts.
F. Average Refueling Speed (C + E)	229 Kts.

FUEL CONSUMPTION DURING AIR REFUELING CHARTS

These charts (figures A6-17 through A6-22) present the fuel flow of the receiver airplane for the tanker's maximum continuous thrust high speeds for the complete weight range of the KC-97E, KC-97C, and KC-135A tankers and the receiver airplane. Three formating altitude graphs are given for each airplane configuration.

USE

Enter the base of the chart at initial receiver airplane weight and proceed vertically to intersect the initial tanker weight on the applicable formating altitude graph. Proceed horizontally to the left scale and read the initial fuel flow. Re-enter the base of the chart at the final receiver airplane's weight and proceed vertically to intersect the final tanker's weight on the applicable formating altitude graph. Proceed horizontally to the left scale and read the final fuel flow during refueling.



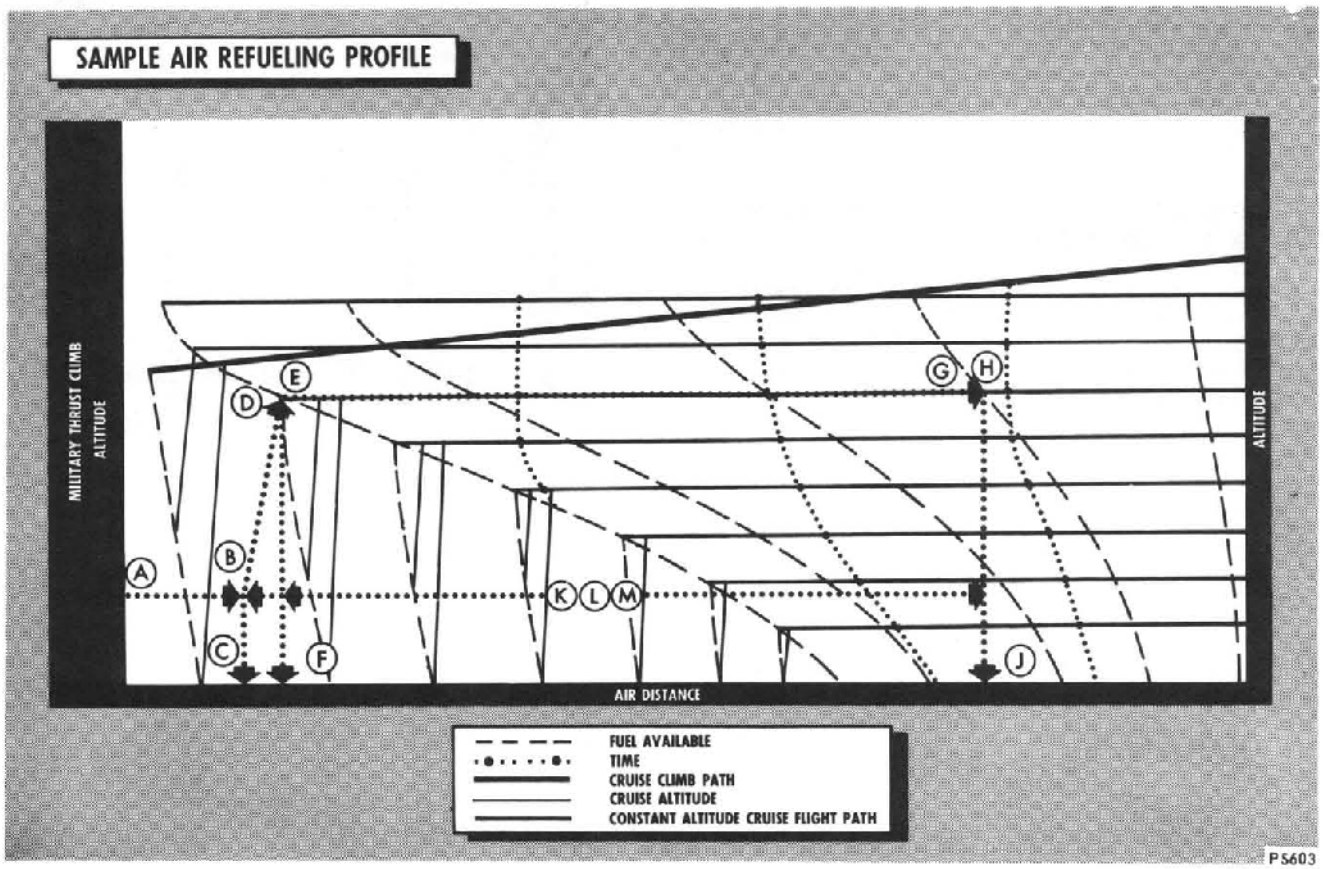
SAMPLE PROBLEM (KC-97E)

Configuration: Airplane with 2 (450) Gallon Tanks

A. Formating Altitude	15,000 Ft.
B. Initial Receiver Weight	33,829 Lbs.
C. Initial Tanker Weight	100,000 Lbs.
D. Initial Fuel Flow During Refueling	133 Lbs./Min.
E. Final Receiver Weight	48,829 Lbs.
F. Final Tanker Weight	85,000 Lbs.
G. Final Fuel Flow During Refueling	162 Lbs./Min.
H. Average Fuel Flow During Refueling	147 Lbs./Min.

AIR REFUELING PROFILES

These charts (figures A6-24 and A6-25) present the relationship of time, fuel, and altitude for maximum range with various fuel loads within the weight range of the airplane configuration after refueling. The climb path guide lines show the distance traveled from refuel altitude to cruise altitude using the Military climb speed schedule at the left of the chart. A cruise table gives recommended Mach numbers and approximate operating conditions for both cruise-climb procedure and for cruise at constant altitude. No reserve for descent and landing has been included.



USE

Establish the cruise altitude, the refuel altitude, and the amount of fuel required to perform military operations and subsequent cruise. This fuel will be referred to hereafter as fuel remaining. Enter the chart on the left side of the estimated refuel altitude and proceed to the right to intersect the proper cruise altitude climb path guide lines. Read the corresponding range figure. Enter the chart at the cruise altitude and proceed to the right to intersect the established fuel remaining line. Read the corresponding range. The distance covered during the post refuel cruise leg will be the difference between the two range values.

SAMPLE PROBLEM

Configuration: Airplane with (2) 450 Gallon Tanks

A. Refueling Altitude	20,000 Ft.
B. Climb-Cruise Guide Line	
C. Total Range Including Climb to Cruise Altitude	1935 Miles
D. Follow Climb Path Guide Line to Cruise Altitude	30,000 Ft.
E. Cruise Time	4 Hrs. 10 Mins.
F. Distance Corresponding to Cruise Time	1916 Miles
G. Follow Line of Constant Cruise to Fuel Remaining Line	2,000 Lbs.
H. Time	29 Mins.
J. Distance	215 Miles
K. Net Cruise Time E-H (4 hrs. 10 Mins. -29) =	3 Hrs. 41 Mins.
L. Net Cruise Distance F - J (1916 Miles - 215 Miles)	1701 Miles
M. Net Cruise Distance Including Climb C - J (1935 Miles - 215 Miles)	1720 Miles

DESCENT FROM OPTIMUM CRUISE ALTITUDE TO REFUEL ALTITUDE CHART

These charts (figures A6-26 and A6-27) present the receiver airplane time, fuel, and distance required to descend from optimum cruise altitude to the established refueling altitude. Three configurations are presented on the same chart.

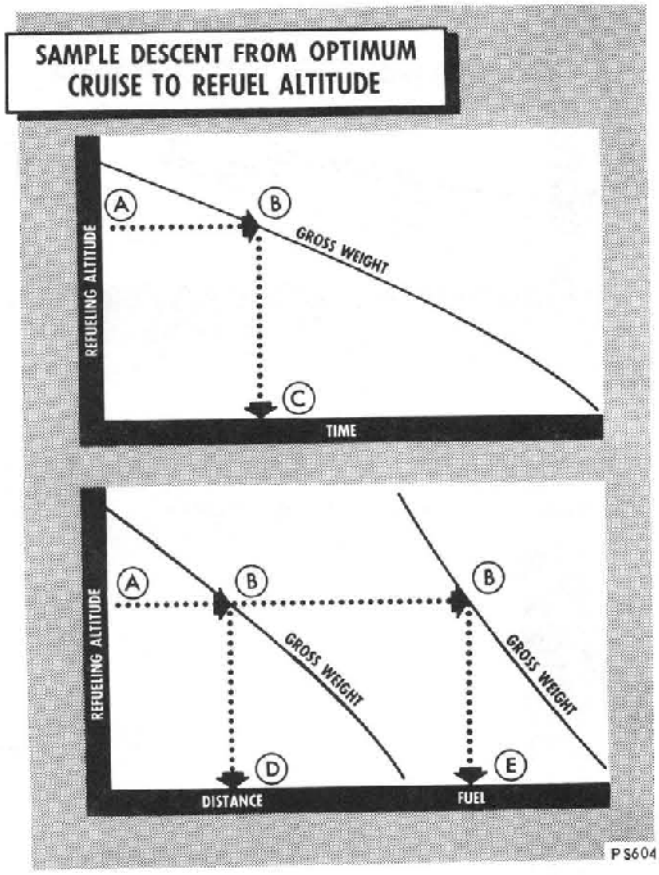
USE

Enter the chart at the established refueling altitude and proceed horizontally to the interpolated weight of the receiver airplane at the beginning of refueling. Read the fuel, time, and distance on the appropriate scale.

SAMPLE PROBLEM

Configuration: Airplane with (2) 450 Gallon Tanks

A. Refueling Altitude	20,000 Ft.
B. Receiver Weight at Start of Refuel	35,000 Lbs.
C. Time	4.6 Min.
D. Distance	32 Miles
E. Fuel	108 Lbs.



MAXIMUM REFUELING ALTITUDE

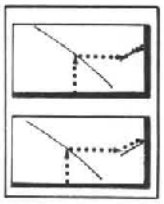
AT 285 KNOTS CALIBRATED AIRSPEED
KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

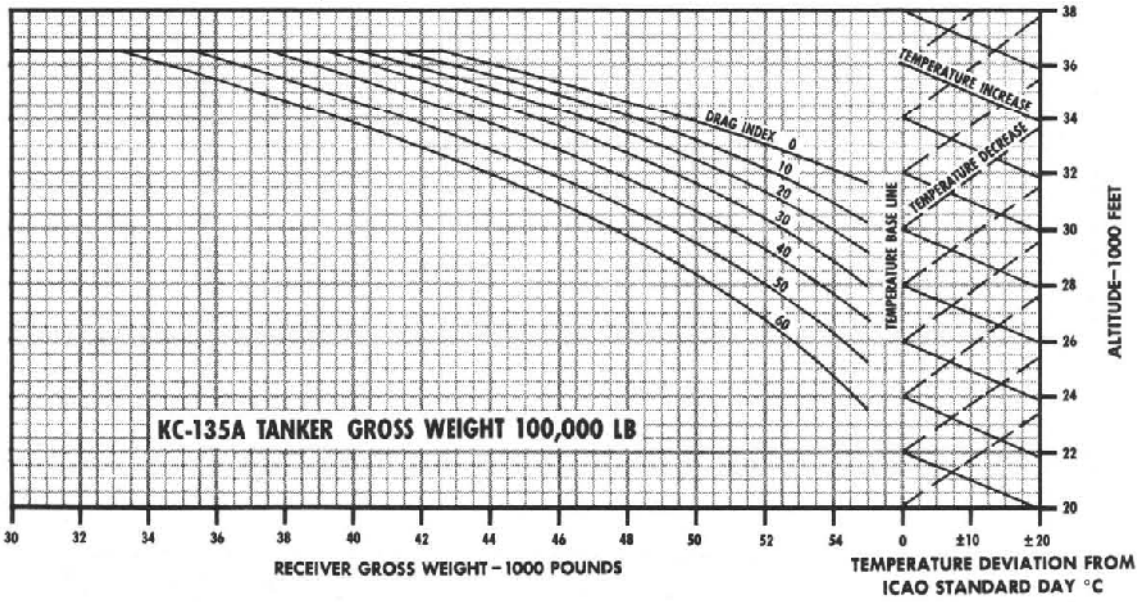
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS 285 KCAS
WITH BOOM IN CONTACT POSITION

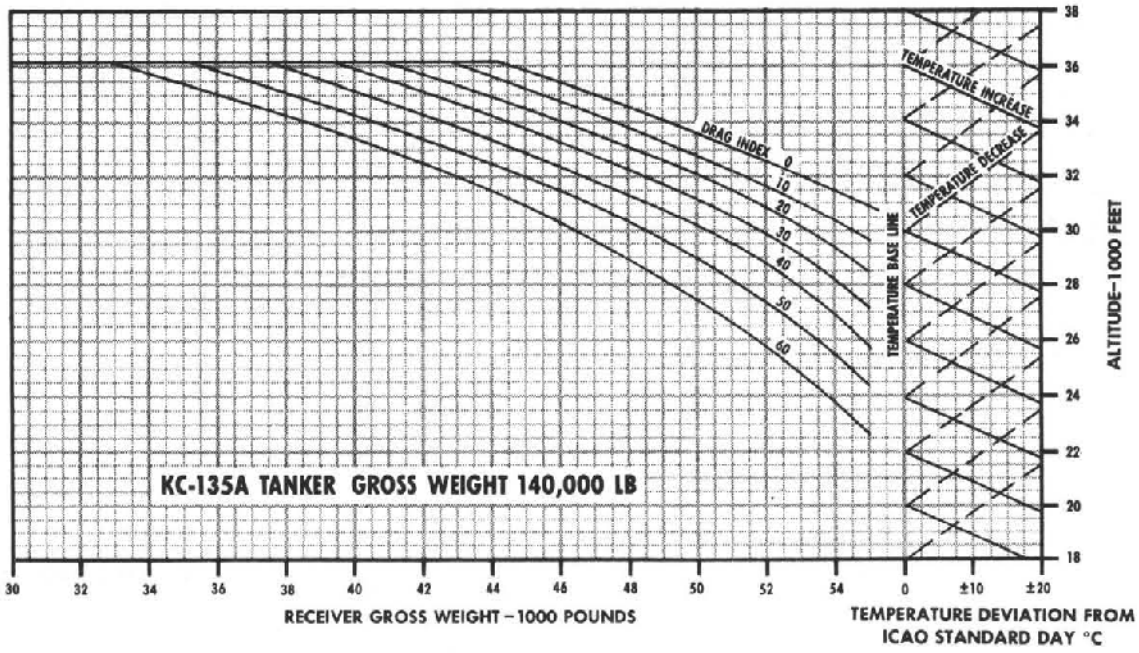
GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFG-P655

Figure A6-1

MAXIMUM REFUELING ALTITUDE

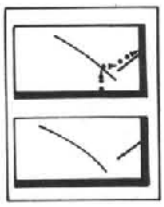
AT 300 KNOTS CALIBRATED AIRSPEED
KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

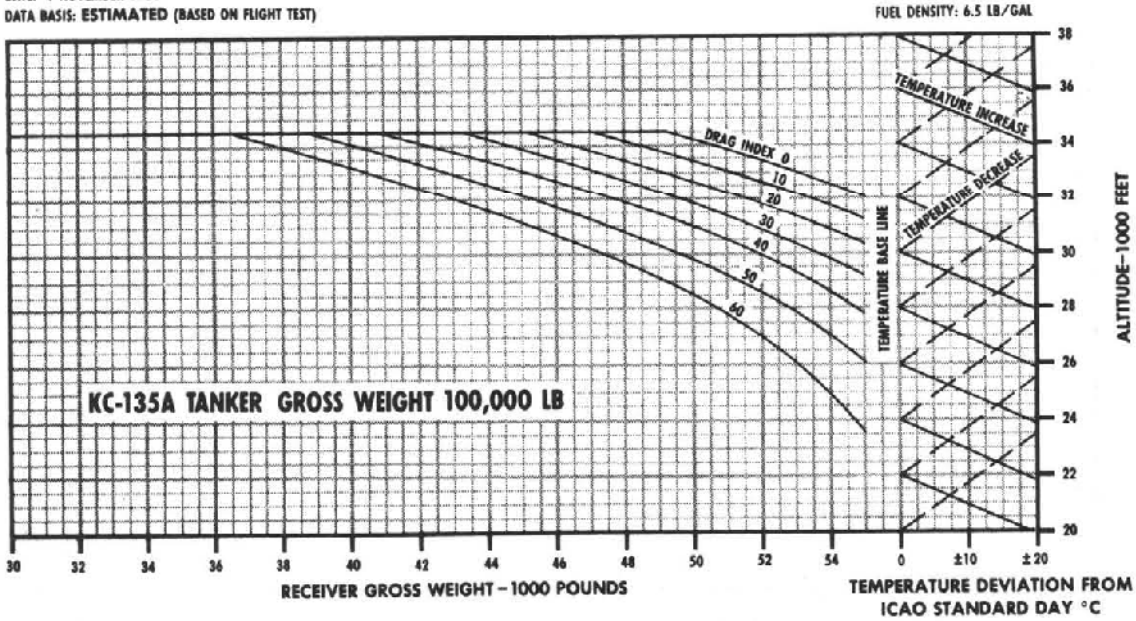
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS 300 KCAS
WITH BOOM IN CONTACT POSITION

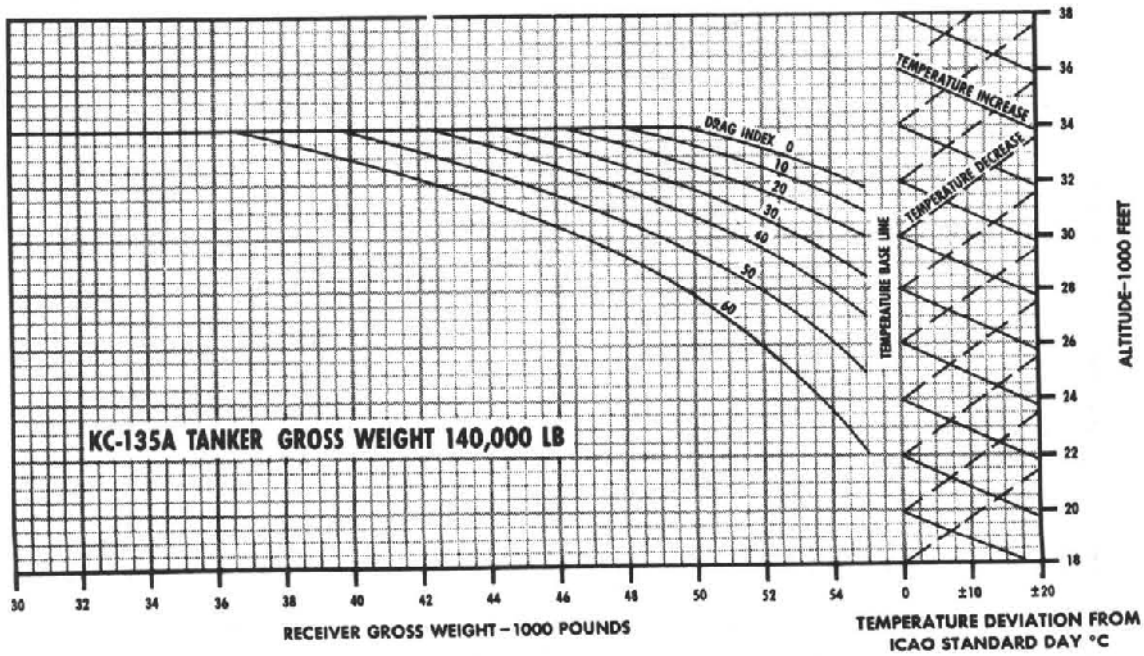
GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFG-P657

Figure A6-2

MAXIMUM REFUELING ALTITUDE

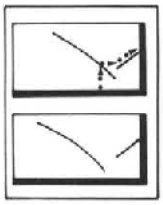
AT 285 KNOTS CALIBRATED AIRSPEED
KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101 G OR RF-101 H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS 285 KCAS
WITH BOOM IN CONTACT POSITION

GUIDE



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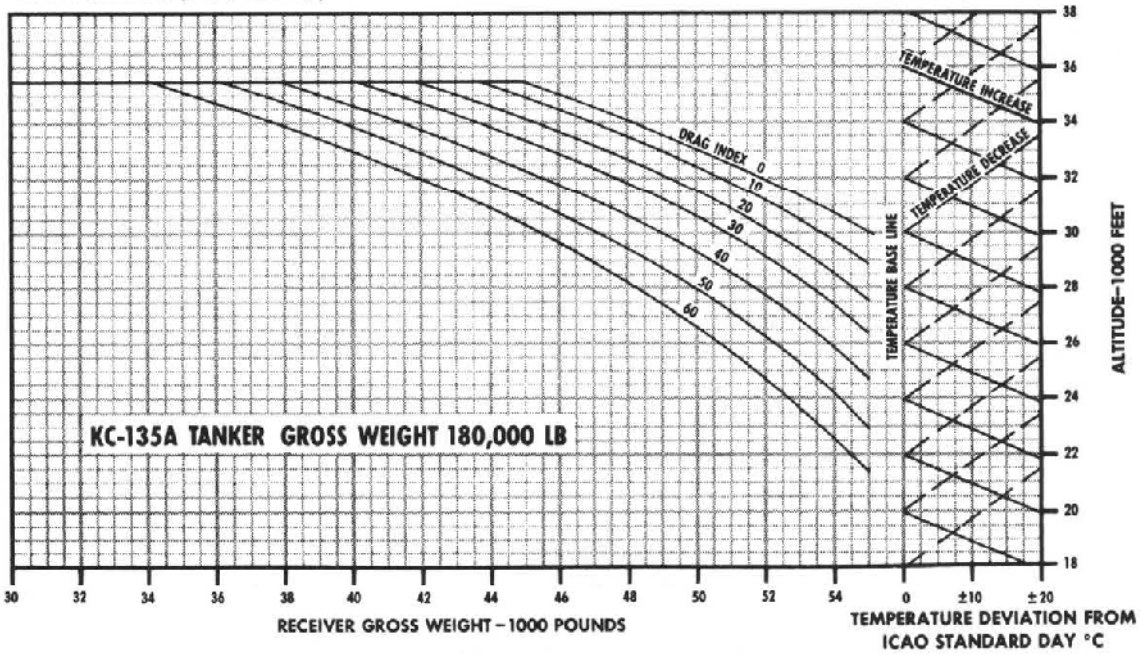
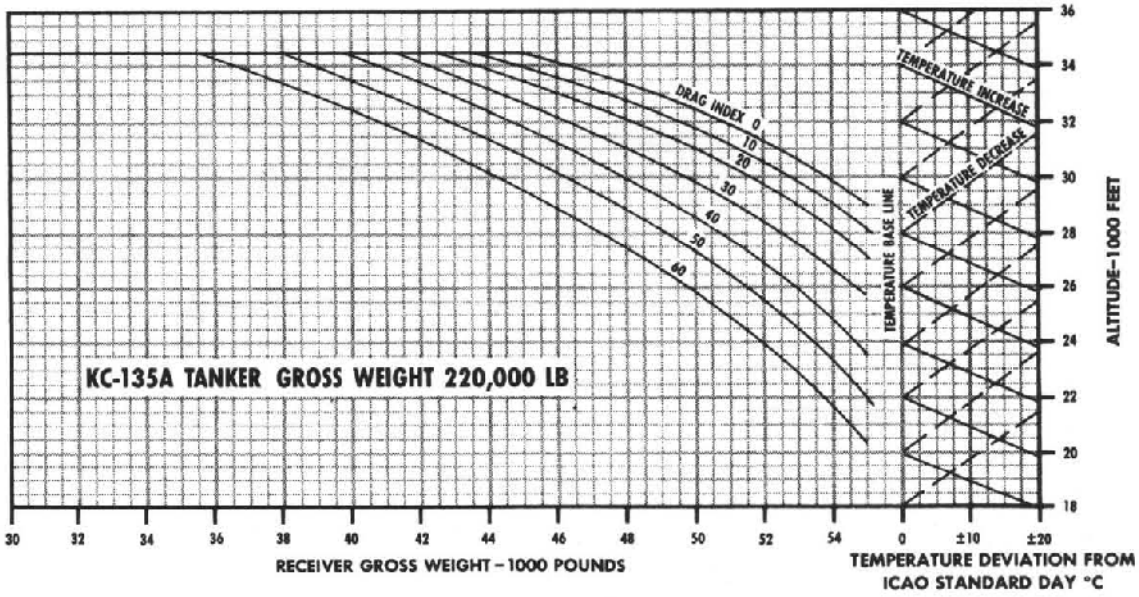
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFG-P656

Figure A6-3

MAXIMUM REFUELING ALTITUDE

AT 300 KNOTS CALIBRATED AIRSPEED

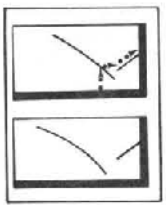
KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

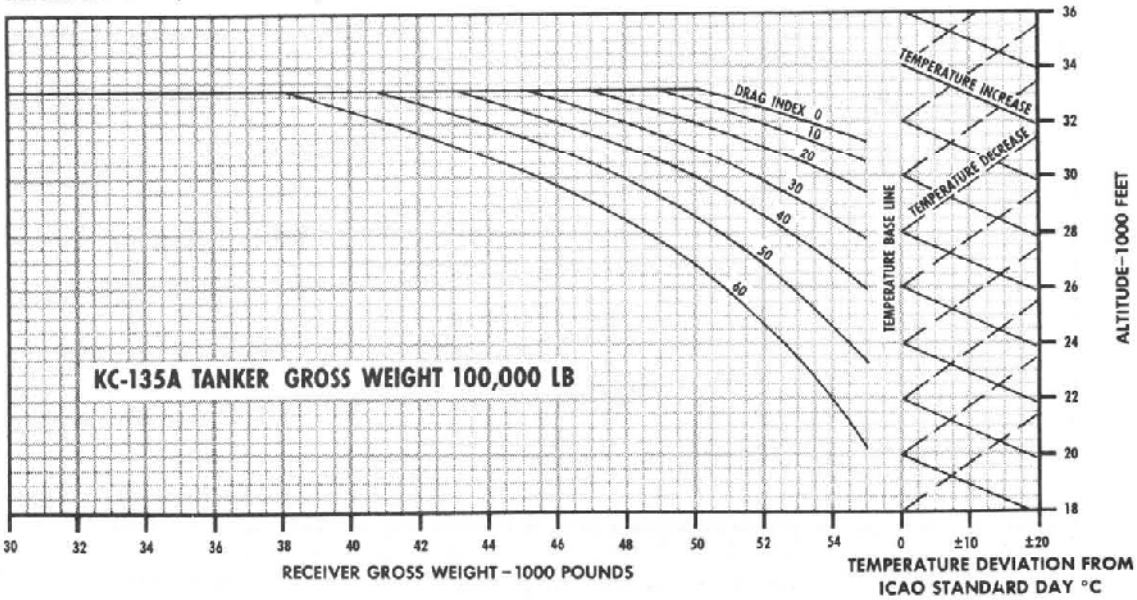
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS 300 KCAS
WITH BOOM IN CONTACT POSITION

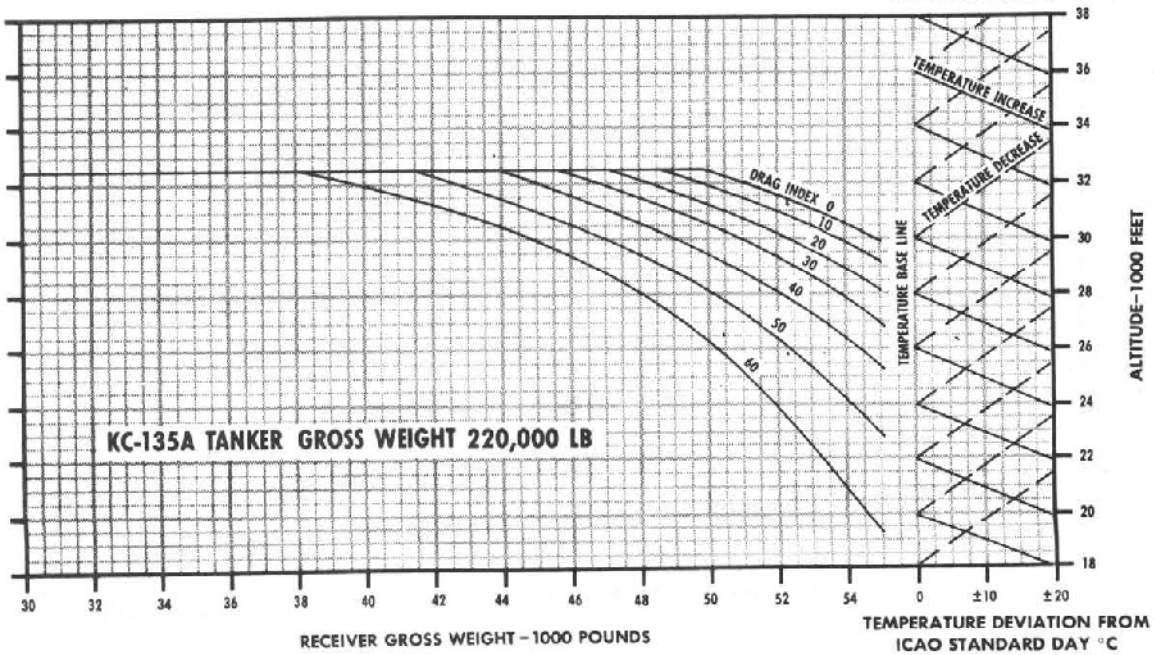
GUIDE



DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





UNCLASSIFIED

RFG-P658

Figure A6-4

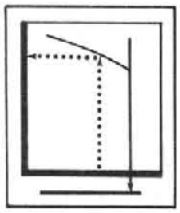
MAXIMUM REFUELING ALTITUDE

KC-97E TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H: CLEAN
FLAPS EXTENDED

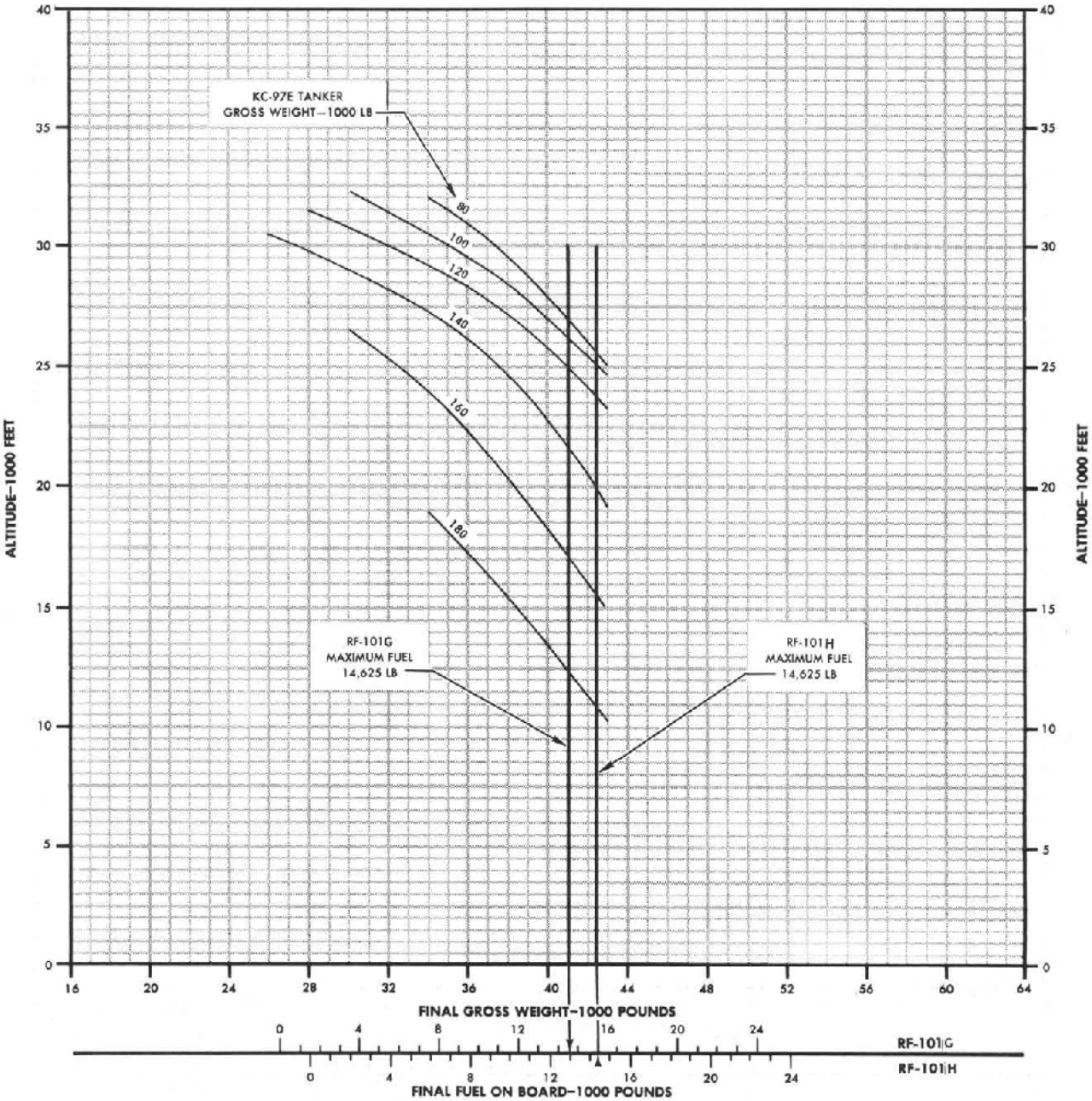
REMARKS
ENGINE(S):(2)J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDE



DATE: 1 MARCH 1956
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P611

Figure A6-5

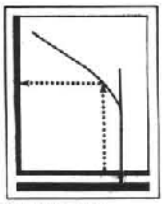
MAXIMUM REFUELING ALTITUDE

KC-97E TANKER

AIRPLANE CONFIGURATION
RF-101G, OR RF-101H: (2) 450 GALLON TANKS
FLAPS EXTENDED

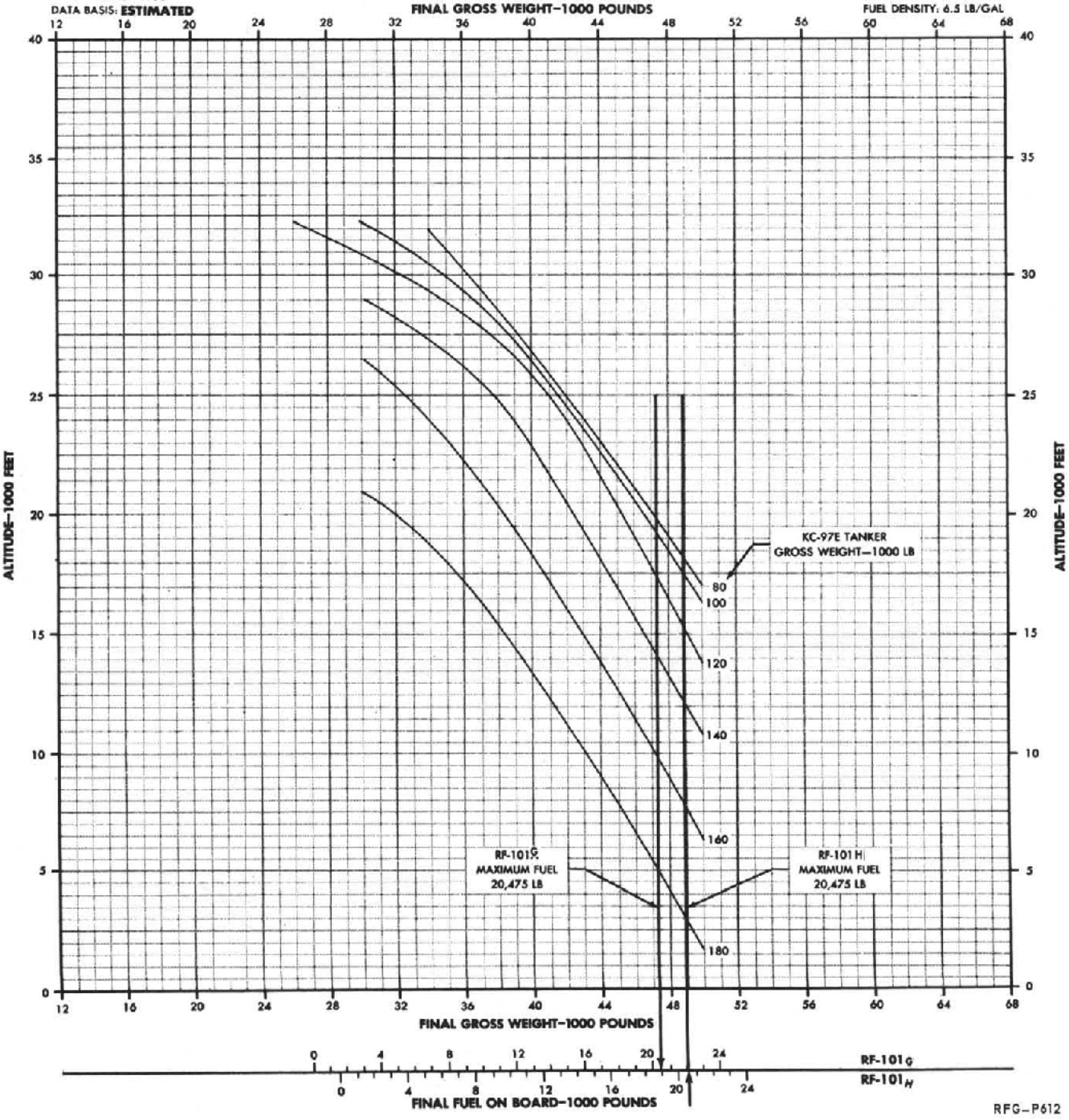
REMARKS
ENGINE(S):(2)J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDE



DATE: 1 MARCH 1956
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG–P612

Figure A6-6

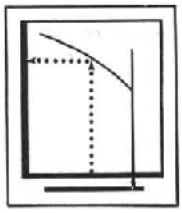
MAXIMUM REFUELING ALTITUDE

KC-97G TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H: CLEAN
FLAPS EXTENDED

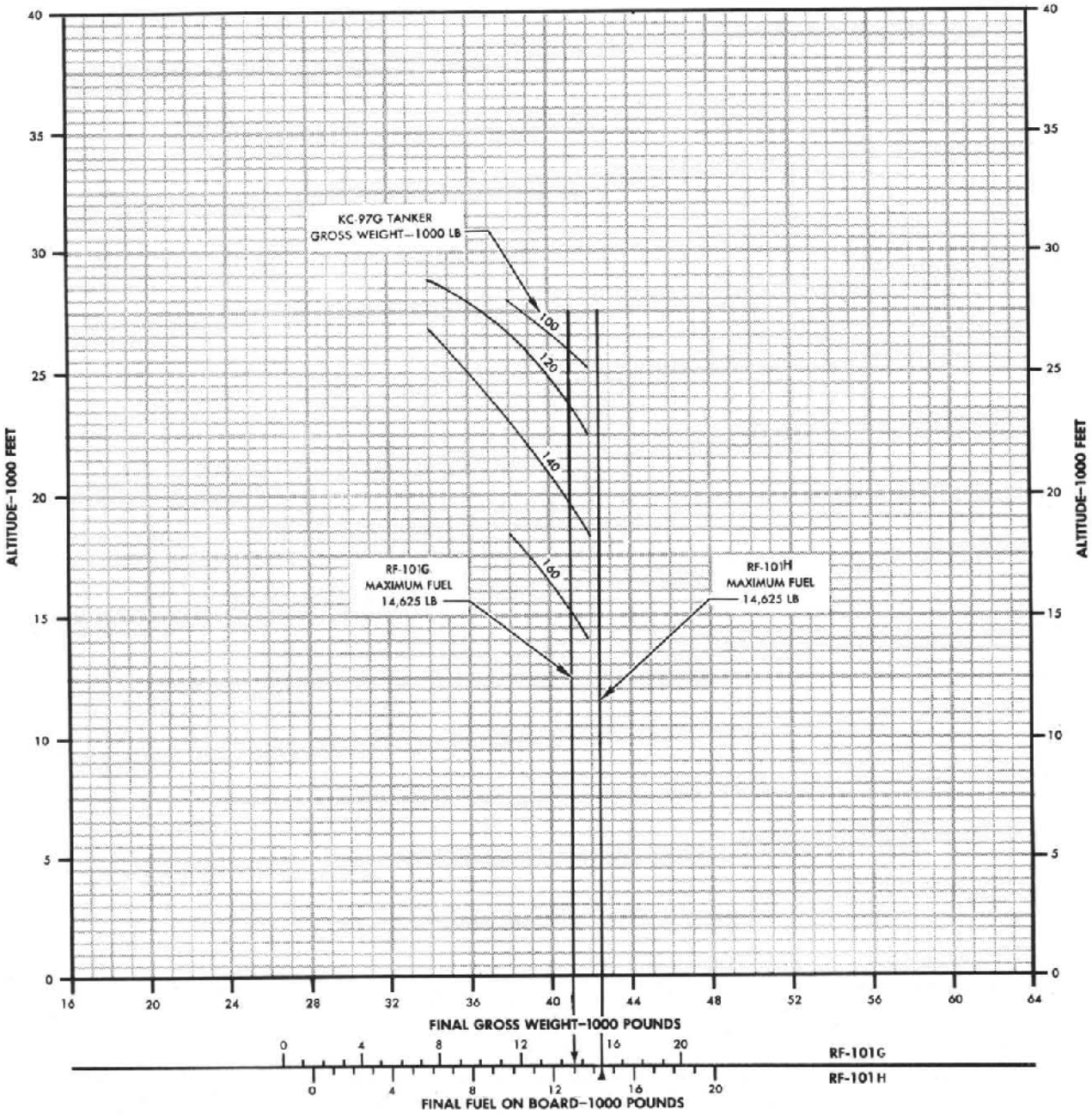
REMARKS
ENGINE(S):(2)J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDE



DATE: 1 MARCH 1956
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P613

Figure A6-7

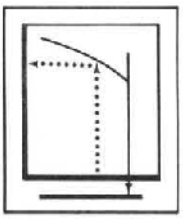
MAXIMUM REFUELING ALTITUDE

KC-97G TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H; (2) 450 GALLON TANKS
FLAPS EXTENDED

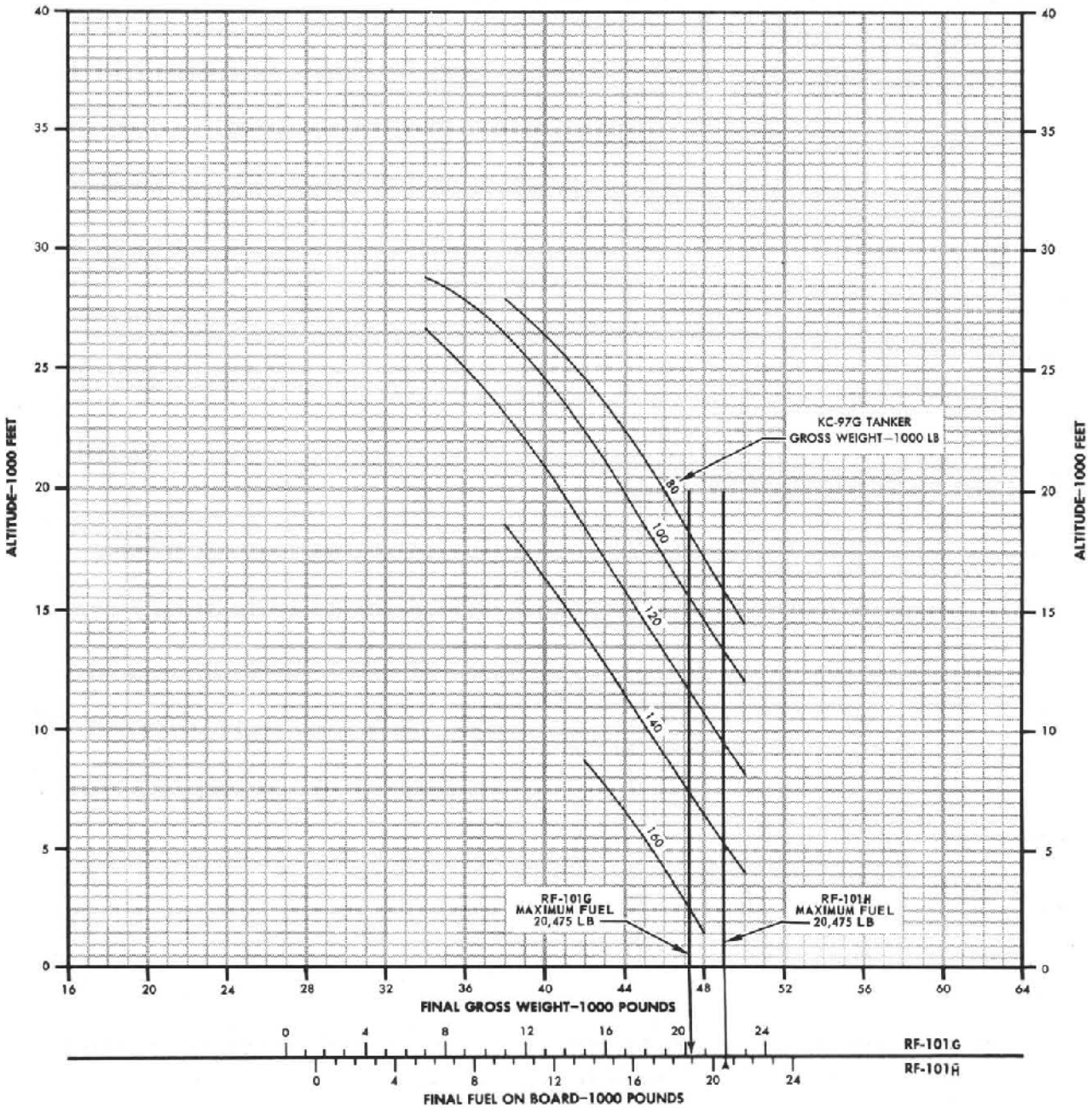
REMARKS
ENGINE(S):(2)J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDE



DATE: 1 MARCH 1956
DATA BASIS: **ESTIMATED**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG–P614

Figure A6-8

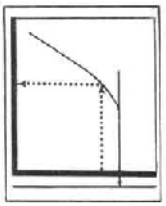
MAXIMUM REFUELING ALTITUDE

KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN

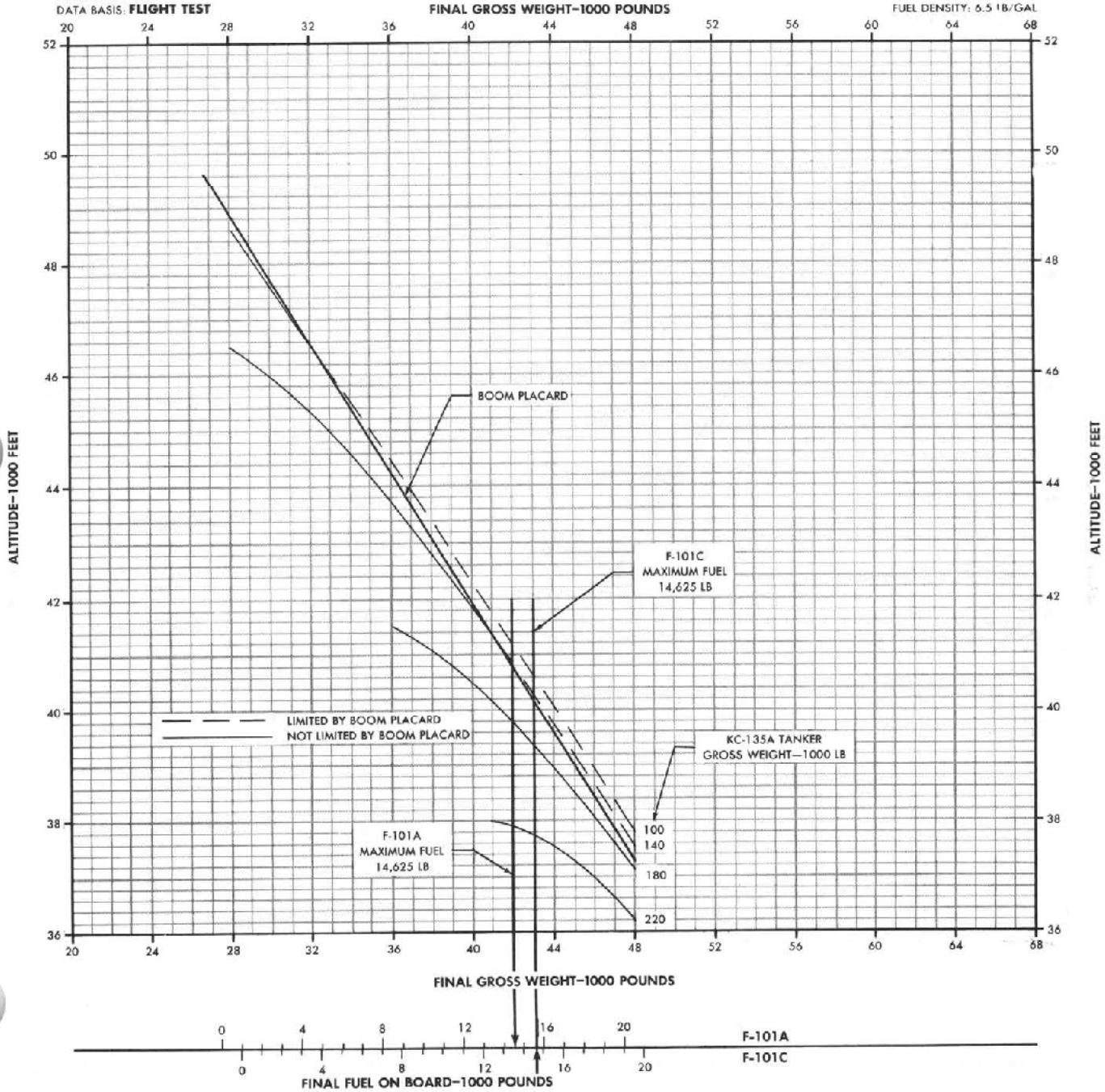
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION .

GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P615

Figure A6-9

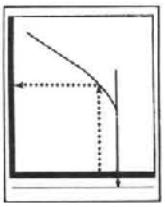
MAXIMUM REFUELING ALTITUDE

KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION .

GUIDE



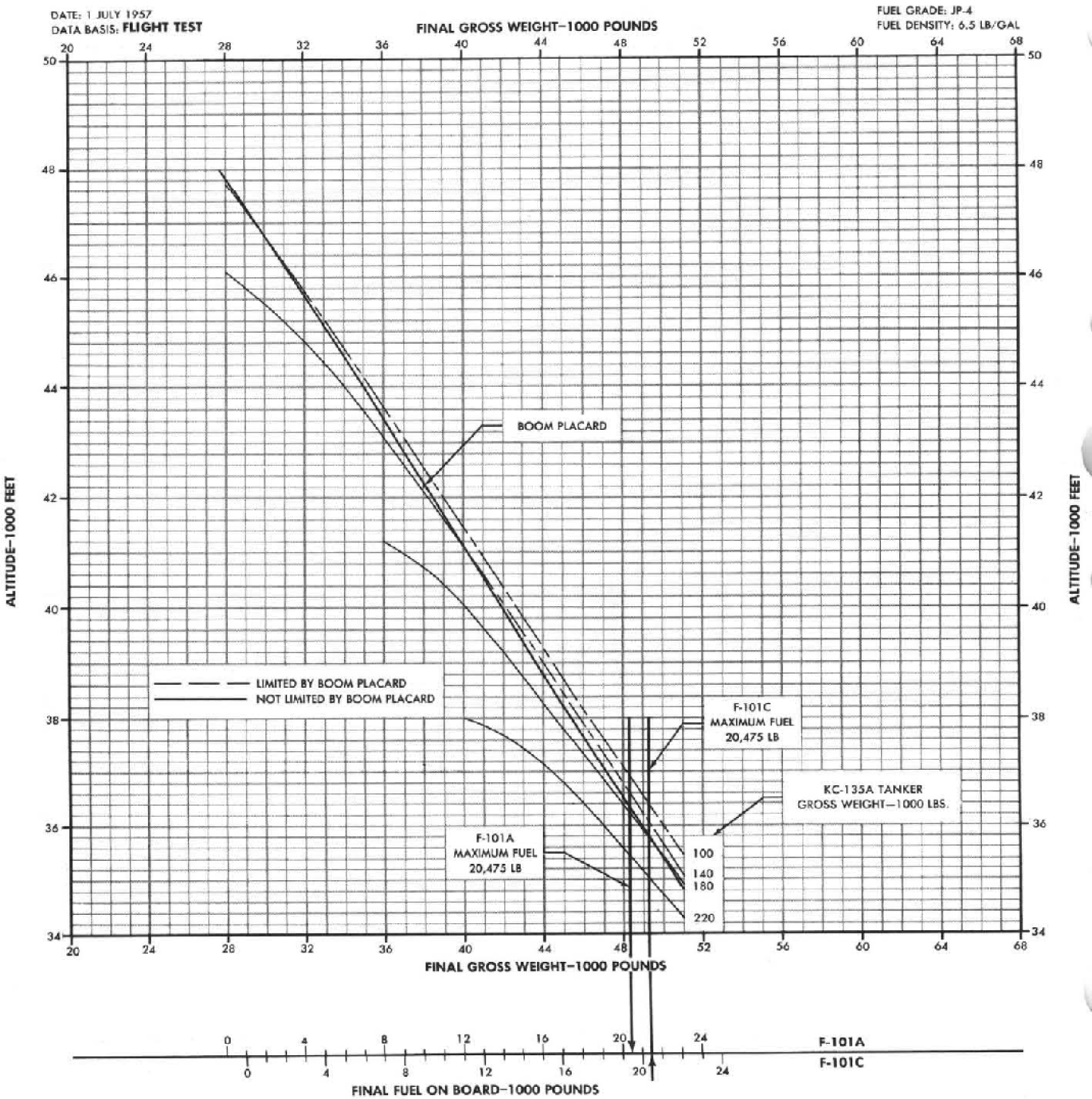


Figure A6-10

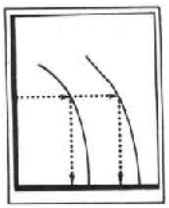
MAXIMUM FORMATING SPEEDS

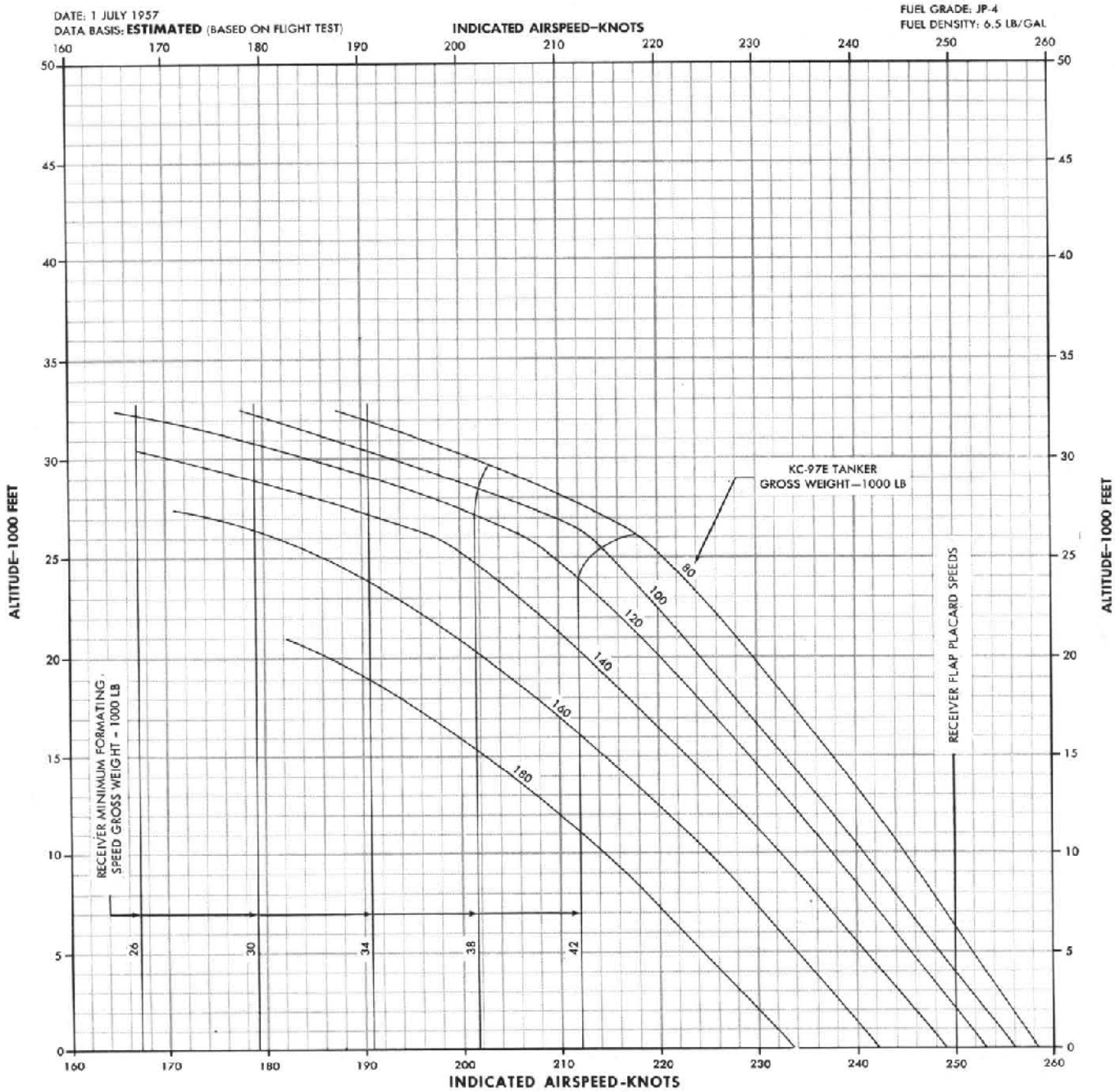
KC-97E TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN
FLAPS EXTENDED

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDF





RFG-P617

Figure A6-11

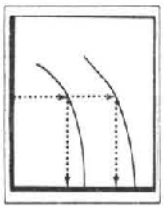
MAXIMUM FORMATING SPEEDS

KC-97E TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : (2) 450 GALLON TANKS
FLAPS EXTENDED

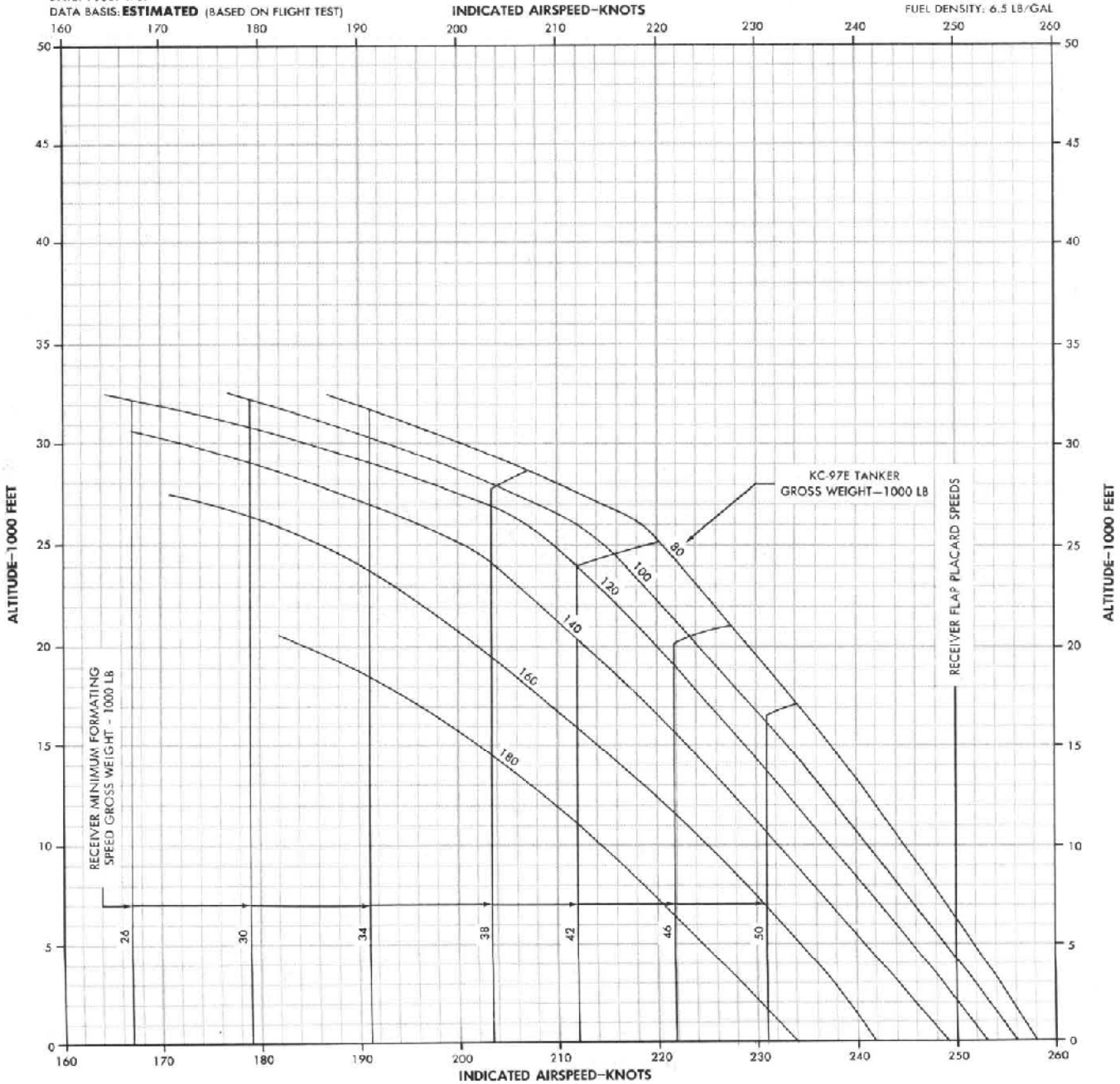
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDE



DATE: 1 JULY 1957
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P618

Figure A6-12

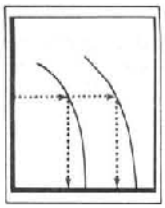
MAXIMUM FORMATING SPEEDS

KC-97G TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN
FLAPS EXTENDED

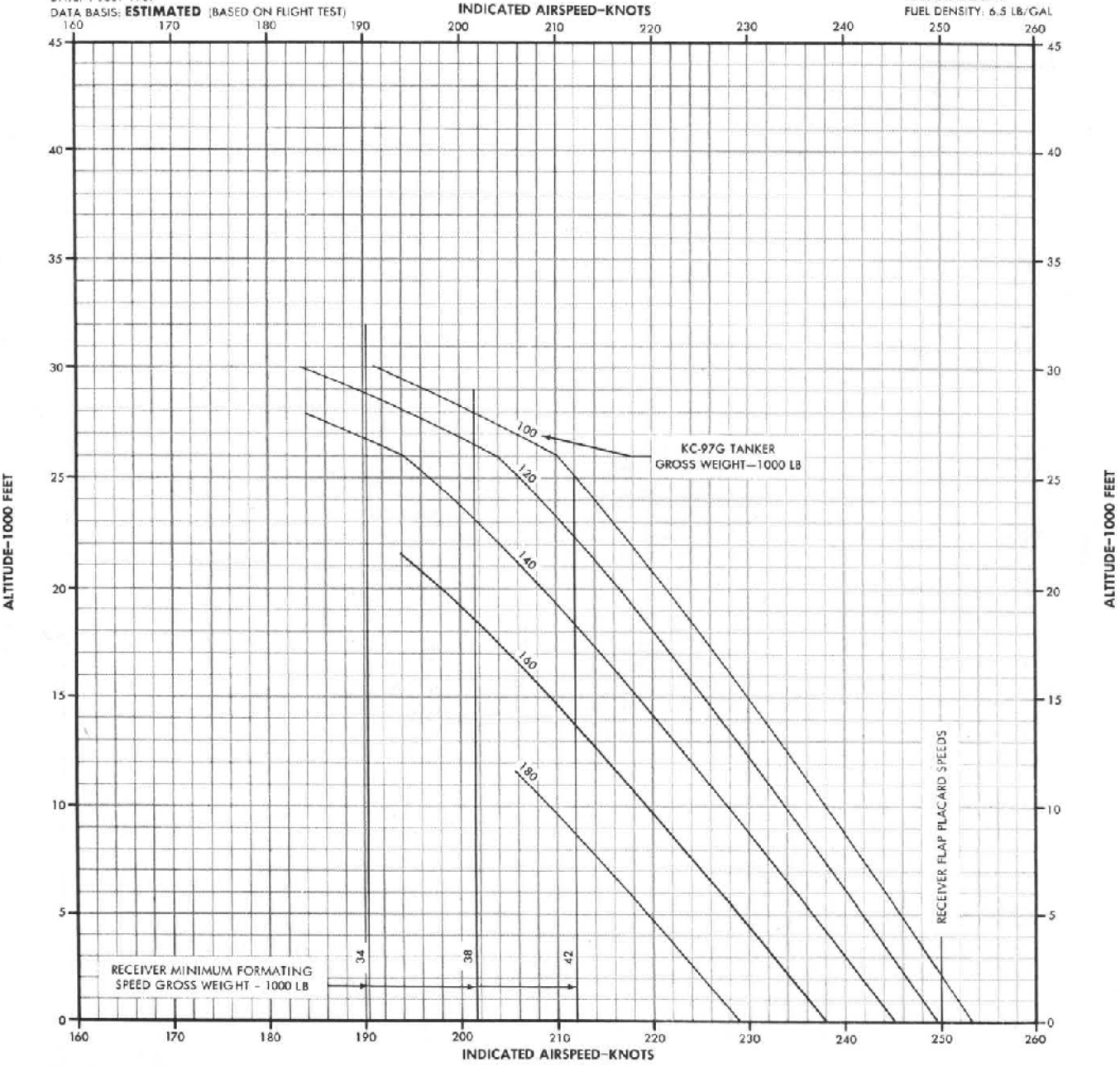
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDE



DATE: 1 JULY 1957
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P619

Figure A6-13

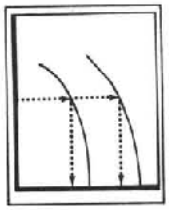
MAXIMUM FORMATING SPEEDS

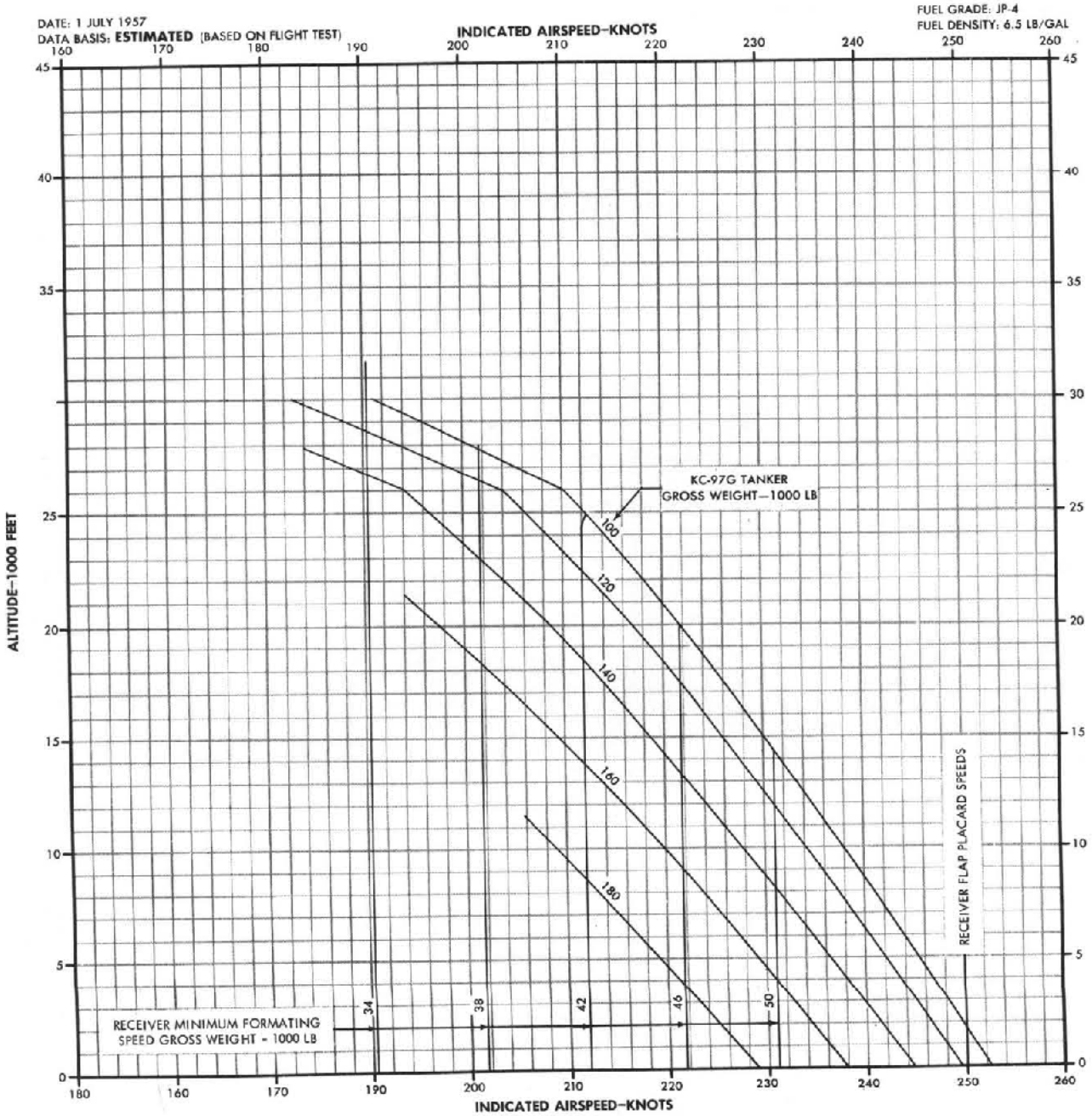
KC-97G TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : (2) 450 GALLON TANKS
FLAPS EXTENDED

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDE





RFG-P620

Figure A6-14

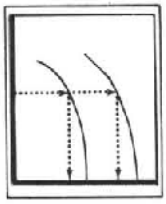
MAXIMUM FORMATING SPEEDS

KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN

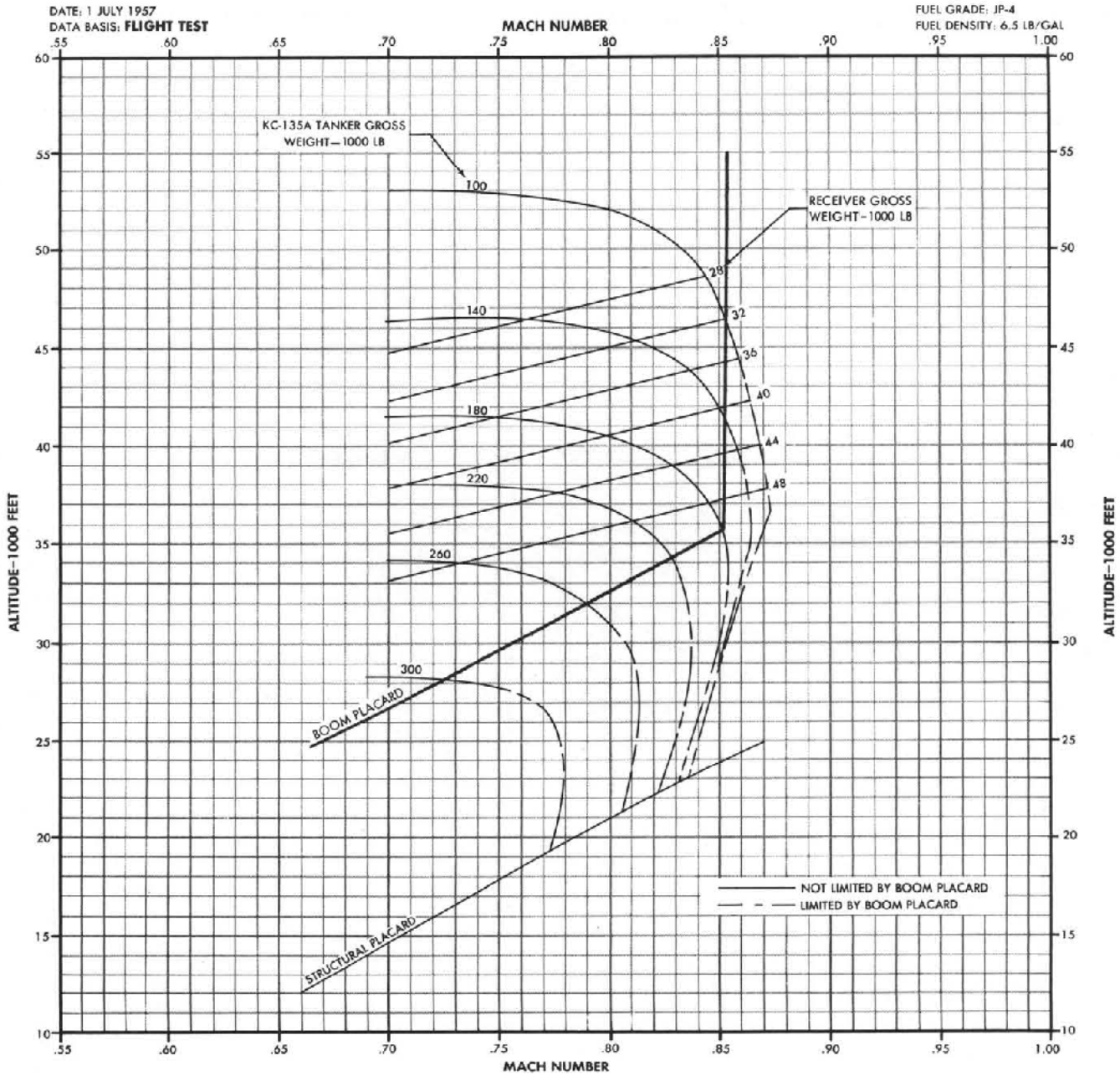
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION .

GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P621

Figure A6-15

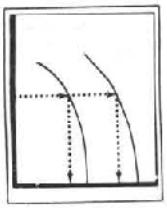
MAXIMUM FORMATING SPEEDS

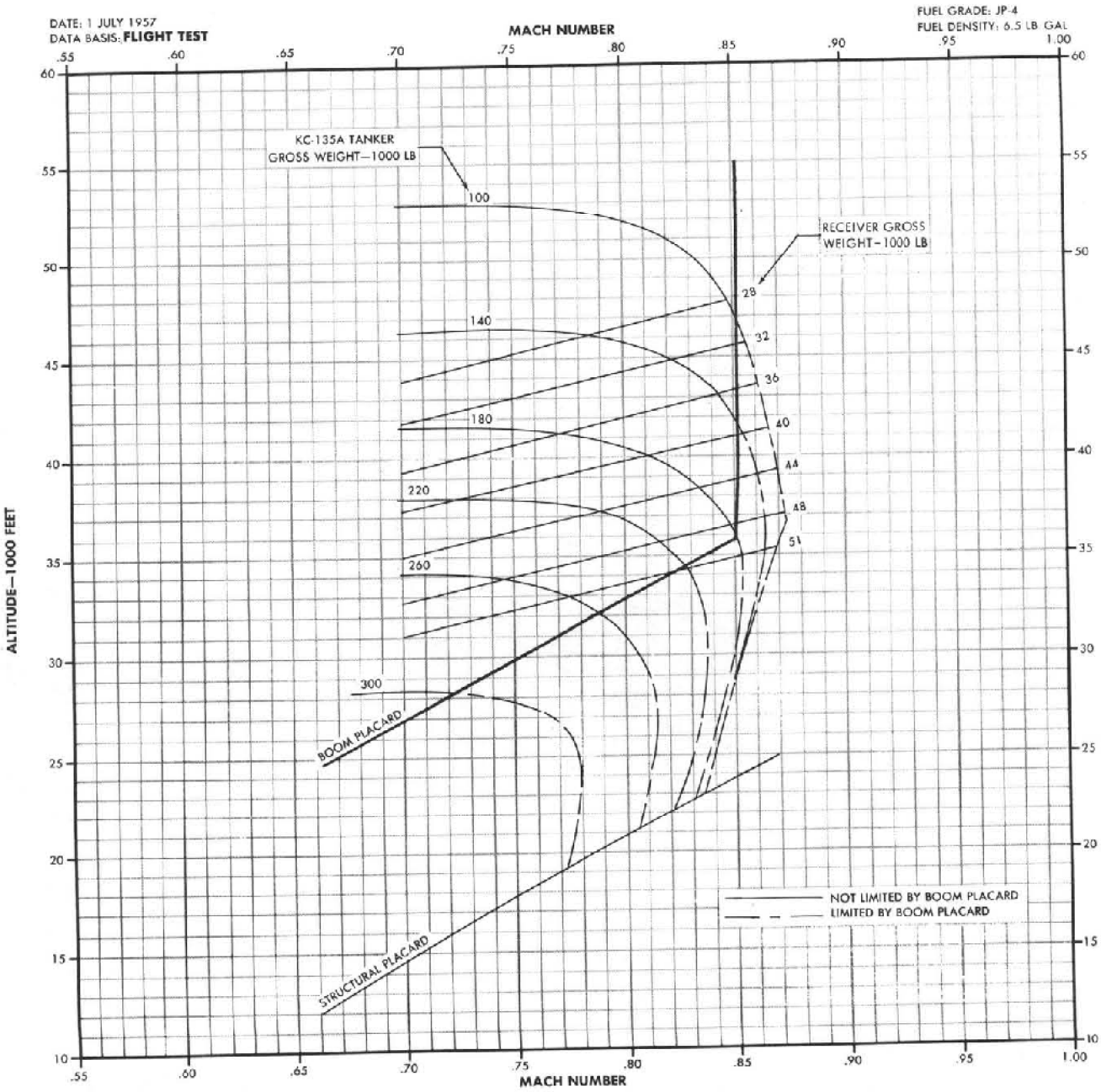
KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : (2) 450 GALLON TANKS

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
REFUEL FLIGHT SPEED IS MAXIMUM CONTINUOUS THRUST HIGH SPEED OF THE TANKER WITH THE BOOM IN CONTACT POSITION.

GUIDE





RFG-P622

Figure A6-16

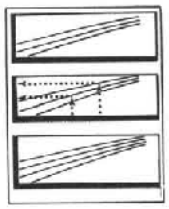
FUEL CONSUMPTION DURING AIR REFUELING

KC-97E TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN
FLAPS EXTENDED

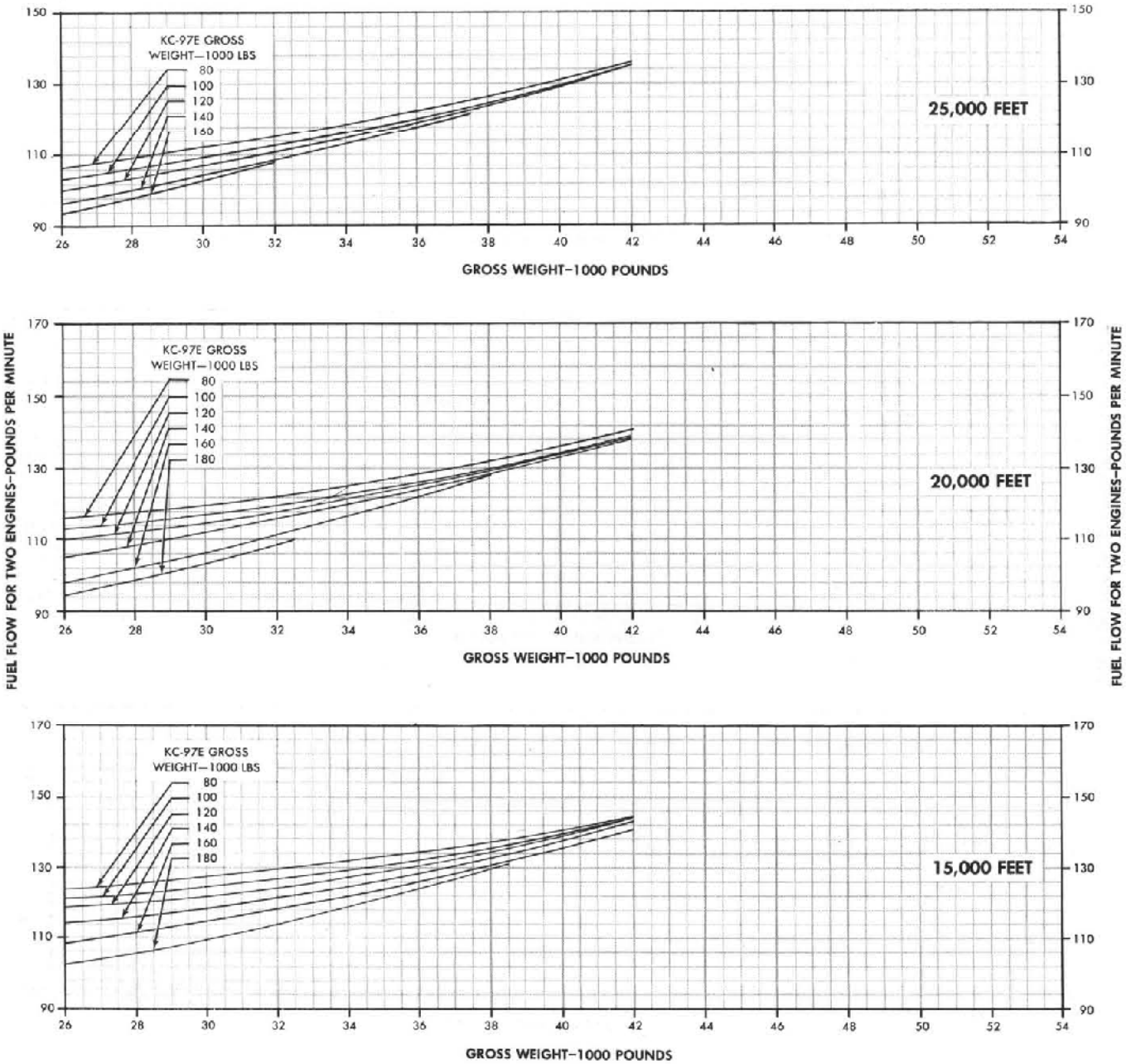
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 MARCH 1956
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P623

Figure A6-17

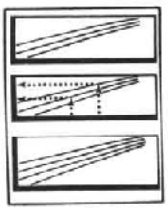
FUEL CONSUMPTION DURING AIR REFUELING

KC-97E TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : (2) 450 GALLON TANKS
FLAPS EXTENDED

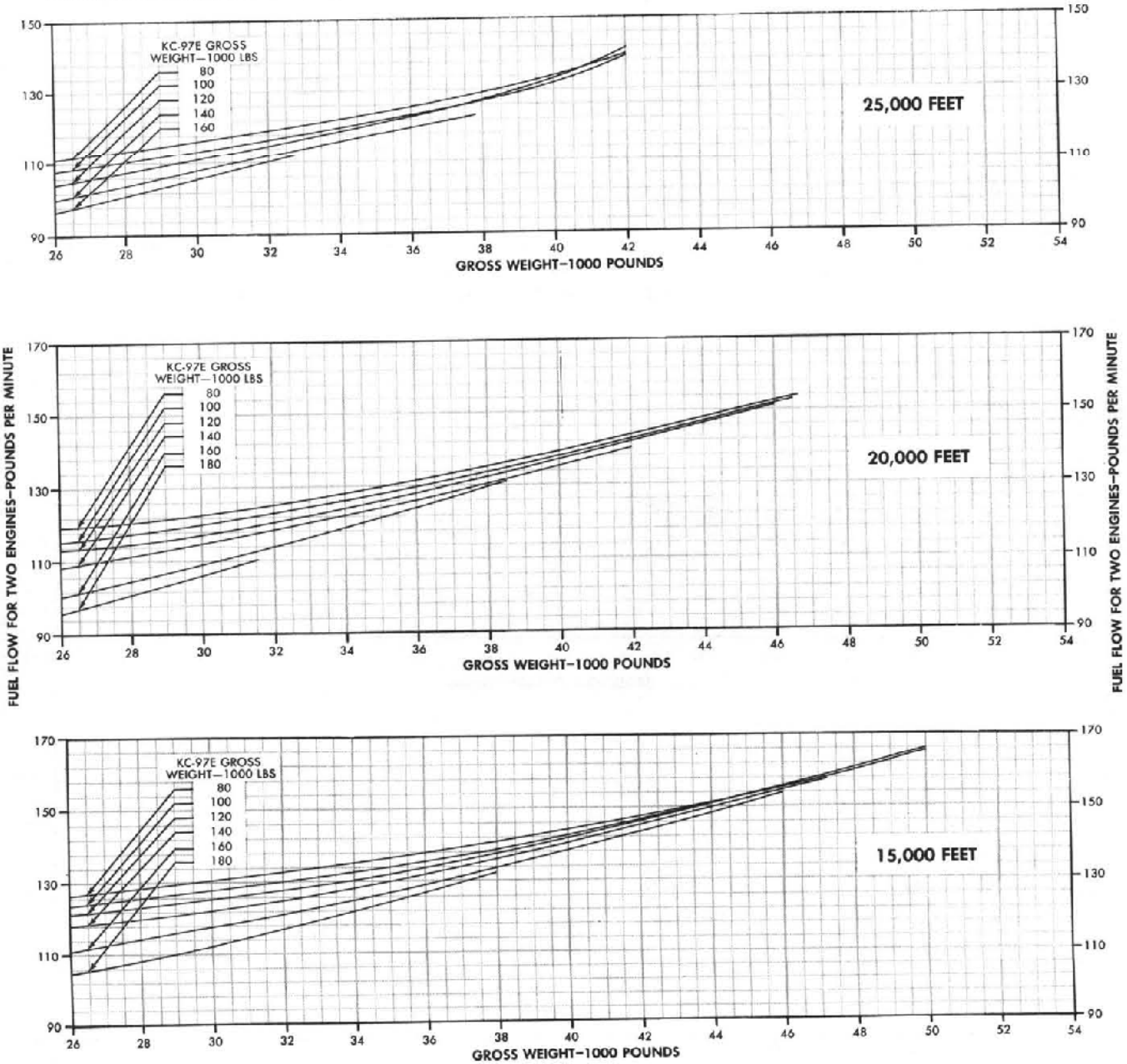
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 MARCH 1956
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P624

Figure A6-18

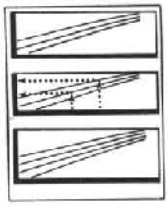
FUEL CONSUMPTION DURING AIR REFUELING

KC-97G TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN
FLAPS EXTENDED

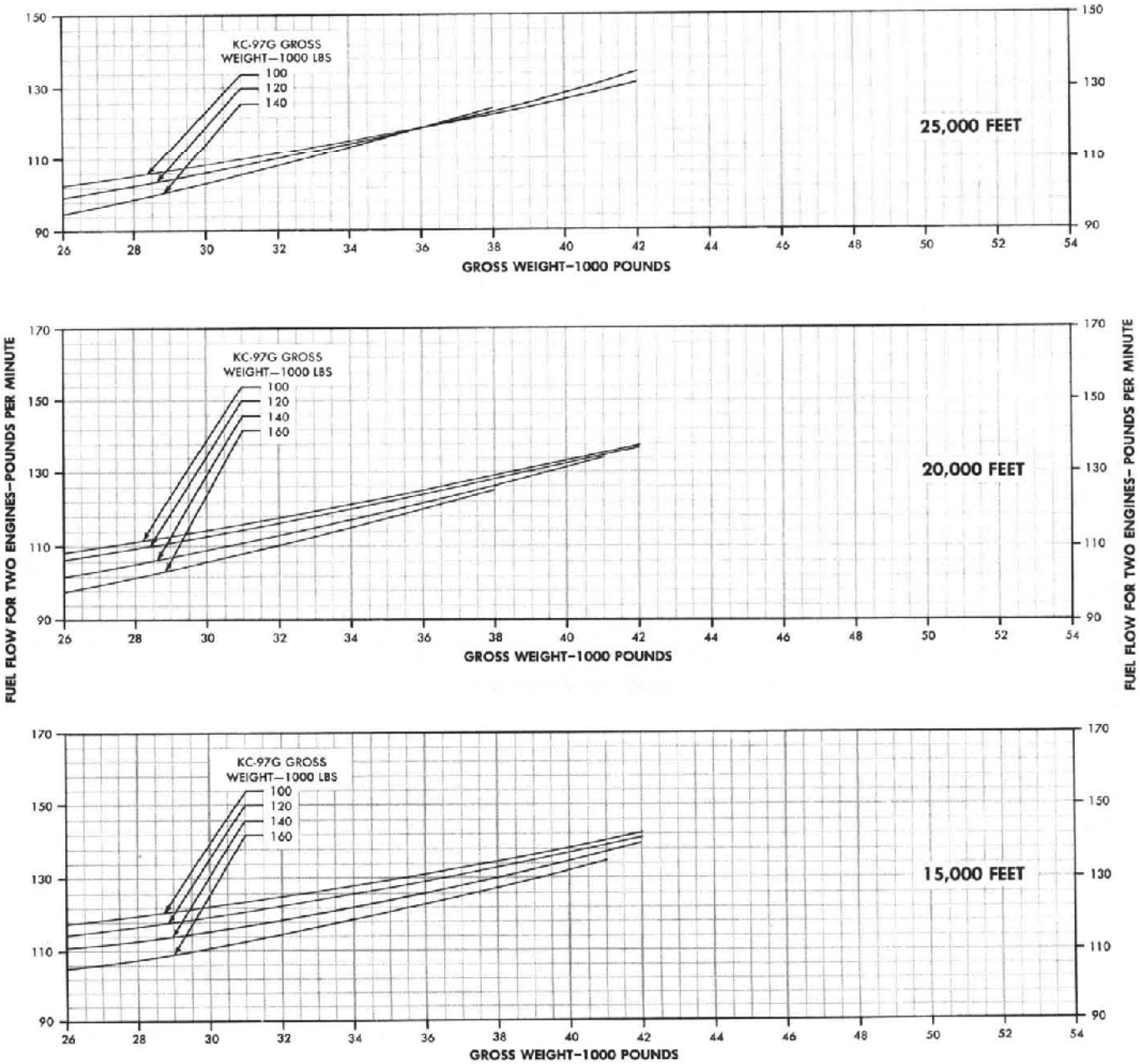
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 MARCH 1956
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P625

Figure A6-19

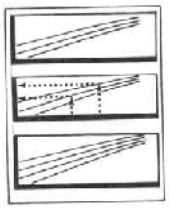
FUEL CONSUMPTION DURING AIR REFUELING

KC-97G TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : (2) 450 GALLON TANKS
FLAPS EXTENDED

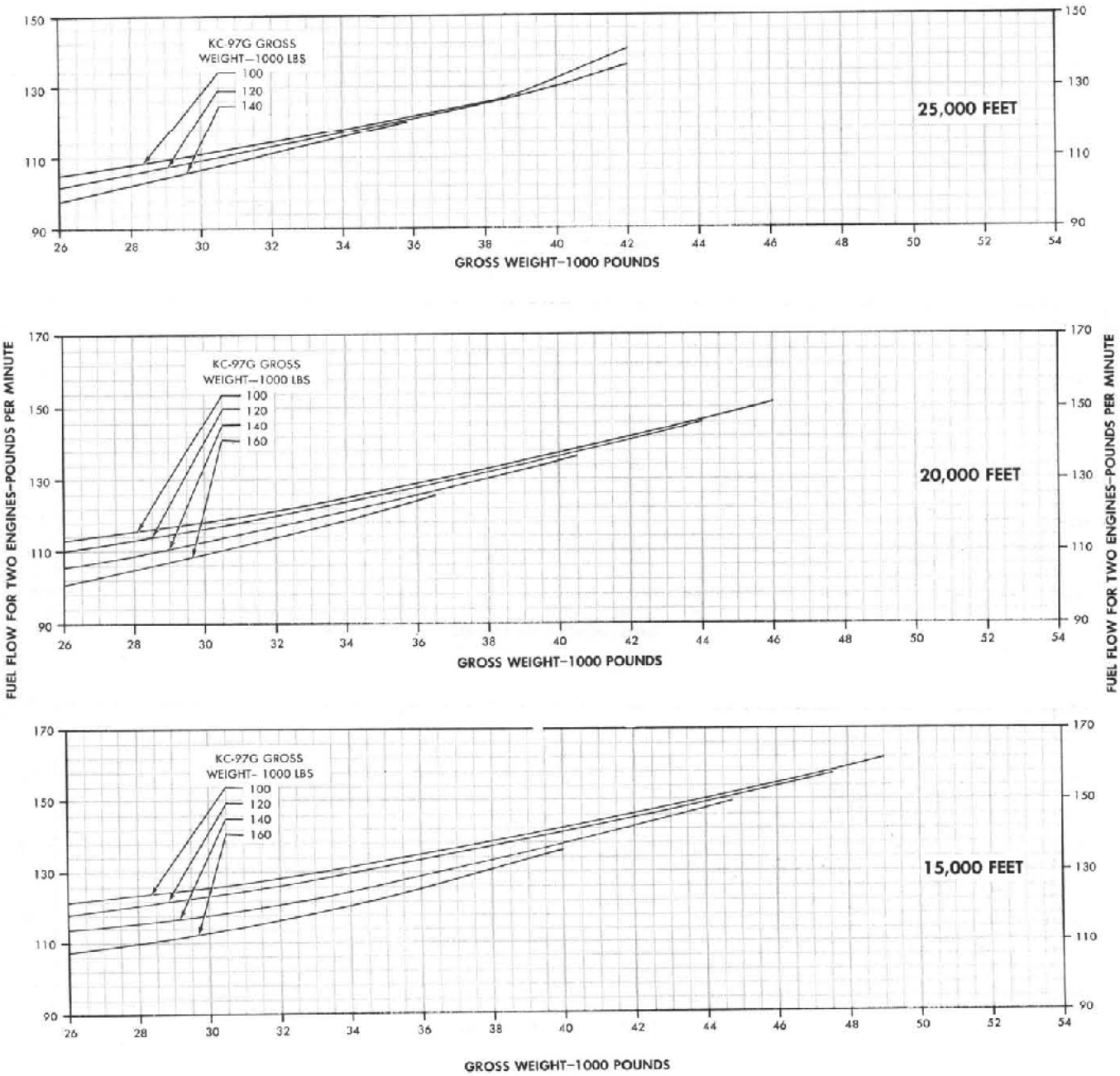
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 MARCH 1956
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P626

Figure A6-20

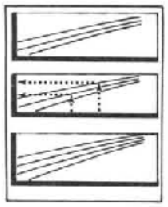
FUEL CONSUMPTION DURING AIR REFUELING

KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN

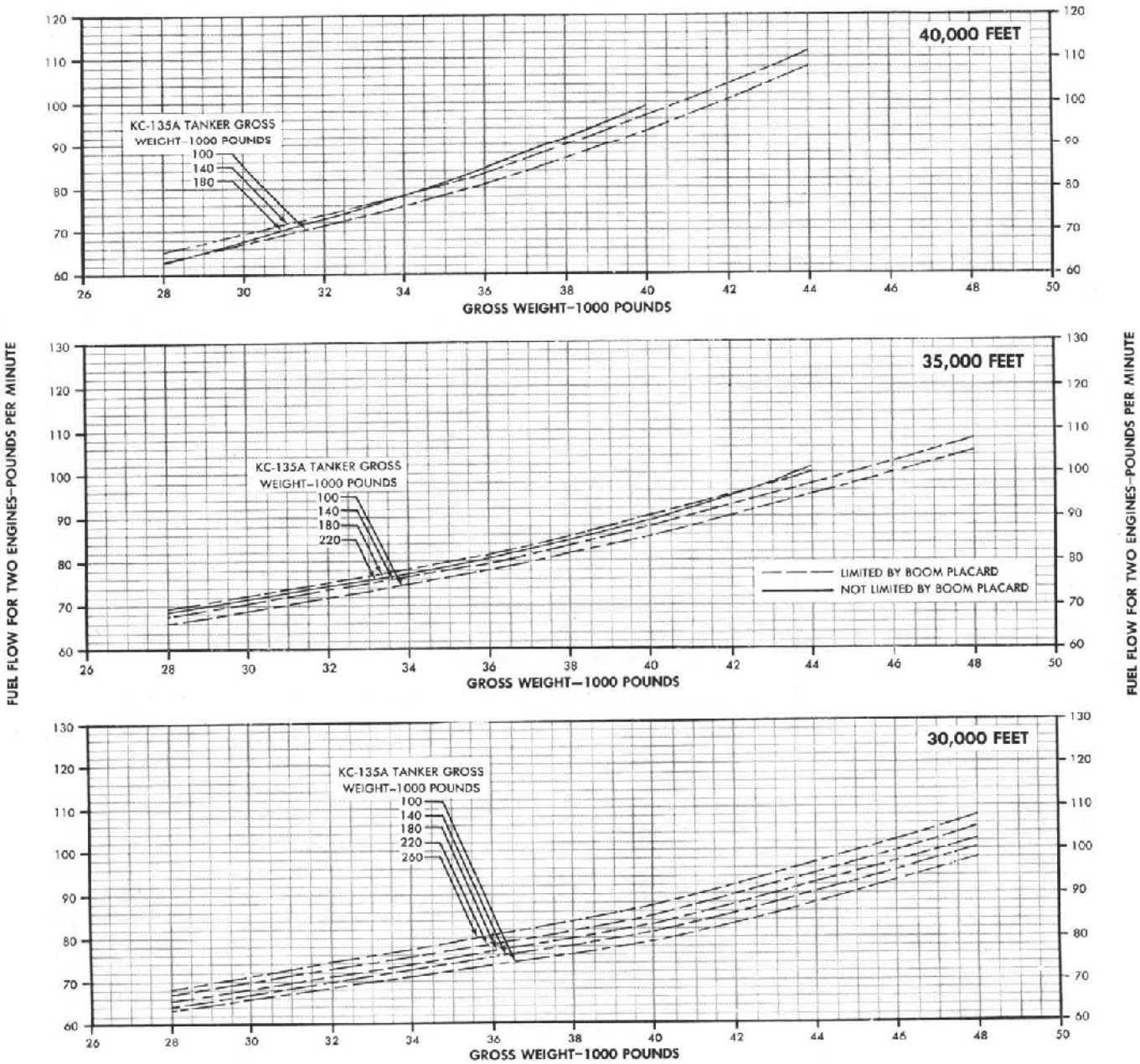
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P627

Figure A6-21

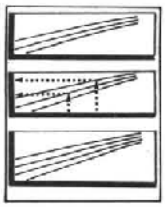
FUEL CONSUMPTION DURING AIR REFUELING

KC-135A TANKER

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : (2) 450 GALLON TANKS

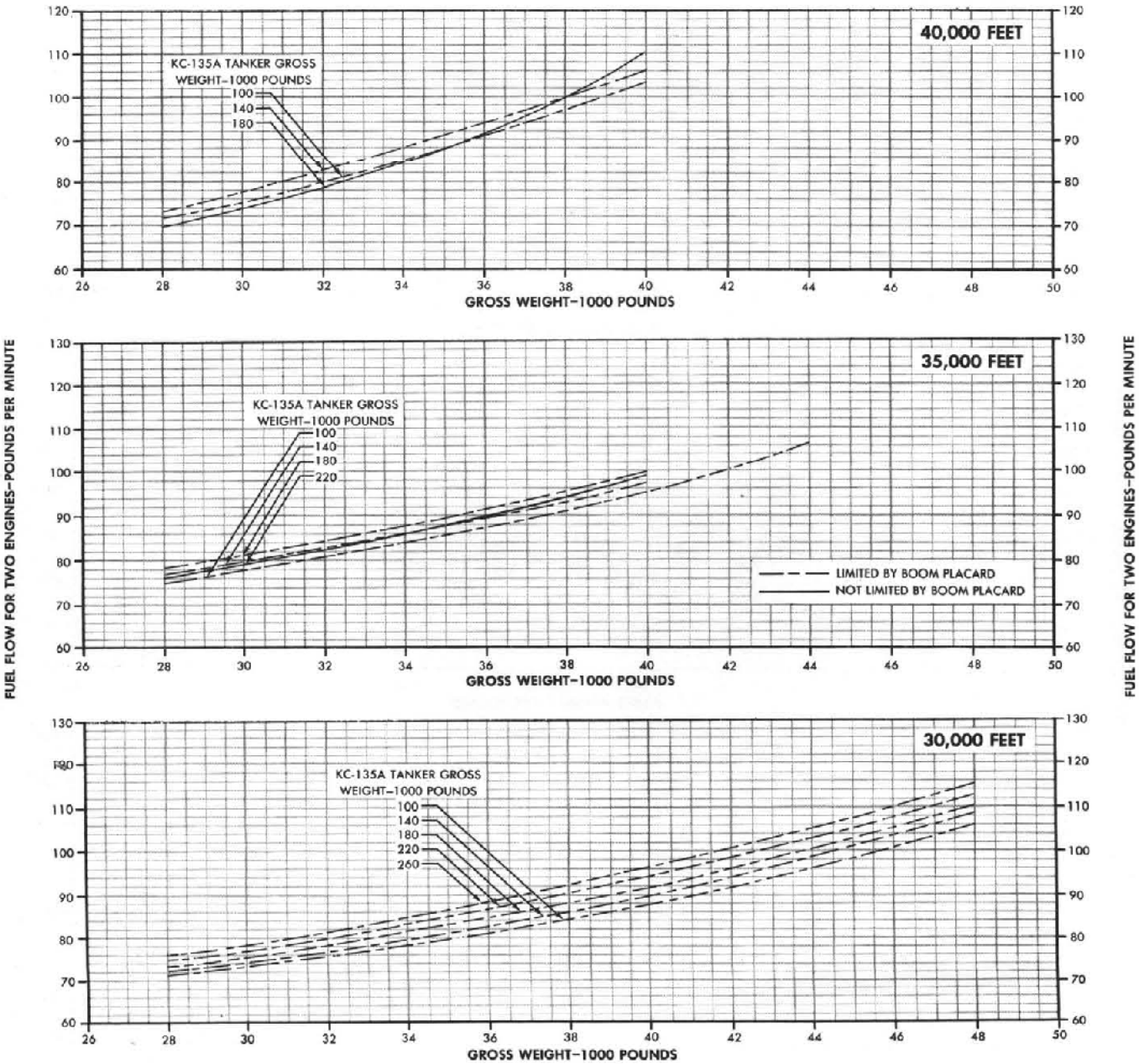
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG–P628

Figure A6-22

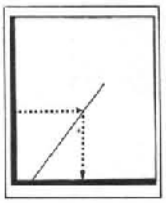
AIR REFUELING TRANSFER TIME

KC-135A TANKERS

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : ALL CONFIGURATIONS

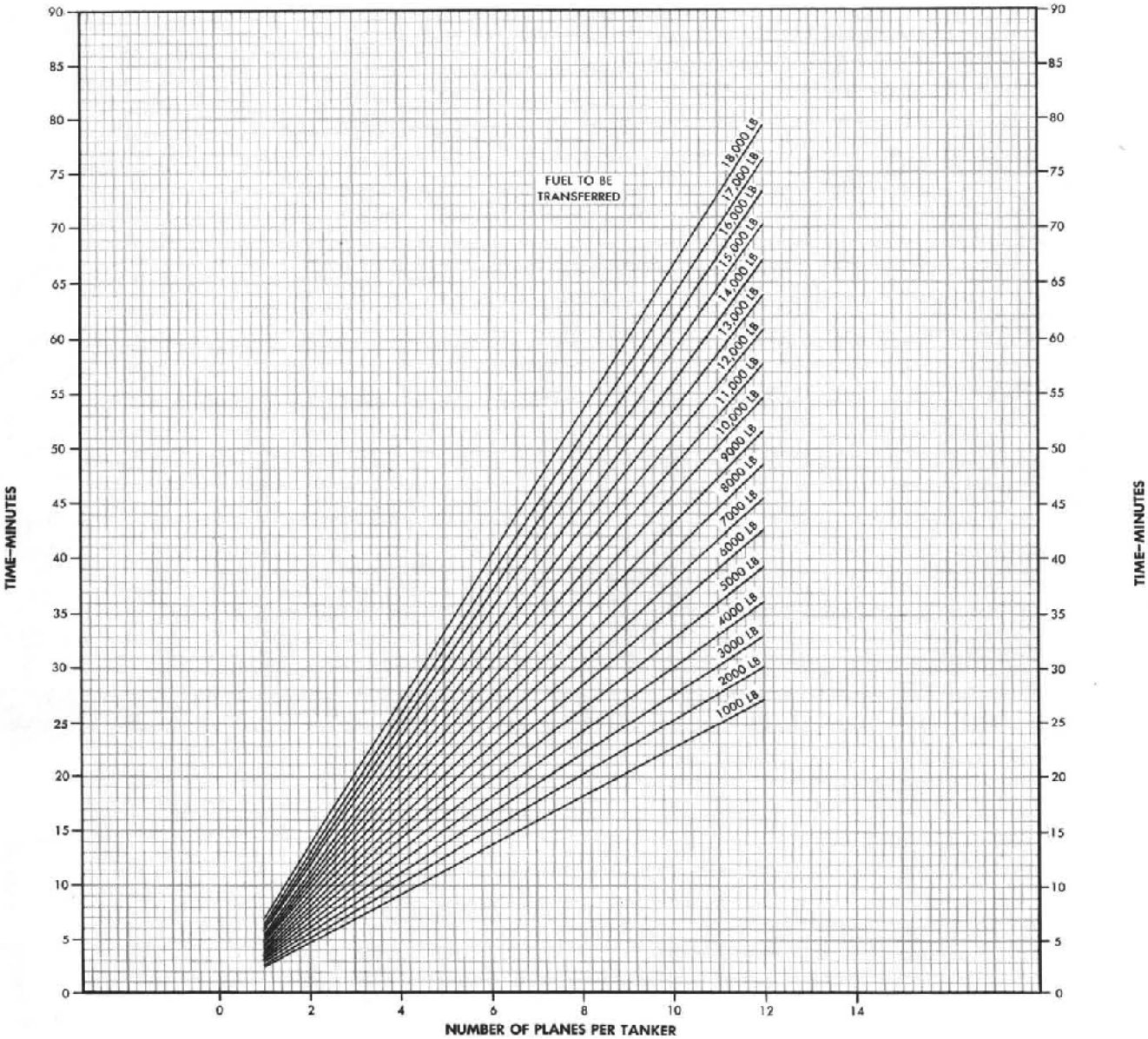
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
RATE OF TRANSFER IS
600 GALLONS PER MINUTE

GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

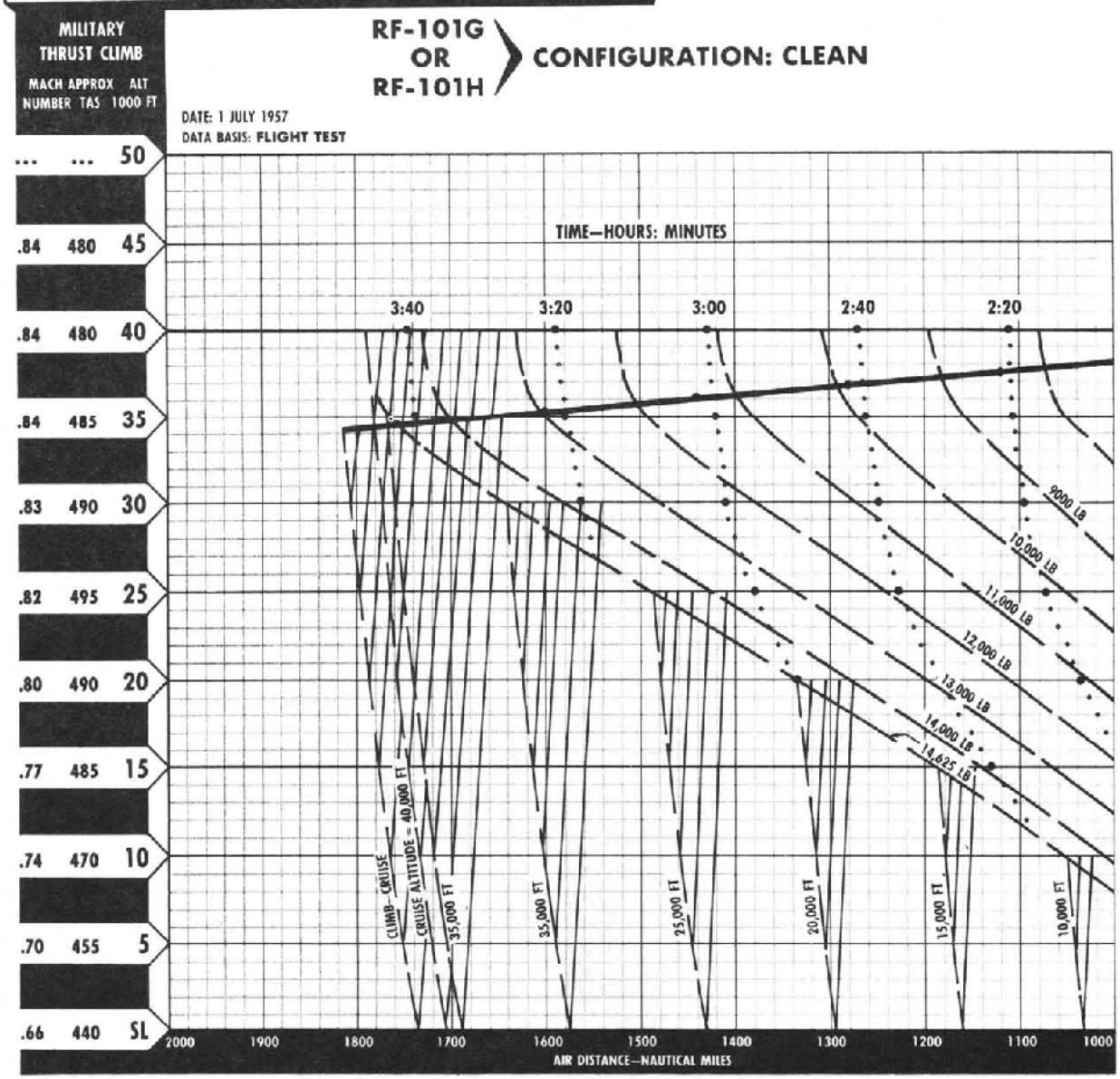
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P638

Figure A6-23

AIR REFUELING PROFILE



REMARKS

1. DOES NOT INCLUDE FUEL, TIME OR DISTANCE TO ACCELERATE TO BEST CLIMB FORMATING SPEED.
2. NO ALLOWANCE OR RESERVE MADE FOR LOITER, DESCENT OR LANDING.
3. USE MILITARY THRUST FOR CLIMBS. (SEE MILITARY THRUST CLIMB CHART FOR DETAILED INFORMATION.)
4. CRUISE AT RECOMMENDED MACH NUMBER.

LEGEND

- ZERO FUEL REMAINING
- FUEL AVAILABLE
- TIME
- CRUISE CLIMB PATH
- CONSTANT ALTITUDE CRUISE FLIGHT PATH
- CRUISE ALTITUDE GUIDE LINE

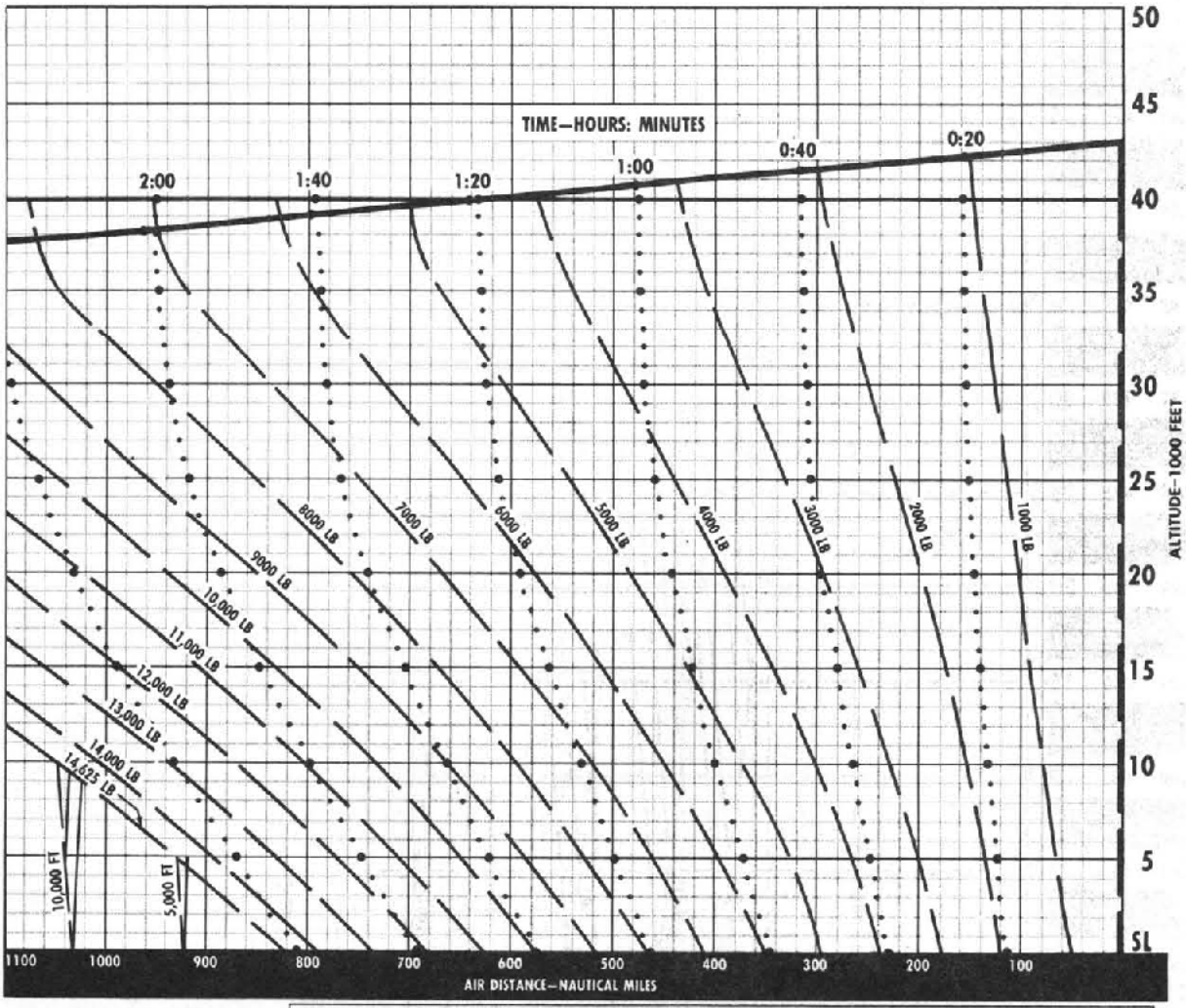
RFG-P630-3

Figure A6-24

MODEL: RF-101G OR RF-101H

ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
POST REFUELING GROSS WEIGHT 42,566 LB

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



CRUISE—CLEAN

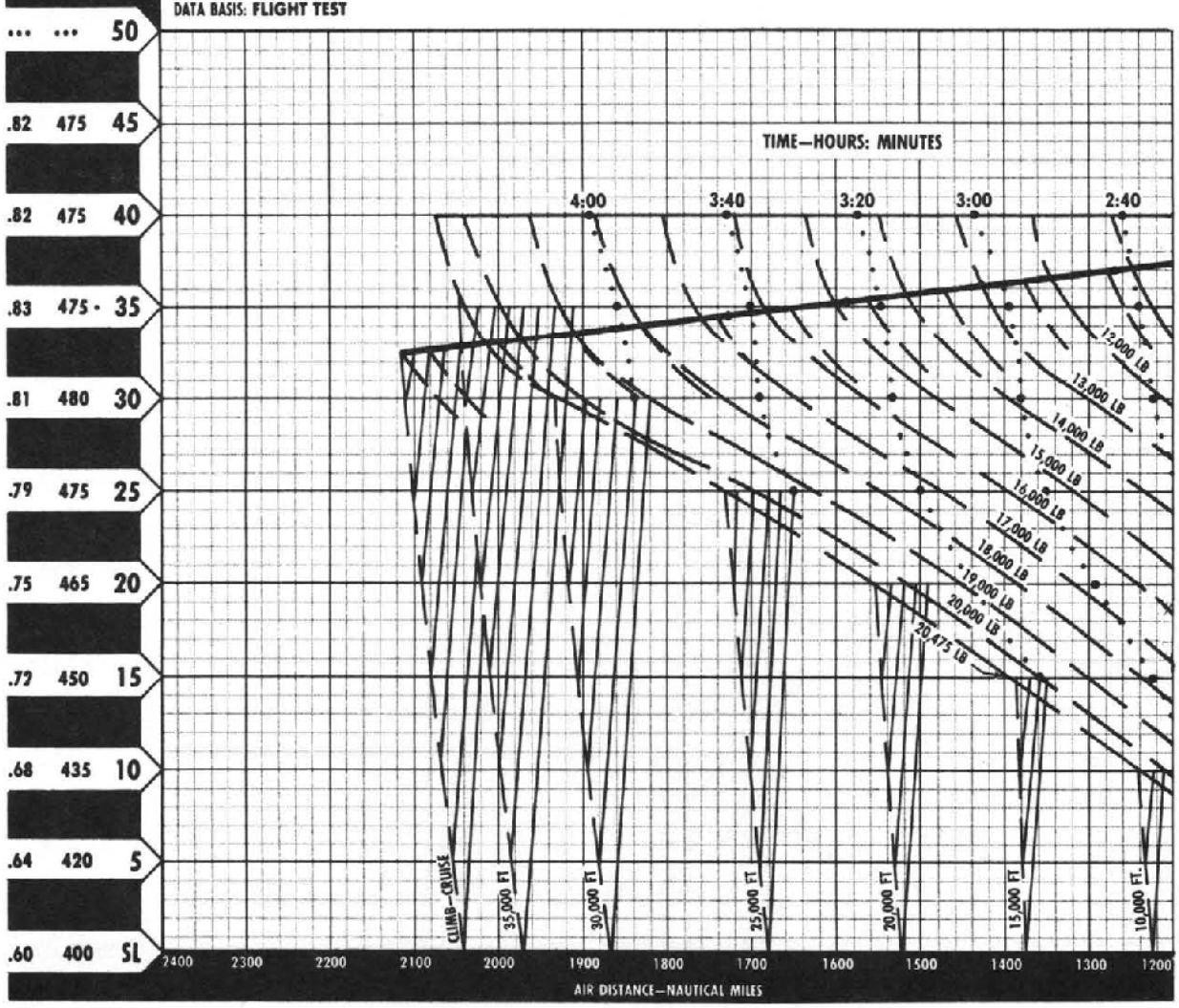
ALTITUDE	MACH NUMBER	APPROX TAS KNOTS	FULL FUEL LOAD MINUS WARM-UP TAKE-OFF AND CLIMB		FUEL USED 7313		EMPTY FUEL LOAD ZERO LB FUEL	
			APPROX FUEL FLOW LB/HR	APPROX PRESSURE RATIO	APPROX FUEL FLOW LB/HR	APPROX PRESSURE RATIO	APPROX FUEL FLOW LB/HR	APPROX PRESSURE RATIO
CRUISE-CLIMB								
INITIAL— 34,300	.84	486	4753	1.94	....	....	....	....
FINAL— 43,100	.84	482	....	....	....	....	3118	1.89
CONSTANT ALTITUDE CRUISE								
40,000 FT	.84	482	4907	2.25	3908	2.00	3142	1.79
35,000 FT	.82	474	4716	1.97	3917	1.78	3369	1.64
30,000 FT	.80	469	4786	1.78	4180	1.64	3702	1.54
25,000 FT	.76	460	5027	1.63	4536	1.53	4111	1.45
20,000 FT	.72	443	5331	1.56	4863	1.46	4452	1.41
15,000 FT	.68	423	5701	1.50	5216	1.43	4829	1.38
10,000 FT	.63	406	6069	1.43	5639	1.37	5286	1.34
5,000 FT	.58	347	6275	1.34	5899	1.31	5565	1.29
SEA LEVEL	.52	374	6635	1.29	6152	1.26	5726	1.23

RFG-P630-4

AIR REFUELING PROFILE

RF-101G OR RF-101H — **CONFIGURATION: TWO 450 GALLON TANKS**

DATE: 1 JULY 1957
DATA BASIS: FLIGHT TEST



REMARKS

1. DOES NOT INCLUDE FUEL, TIME OR DISTANCE TO ACCELERATE TO BEST CLIMB FORMATING SPEED.
2. NO ALLOWANCE OR RESERVE MADE FOR LOITER, DESCENT OR LANDING.
3. USE MILITARY THRUST FOR CLIMBS. (SEE MILITARY THRUST CLIMB CHART FOR DETAILED INFORMATION.)
4. CRUISE AT RECOMMENDED MACH NUMBER.

LEGEND

- ZERO FUEL REMAINING
- FUEL AVAILABLE
- TIME
- CRUISE CLIMB PATH
- CONSTANT ALTITUDE CRUISE FLIGHT PATH
- CRUISE ALTITUDE GUIDE LINE

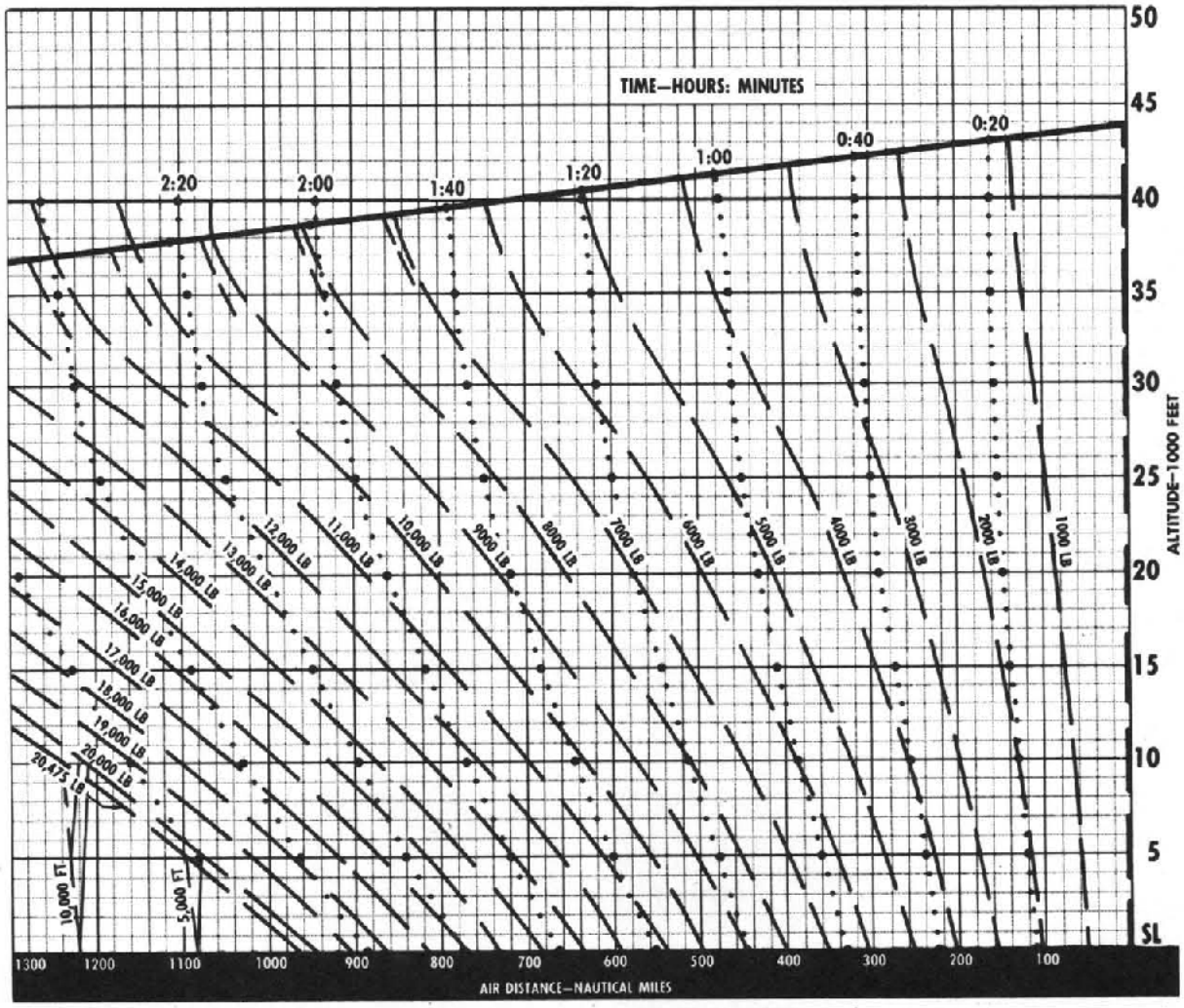
RFG-P631-3

Figure A6-25

MODEL: RF-101G OR RF-101H

ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY
POST REFUELING GROSS WEIGHT 48,829 LB

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



CRUISE—(2) 450 GALLON TANKS

ALTITUDE	MACH NUMBER	APPROX TAS KNOTS	FULL FUEL LOAD MINUS WARM-UP TAKE-OFF AND CLIMB		FUEL USED 10,238 LB		EMPTY FUEL LOAD ZERO LB FUEL	
			APPROX FUEL FLOW LB/HR	APPROX PRESSURE RATIO	APPROX FUEL FLOW LB/HR	APPROX PRESSURE RATIO	APPROX FUEL FLOW LB/HR	APPROX PRESSURE RATIO
CRUISE-CLIMB								
INITIAL– 32,459 FT	.83	484	5995	2.14	....	....	....	....
FINAL– 43,800 FT	.83	476	....	....	....	....	3465	2.04
CONSTANT ALTITUDE CRUISE								
35,000 FT	.81	465	6023	2.26	4636	1.97	3761	1.76
30,000 FT	.78	460	5920	2.03	4863	1.81	4197	1.66
25,000 FT	.75	450	6215	1.84	5300	1.69	4678	1.58
20,000 FT	.70	431	6520	1.76	5641	1.62	5017	1.53
15,000 FT	.65	408	6846	1.70	5991	1.57	5397	1.47
10,000 FT	.60	385	7143	1.61	6374	1.50	5755	1.42
5,000 FT	.56	362	7510	1.47	6766	1.39	6209	1.34
SEA LEVEL	.50	333	7744	1.37	6981	1.32	6367	1.28

RFG–P631–4

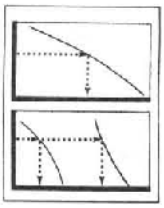
DESCENT FROM OPTIMUM CRUISE TO REFUEL ALTITUDE

KC-97E, KC-97G AND KC-135A TANKERS

AIRPLANE CONFIGURATION
RF-101G OR RF-101H : CLEAN

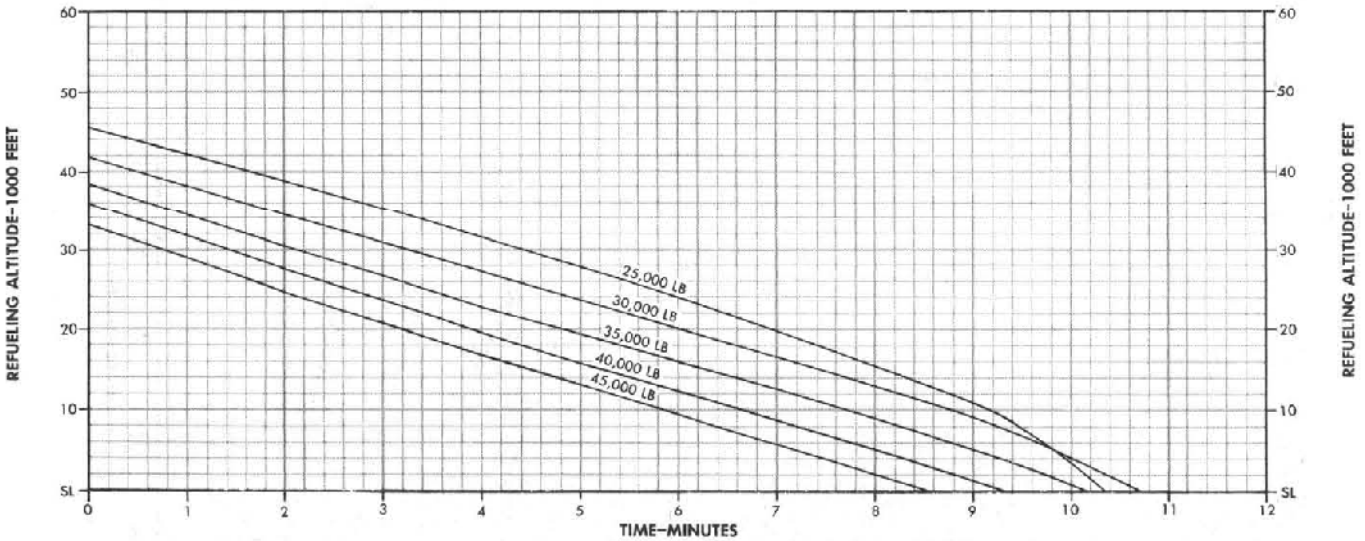
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

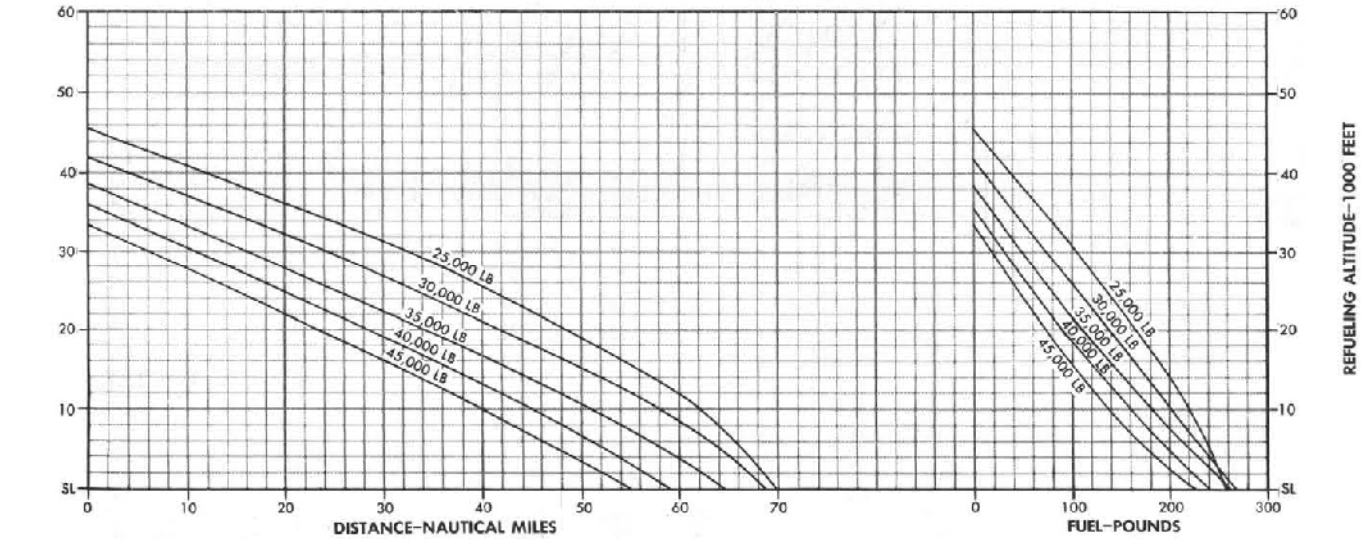
GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFG-P639

Figure A6-26

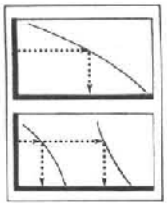
DESCENT FROM OPTIMUM CRUISE TO REFUEL ALTITUDE

KC-97E, KC-97G AND KC-135A TANKERS

AIRPLANE CONFIGURATION
F-101G OR RF-101H : (2) 450 GALLON TANKS

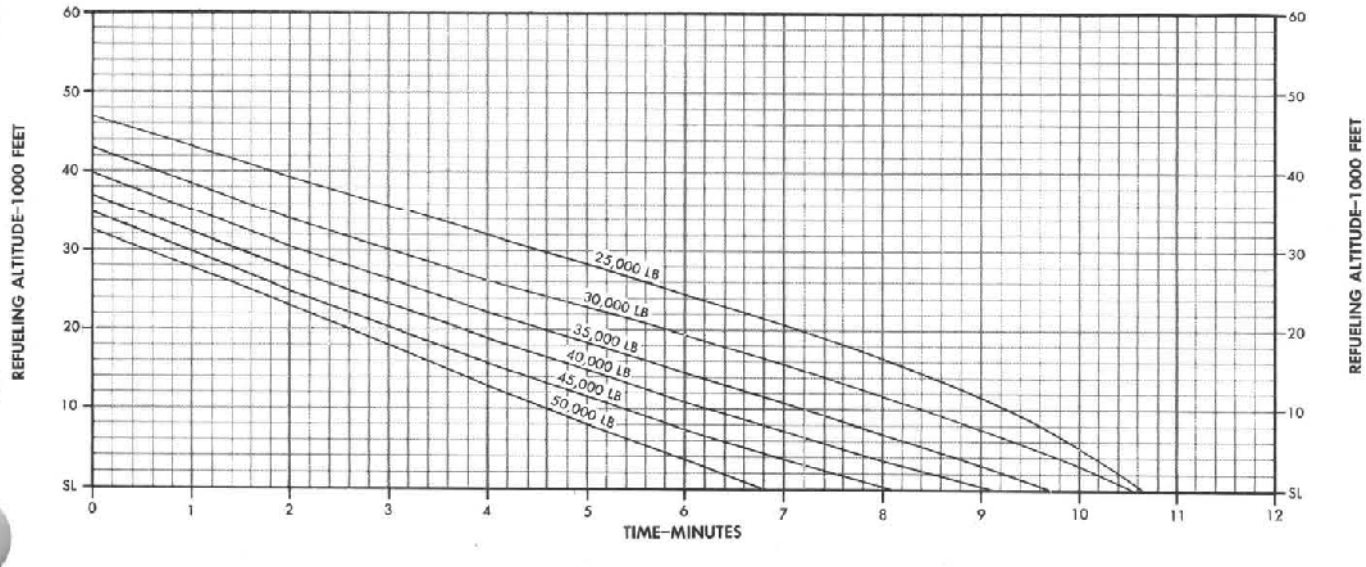
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

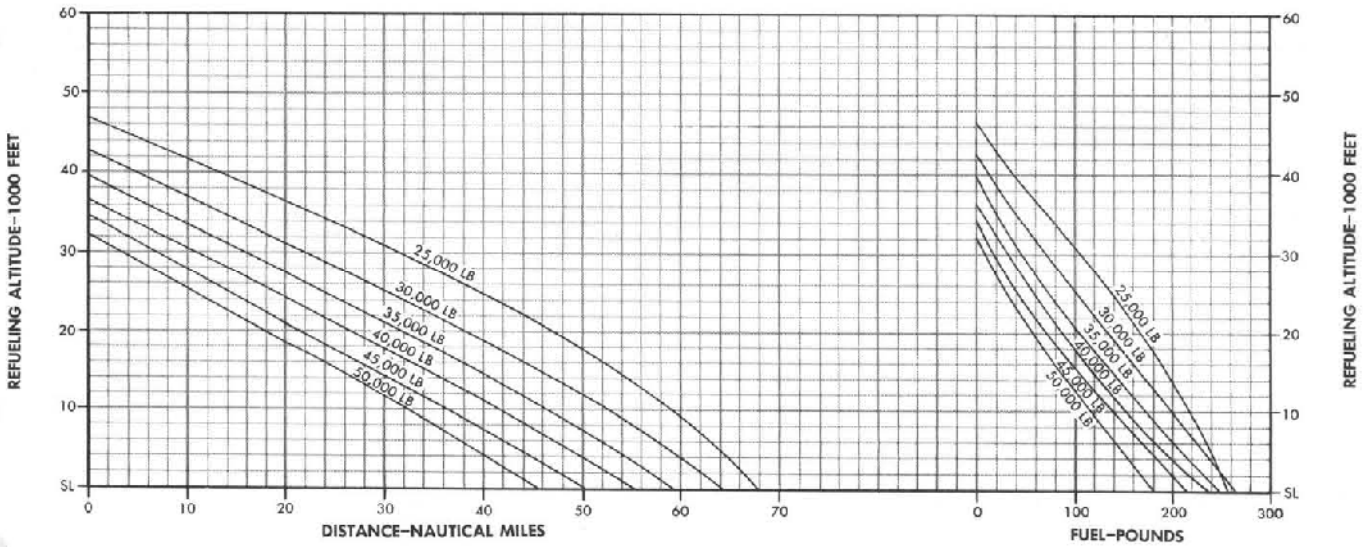
GUIDE



DATE: 1 JULY 1957
DATA BASIS: **FLIGHT TEST**

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL





RFG–P640

Figure A6-27

Part 7
DESCENT

DESCENT CHARTS

The descent charts provided in this part supply the pilot with three alternate descent schedules. They include a maximum range descent, a penetration descent, speed brakes in and a penetration descent, speed brake extended.

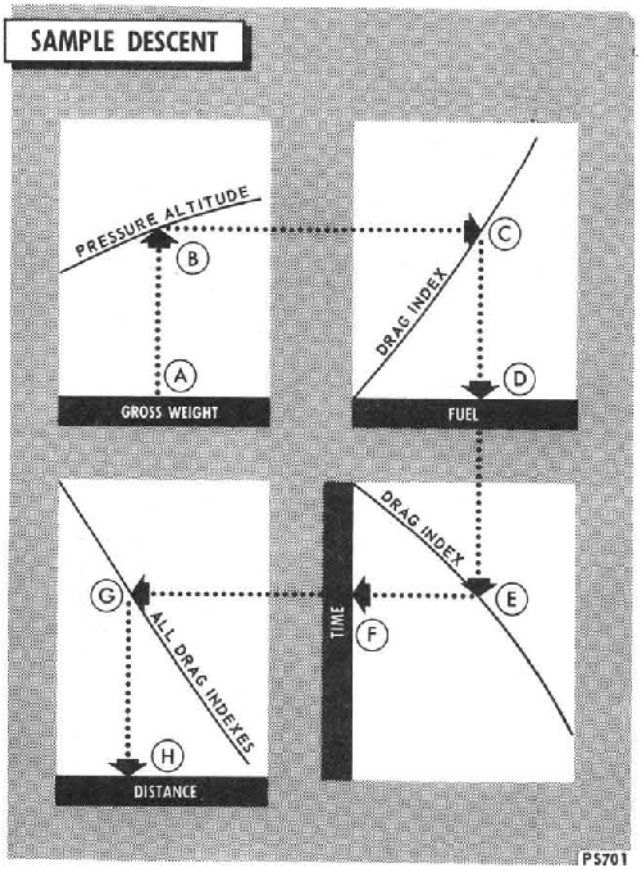
USE

Since the layout of the charts is similar, the use of all three will be undertaken simultaneously. Enter the charts with the airplane gross weight at the start of descent. Project up to the altitude at which the descent is to be commenced. Note the corresponding Mach number. From this point project horizontally to the right to the drag index, then downward to read total fuel consumed in the descent. Proceed on down to the drag index within the time plot, then horizontally to the left to read the time required for the descent. From this point proceed further to the left to the drag index reflector, then downward to read the horizontal distance covered during descent. If the descent is to be broken off before reaching sea level, simply enter the chart again with the estimated gross weight for the level-off altitude, and proceed as before. Then subtract the data obtained for level-off from the corresponding data for the initial descent to obtain the incremental data desired.

SAMPLE PROBLEM

Maximum Range Descent

A.	Initial Gross Weight	40,000 Lbs.
B.	Pressure Altitude	30,000 Ft.
C.	Drag Index	10
D.	Fuel Used	1140 Lbs.
E.	Drag Index	10
F.	Time to Descend to Sea Level	15 Minutes
G.	Drag Reflector	
H.	Distance Traveled	108 Miles



MAXIMUM RANGE DESCENT

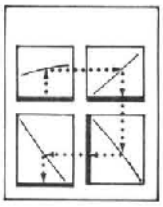
IDLE THRUST
300 KCAS TO MACH 0.85

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

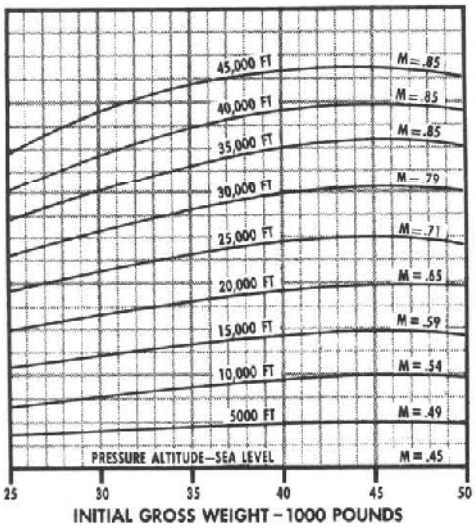
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

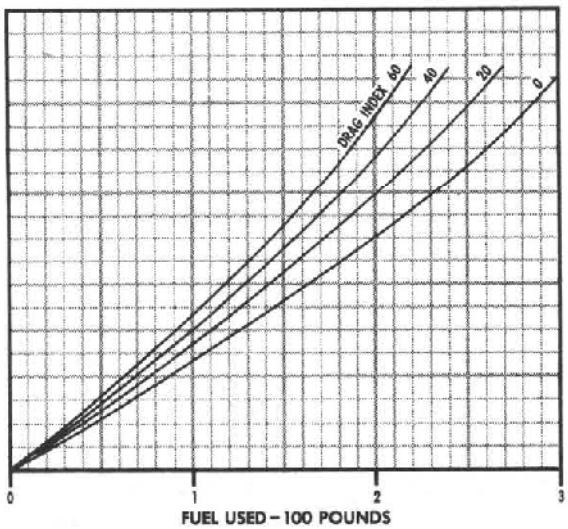
GUIDE

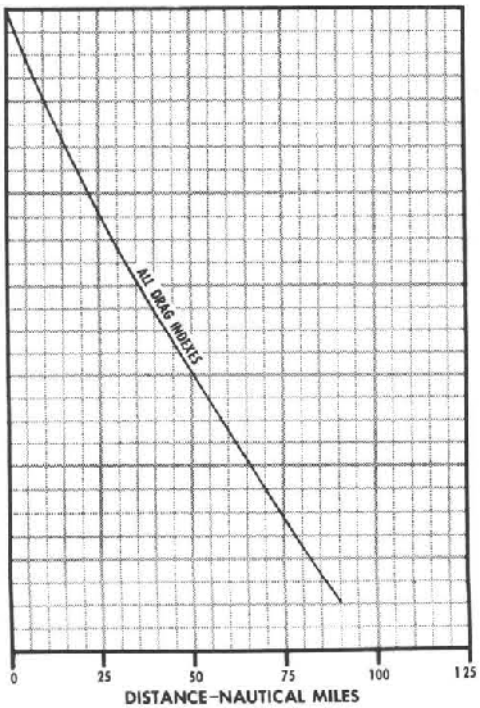


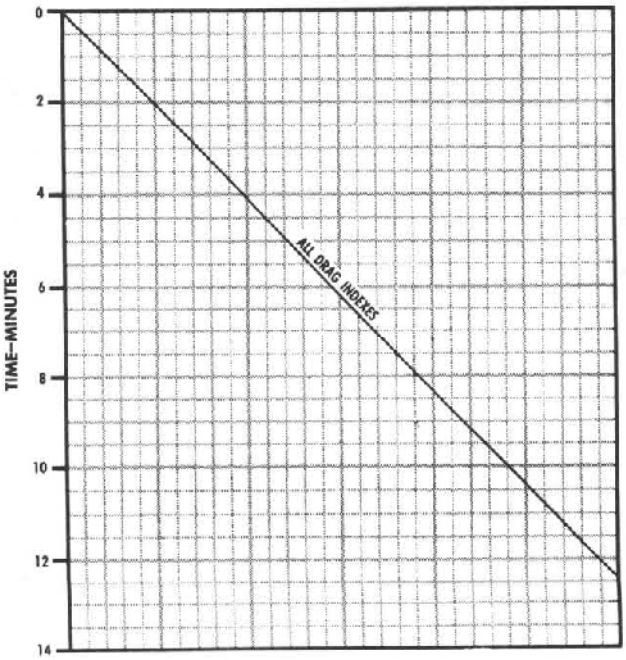
DATE: 1 NOVEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL









RFG-P702

Figure A7-1

PENETRATION DESCENT

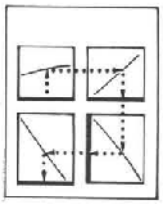
78% RPM
350 KCAS TO MACH 0.81

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

DRAG INDEX
INDIVIDUALLY NOTED
0-60

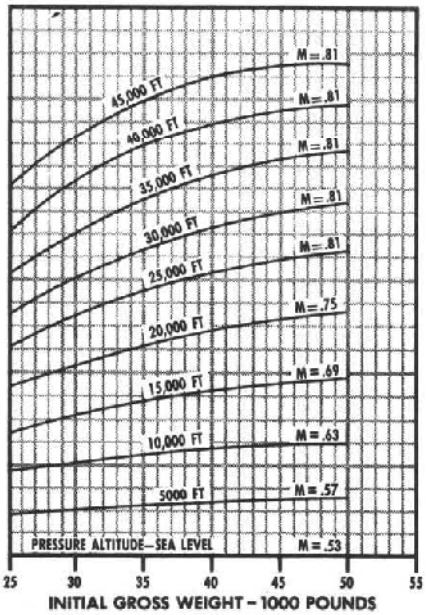
REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

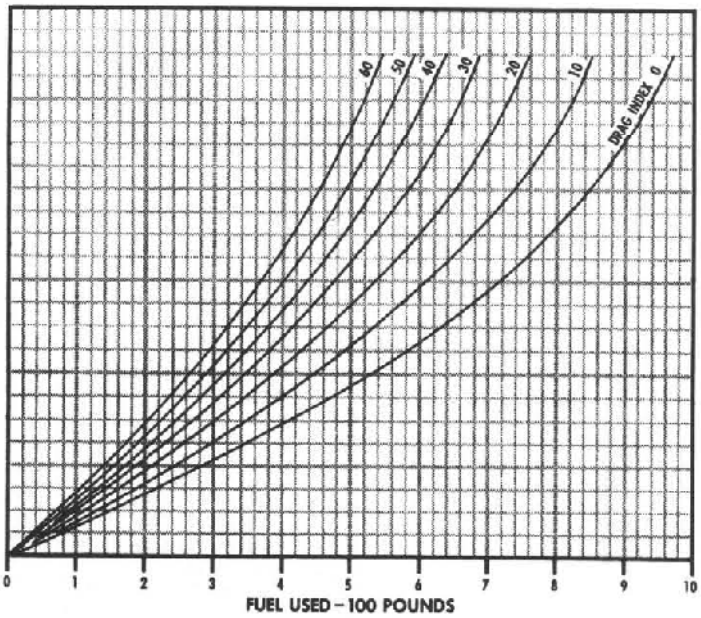
GUIDE

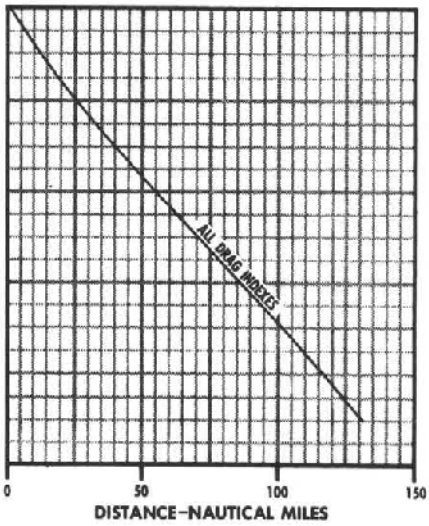


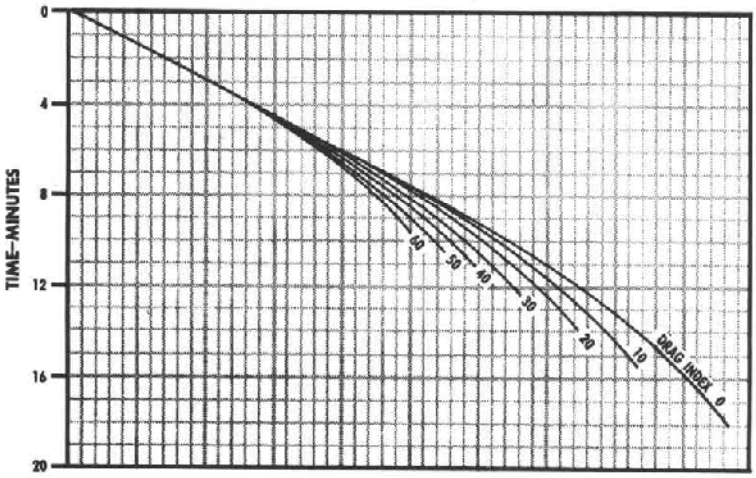
DATE: 1 NOVEMBER 1964
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL









RFG–P703

Figure A7-2

PENETRATION DESCENT

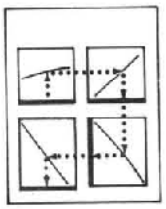
82% RPM
350 KCAS TO MACH 0.81

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS
SPEED BRAKES EXTENDED

DRAG INDEX
INDIVIDUALLY NOTED
0-60

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 1 NOVEMBER 1964
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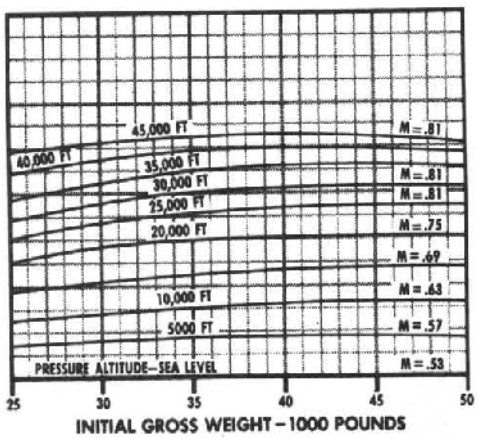
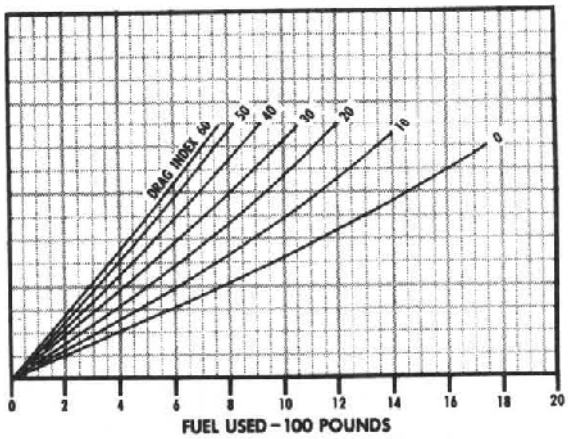
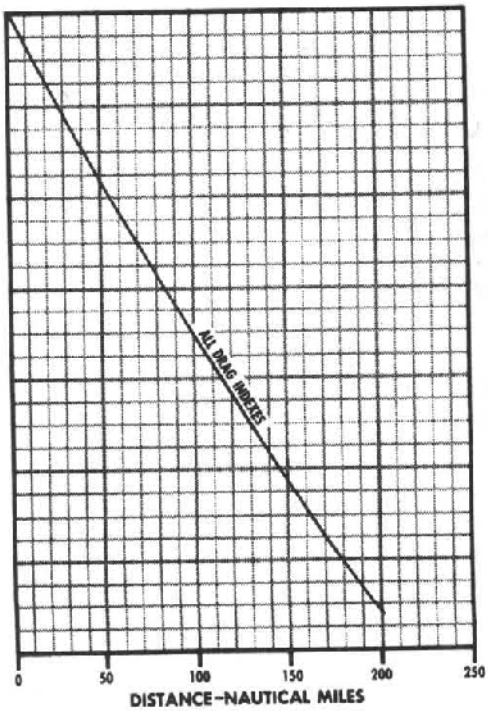
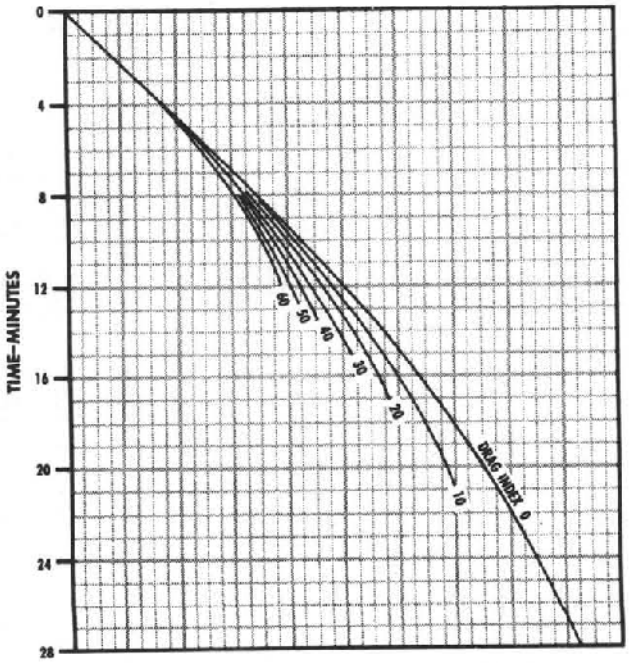
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL









RFG–P708

Figure A7-3

Part 8
LANDING

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Charts

Landing Speeds A8-3
Landing Distance A8-4

LANDING SPEED CHART

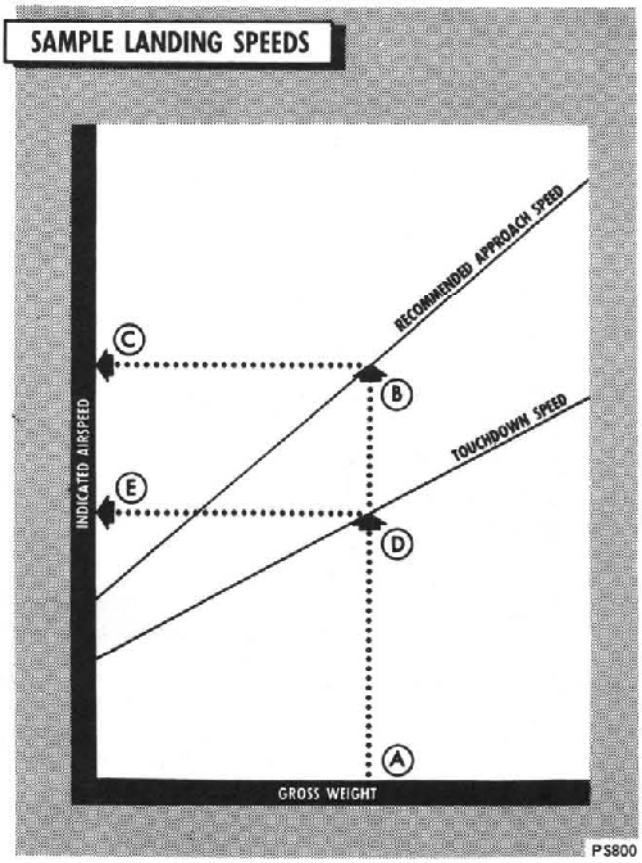
The landing speeds charts (figure A8-1) shows recommended approach speed curves and touchdown speed curves for various airplane gross weights.

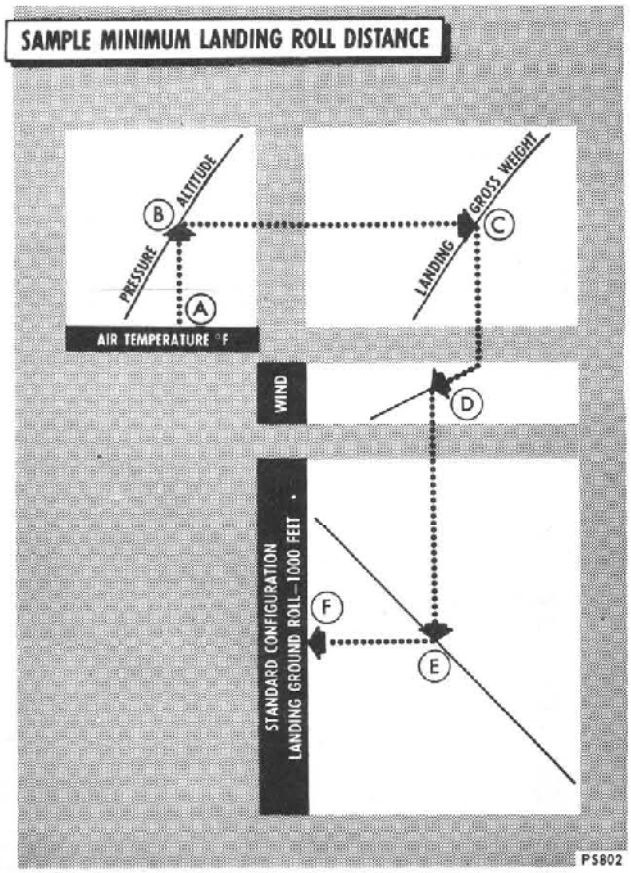
USE

Enter the chart at estimated landing gross weight. Proceed vertically to the recommended approach speed reflector line and project horizontally to the left scale to read recommended approach speed. From the intersection of the touchdown speed reflector line, project horizontally to the left scale and read recommended touchdown speed.

SAMPLE PROBLEM

A.	Estimated Landing Gross Weight	30,000 Lbs.
B.	Approach Speed Reflector Line	
C.	Recommended Approach Speed	168 Kts.
D.	Touchdown Speed Reflector Line	
E.	Recommanded Touchdown Speed	158 Kts.





LANDING DISTANCE CHARTS

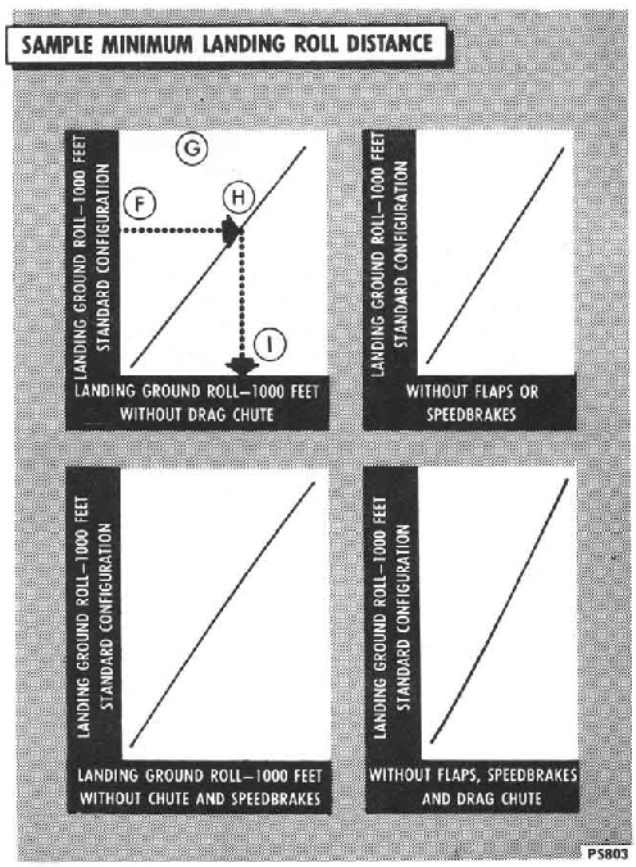
Landing and ground roll distances (with or without use of the drag chute, speed brakes, or flaps) are shown in figure A8-2 and A8-3. The following conditions are considered: Temperature, pressure altitude, gross weight, head or tail winds, and runway condition readings (RCR). Refer to Landing Speeds (figure A8-1) for approach and touchdown speeds.

USE

Enter the chart (figure A8-2) at given surface temperature, proceed vertically to intersect station pressure altitude. Proceed horizontally to the estimated landing gross weight. Descend to the top of the head or tail wind correction chart. Proceed parallel to the wind guide lines to effective wind. Descend directly to the RCR reflector line corresponding to the existing runway condition. Read the landing ground roll for a "standard" configuration on the left hand scale. For a non-standard configuration landing roll, enter the applicable chart (figure A8-3) at the standard configuration landing roll obtained from figure A8-2. Proceed horizontally to the RCR reflector line corresponding to the existing runway condition. Read landing roll distance for the applicable non-standard configuration on the bottom scale.

SAMPLE PROBLEM

A.	Temperature	60°F
B.	Pressure Altitude	Sea Level
C.	Estimated Landing Gross Weight	35,000 Lbs.
D.	Effective Headwind Applied	20 Kts.
E.	Wet Runway Reflector Line (Standard Conf)	RCR-12
F.	Landing Ground Roll (Standard Conf)	5150 Ft.
G.	Non-Standard Configuration	Without Drag Chute
H.	Wet Runway Reflector Line	RCR-12
I.	Landing Ground Roll (Non-Standard Conf)	7700 Ft.

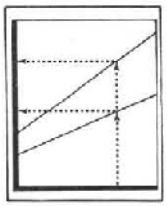


LANDING SPEEDS

AIRPLANE CONFIGURATION
RF-101G OR RF-101H: ALL CONFIGURATIONS
FLAPS EXTENDED, GEAR DOWN

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



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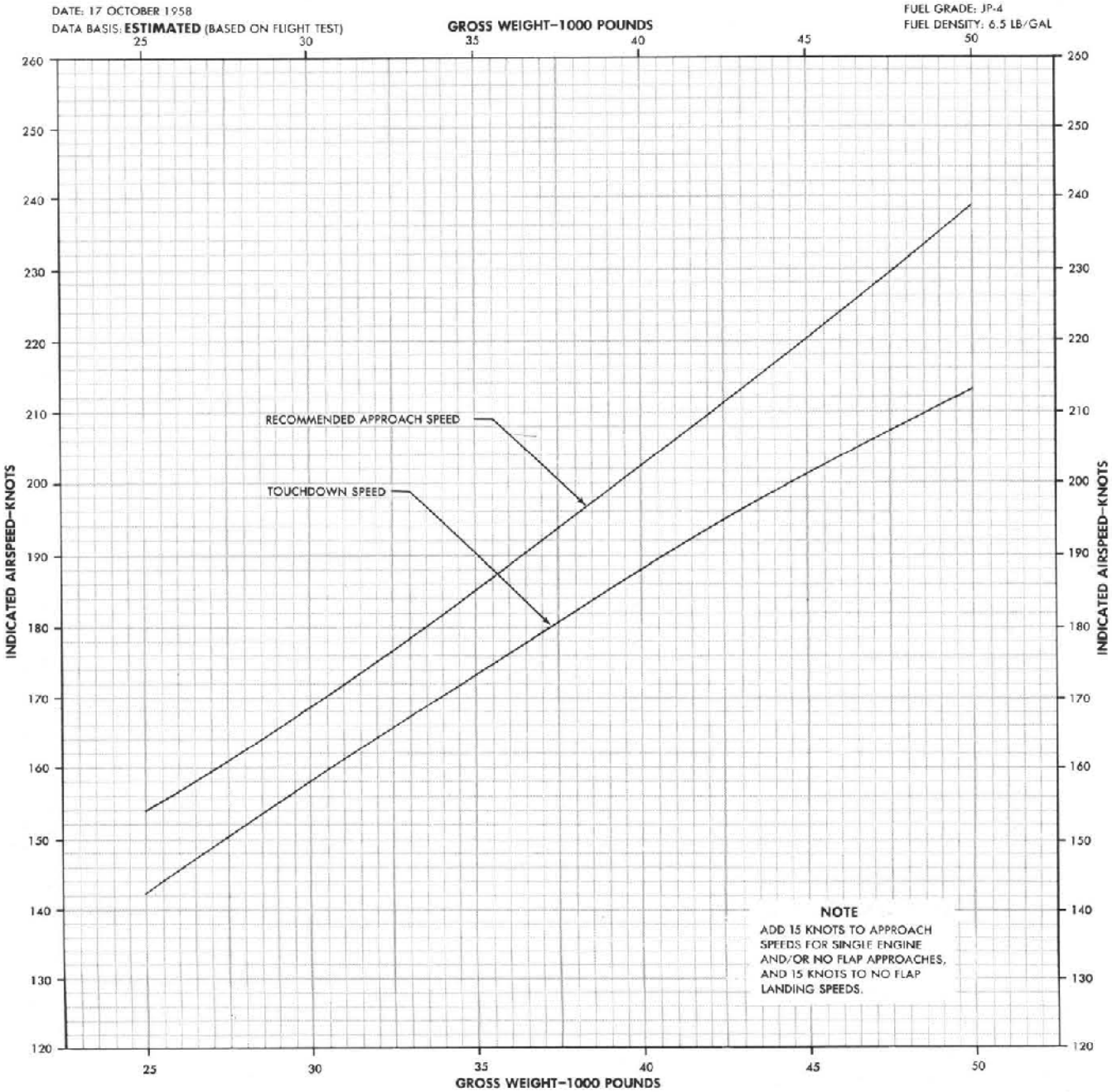
DATA BASIS: **ESTIMATED** (BASED ON FLIGHT TEST)

FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL



RFG-P800

Figure A8-1

MINIMUM LANDING ROLL DISTANCE

STANDARD LANDING

AIRPLANE CONFIGURATION

RF-101G OR RF-101H: ALL CONFIGURATIONS

FLAPS EXTENDED, GEAR DOWN, SPEEDBRAKES OPEN, DRAG CHUTE DEPLOYED AND WHEEL BRAKE OPERATING

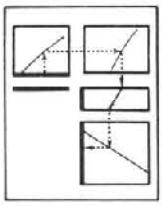
REMARKS

ENGINE(S): (2) J57-P-13

NOTES:

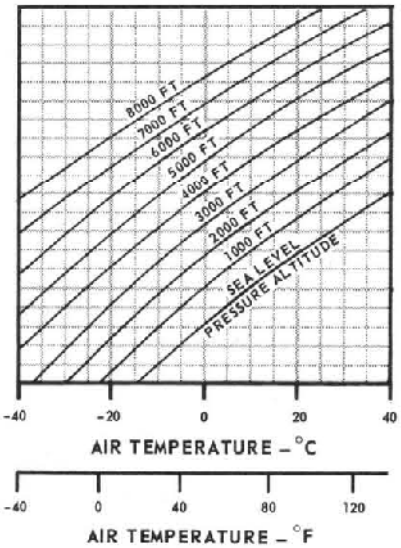
1. WHEN LANDING OVER A 50 FT. OBSTACLE AT END OF RUNWAY ADD 1000 FT. TO RUNWAY LENGTH REQUIRED.
2. WHEN LANDING WITH A NON-STANDARD CONFIGURATION READ FOR THE STANDARD CONFIGURATION FIRST THEN ENTER NEXT PAGE FOR THE APPLICABLE ADJUSTMENT.

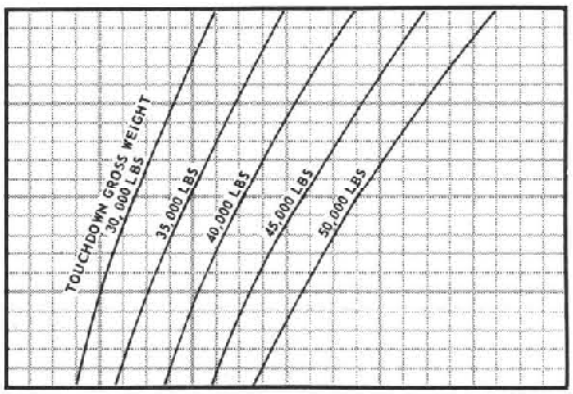
GUIDE

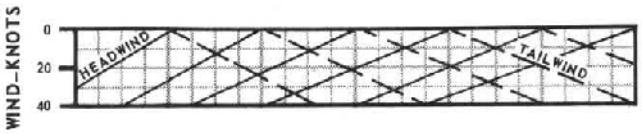


DATE: 31 DECEMBER 1964
DATA BASIS: ESTIMATED (BASED ON FLIGHT TEST)

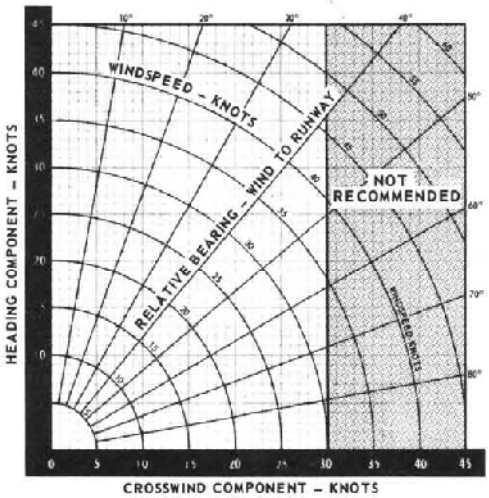
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL

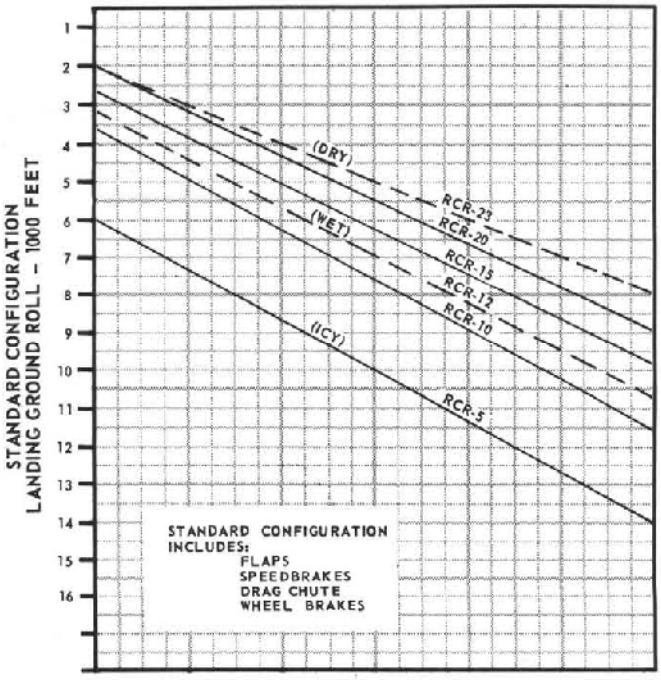






WIND COMPONENTS





OPERATIONAL LIMITS:

FOR AN RCR OF 11 OR LESS ADD A FACTOR 5 TO THE RCR. FOR EXAMPLE: AN RCR OF 9 WILL PERMIT LANDING WITH A 90 DEGREE CROSSWIND COMPONENT OF 14 KTS.

FOR AN RCR OF 12 OR HIGHER ADD A FACTOR OF 10 TO THE RCR, FOR EXAMPLE: AN RCR OF 16 WILL PERMIT LANDING WITH A 90 DEGREE CROSSWIND COMPONENT OF 26 KTS.

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Figure A8-2

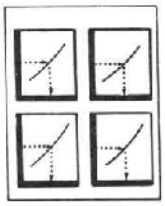
MINIMUM LANDING ROLL DISTANCE

NON STANDARD LANDING

AIRPLANE CONFIGURATION
RF-101G OR RF-101H
ALL CONFIGURATIONS

REMARKS
ENGINE(S): (2) J57-P-13
ICAO STANDARD DAY

GUIDE



DATE: 31 DECEMBER 1964
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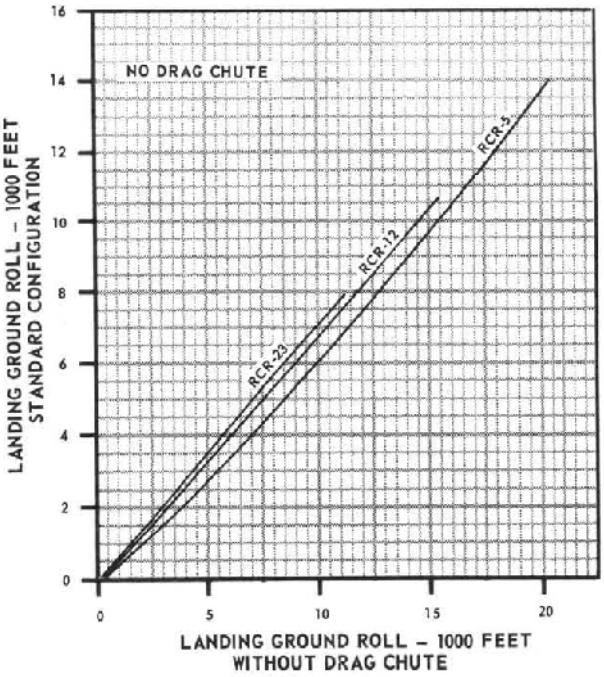
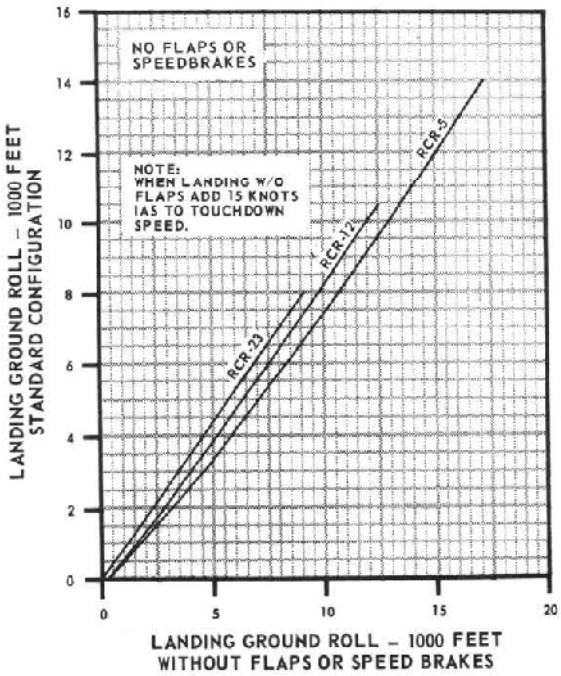
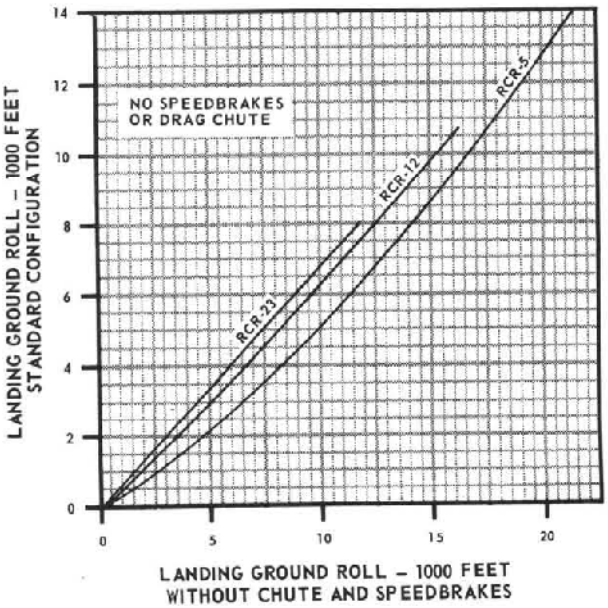
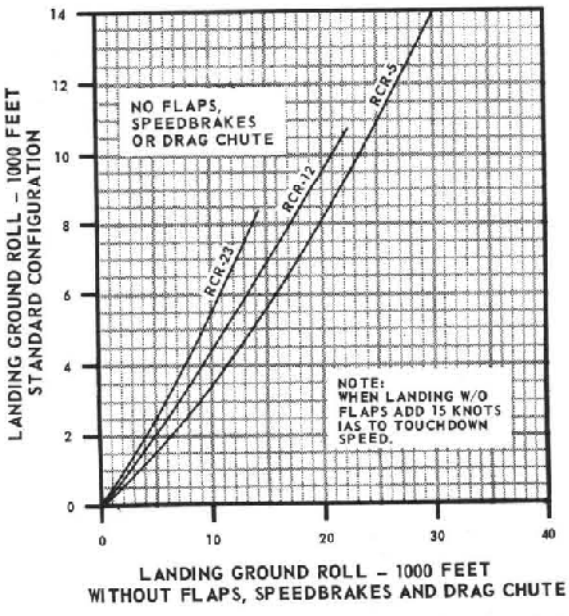
FUEL GRADE: JP-4
FUEL DENSITY: 6.5 LB/GAL









RFG-P802 A

Figure A8-3

Part 9
MISSION PLANNING

TAKEOFF DATA CARD

The Takeoff Data card is contained in the abbreviated check list, T.O. 101(R)G-1CL-1, and the required parts should be completed during the preflight mission planning phase. The format of the card provides a ready reference of: Known conditions, speeds and runway distances (A through F); Go/No-Go line check and takeoff speeds and landing immediately after takeoff data (K through M) in the event an emergency occurs immediately after takeoff. The Takeoff Data card should be filled out in the following sequence:

1. Steps A through C are known conditions and should be compiled prior to filling out the card.
2. Step D is obtained from the Maximum Refusal Speed Chart (figure A2-2 or A2-3).
3. Step E is obtained from the Takeoff Distance Charts (figure A2-4 or A2-5). Single engine takeoff speed delta (Δ) is also obtained from this chart and should be noted at this time in order to compute step J. later on.
4. Step F is obtained from the Climb Out Flight Path Chart (figures A2-8 and 9).
5. Steps G and H are obtained from the Velocity During Takeoff Ground Run Chart (figure A2-6 or A2-7).
6. Step J is obtained by adding the single engine delta (Δ) airspeed, obtained in step E above, to the normal takeoff speed. (Step H)
7. Step K is obtained from the Recommended Minimum Speed Line, plotted in red, on the Stall Speeds Chart (figure 6-2).
8. Step L is obtained from the Landing Speeds Chart (figure A8-1).
9. Step M is obtained from the Minimum Landing Roll Distance Charts (figures A8-2 and A8-3).

TAKEOFF DATA

(A) Runway Length _____ Ft. Field Pressure Alt. _____ Ft. (B)
(C) Temperature _____ °F
(D) Refusal Speed _____ IAS
(E) Takeoff Dist..... Normal _____ 50 Ft. Obstacle _____ Ft. (F)

(G) GO/NO-GO CHECK ... Dist. _____ Speed _____ IAS
(H) NORMAL TAKEOFF ..... Speed _____ IAS
(J) SINGLE ENGINE TAKEOFF ..... Speed _____ IAS

MINIMUM LEVEL FLIGHT SPEED

(K) T.O. Config. _____ IAS Clean Config. _____ IAS

LANDING IMMEDIATELY AFTER TAKEOFF

(L) Approach Speed (Single Engine) _____ IAS
(M) Stopping Distance (No Drag Chute) _____ Ft.

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FLIGHT MANUAL AND SAFETY AND OPERATIONAL SUPPLEMENT STATUS

This page will be published with each Safety Supplement, Operational Supplement, Flight Manual Change, and Flight Manual Revision. It provides a comprehensive listing of the current Flight Manual, Flight Crew Checklist, and Safety and Operational Supplements. The supplements you receive should follow in sequence and if you are missing one listed on this page, see your Publications Distribution Officer and get your copy. The appropriate indexes should be checked periodically to make sure you have the latest publications.

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