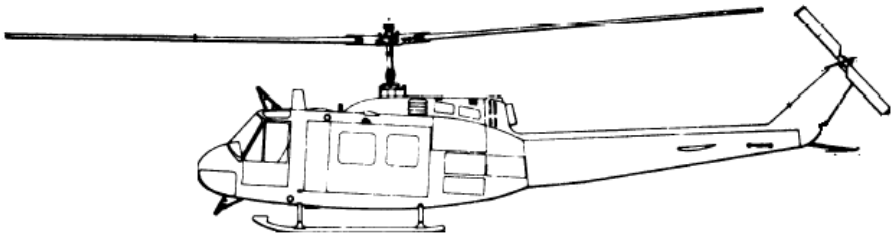
`

BELL UH-1H
PERFORMANCE PLANNING MANUAL

ENSPIRE AVIATION



CONTENTS

UH-1 PERFORMANCE PLANNING CARD

CURRENT CONDITIONS			
PA	1	FAT	2
TAKE-OFF WEIGHT	3	LOAD	4
CAL FACTOR	5	FUEL	6

	CHART VALUE	IND TRQ
MAX TORQUE AVAIL	7	
MAX ALLOWABLE GW (IGE)	8	
MAX ALLOWABLE GW (OGE)	9	
PREDICTED HOVER TORQUE	10	
GO/NO GO TORQUE (IGE)	11	
GO/NO GO TORQUE (OGE)	12	
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PA	15	FAT	16
LOAD	17	FUEL	18

	CHART VALUE	IND TRQ
MAX TORQUE AVAIL	19	
MAX ALLOWABLE GW (IGE)	20	
MAX ALLOWABLE GW (OGE)	21	
GO/NO GO TORQUE (IGE)	22	
GO/NO GO TORQUE (OGE)	23	
DCM	24	

CRUISE DATA			
	FAT 26	GW 27	PA 25

	IAS	IND TRQ	FUEL FLW
CRUISE	28	29	30
MAX END OR R/C	31	32	33
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STOP	39
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TAKE-OFF WEIGHT

TASK: Prepare the UH-1 Performance Planning Card.

CONDITIONS: Given data from weight and balance, the Aircraft operators manual, environmental conditions, and a blank performance planning card

STANDARDS:
Correctly compute performance planning data according to procedures given in the aircraft operator's manual and the description below.

DESCRIPTION:
1. Crew Actions. The PC will ensure that aircraft performance data to complete the mission are available and that aircraft limitations will not be exceeded. The most accurate performance data can be obtained by using existing conditions. Predicted hover torque should be determined using the conditions forecast for the time of departure. The PC may direct the other RCM to assist in completing these data as necessary.

2. Procedures.

a. The PPC is used as an aid to organize performance data; this form must be used for evaluations. Instructions for completing the PPC are provided below; the numbered paragraphs coincide with the numbers on the PPC.

b. The same PPC data will suffice for consecutive takeoffs and landings when aircraft gross weight or environmental conditions have not increased significantly; that is, 200 pounds gross weight, 5 degrees Celsius, or 500 feet PA.

NOTE: The Current Conditions section of the PPc, items (I) through (14), is based on conditions existing at initial takeoff (departure). Crew members use this information to validate the PPC comparing the aircraft's actual performance to the planned performance. If the current conditions are the same as the maximum conditions for the mission period, this section need not be completed.

1. P.A.* Record the current PA forecast for the time of departure.
2. F.A.T.Record the current FAT forecast for the time of departure
3. Takeoff GWT.* Record the current takeoff gross weight for the time of departure
4. Load.* Record the maximum weight of the load(s) expected during the mission
5. Cal Factor* Record the calibration factor (data plate torque).
6. Fuel Record the takeoff fuel weight for the time of departure.

7. Max Torque Avail.* Using current conditions and the Maximum Torque Available (30-minute operation) chart, record the chart value and compute and record the indicated maximum torque available

NOTE: The torque correction value (chart value to indicated), obtained from (7) above may be applied to all subsequent torque values on the PPC.

8, Max Allowable GWT (IGB)@* Using current conditions and the Hover Ceiling chart, compute and record the maximum allowable gross weight (IGE). If the 5-foot skid height line is not intersected, record the maximum allowable gross weight (IGE) as 9,500 pounds.

9 Max Allowable GWT (OGE). Using current conditions and the Hover Ceiling chart, compute and record the maximum allowable gross weight (OGE).

10. Predicted Hover Torque Using current conditions, the Hover Power Required chart, and the takeoff gross weight, compute and record the torque required to hover at a 5-foot skid height (or as required).

11. Predicted Hover Torque (OGE). Using current conditions, the Hover Power Required chart, and the takeoff gross weight compute and record the torque required to hover at a 50-foot skid height (OGE).

12. Go/No-Go Torque (IGE).* Using the Hover Power Required chart, the maximum allowable gross weight (IGE), and a 5-foot skid height (or as required), record the go/no-go torque (IGE).

13. Go/No-Go Torque (OGE) Using the Hover Power Required chart, the maximum allowable gross weight (OGE), and a 5-foot skid height, record the go/no-go torque (OGE). (For external load operations, use a skid height line that will ensure a 5-foot load height.)

14 Directional Control Margin* Using Sheet 1 of the Control Margin chart and the takeoff gross weight, record the maximum right crosswind component (90 degrees) that may be encountered and still maintain a 10 percent DCM. If the highest reported or forecast wind (steady or gust) is above the DCM (right crosswind) value, the DCN may be less than 10 percent. During hover or slow-speed operations with a right crosswind approximately 35 to 150 degrees from the nose of the aircraft, a less than 10 percent DCM may be available. During flights with winds greater than 10 knots and approximately 100 to 260 degrees from the nose of the aircraft, a reduction of longitudinal cyclic control may be experienced. The crew should avoid hover or slow speed operations with wind from these quadrants. (Sheet 2 of the Control Margin chart presents areas to avoid during crosswinds and tailwinds.)

NOTE: The Maximum Conditions section of the PPC, items (15) through (24), is used to predict the aircraft's performance capabilities under the maximum PA, temperature, and winds forecast for the mission.

15. P.A. Record the maximum PA forecast for the mission period.

16. FAT. Record the maximum FAT forecast for the mission period.

17. Load.* Record the maximum weight of the load(s) expected during the mission.

18. Fuel. Record the takeoff fuel weight.

19. Max Torque Avail.* Using maximum conditions, compute the maximum torque available as described in (7) above.

20. Max Allowable GWT CIGE).* Using maximum conditions, compute the maximum allowable gross weight (IGE) as described in (8) above.

21. Max Allowable GWT (OGE). Using maximum conditions, compute the maximum allowable gross weight (OGE) as described in (9) above.

22 Go/No-Go Torque (lGE).* Using the Hover Power Required chart, the maximum allowable gross weight (lGE) and a 5-foot skid height (or as required) record the go/no-go torque (lGE).

23. Go/No-Go Torque (OGE). Using the Hover Power Required chart, the maximum allowable gross weight (OGE) and a 5-foot skid height, record the go/no-go torque (OGE). (For external load operations use a skid height line that will ensure a 5-foot load height.)

24 DCM.*Using current conditions compute the DCM as described in (14) above.

NOTE: The Cruise Data section items (25) through (37), is used to predict the aircraft's performance at a planned cruise altitude and airspeed. For operations that involve several changes in conditions, the RCM is expected to use his best judgment in selecting performance criteria.

25. PA. Record the planned cruise PA

26 FA T Record the forecast FAT at cruise altitude.

27. Aircraft GWT. Record the aircraft gross weight for anticipated cruise conditions.

28 cruise lAS.* Using the Cruise chart record the indicated airspeed for anticipated cruise conditions.

29 Cruise lnd TorQUe. Using the Cruise chart, record the indicated torque required to maintain the airspeed in (28) above.

30 Cruise Fuel Flow.* Using the Cruise chart, record the predicted fuel flow at cruise lAS.

31 Max End or R/C IAS. Using the Cruise chart record the maximum endurance or maximum rate of climb lAS.

32 Max End or R/C lnd TorQUe. Using the Cruise chart, record the indicated torque required to maintain maximum endurance or maximum rate of climb lAS.

33 Max End or R/C Fuel Flow. Using the Cruise chart, record the predicted fuel flow at maximum endurance or maximum rate of climb lAS.

34.Max Range lAS. using the cruise chart, record the maximum range lAS.

35 Max Range lnd Torque. Using the Cruise chart, record the indicated torque required to maintain maximum range lAS.

36 Max Range Fuel Flow. Using the Cruise chart, record the predicted fuel flow at maximum range lAS.

37 Vne lAS.* Using the Airspeed Operating Limits chart, record the maximum allowable airspeed at cruise altitude.

NOTE: The Fuel Management section, items (38) through (42), is used to record in-flight fuel consumption. The use of this section is not mandatory. (Task 1023 discusses fuel management procedures.)

38 start. Record the indicated fuel weight and clock time to initiate the fuel consumption check.

39 stop. Record the indicated fuel weight and clock time to close the fuel consumption check.

40. PPH. Record the computed fuel consumption rate in pounds per hour.

41. Reserve. Record the computed indicated fuel weight and clock time to meet the required fuel reserve.

42 Burnout. Record the computed and clock time at zero fuel weight.

NOTE: The Weight Computation section, items (43) through (49), is used to compute an increase in aircraft weight and load. critical mission requirements may require the addition of passengers or equipment during the flight. The use of this section is not mandatory. However, the PC must ensure that the weight and balance limits are not exceeded. (Task 1003 discusses the weight and balance limits.)

43. Basic Weight. Record the basic aircraft weight from DD Form 365-4.

44.Crew and FIt Equip Weight. Record the crew and flight equipment weight from DD Form 365-4 or as determined by the crew.

45 Mission Equip weight. Record the mission equipment weight (for example, weapons) from DD Form 365-4 or as determined by the crew.

46 Operating weight. Record the operating weight from DD Form 365-4 or as determined by the crew. (Add basic weight, crew and flight equipment weight, and mission equipment weight to obtain operating weight.)

47 Fuel Weight. Record the fuel weight from DD Form 365-4 or the current fuel weight.

48 Pax .• Baggage .• Cargo .• and Ammo Weight .• Record the weight of these items from DD Form 365-4 or weight as determined by the crew.

49 Takeoff GWT. Record the takeoff gross weight by adding operating weight, fuel weight, and additional pax, baggage, cargo, and ammo weights.

NOTE 1: The Remarks section is used to record pertinent performance planning remarks.

NOTE 2: Tabular performance data charts are used to aid in performance planning. They provide an easy-to-use device in the cockpit and may be used during flights that require current data.

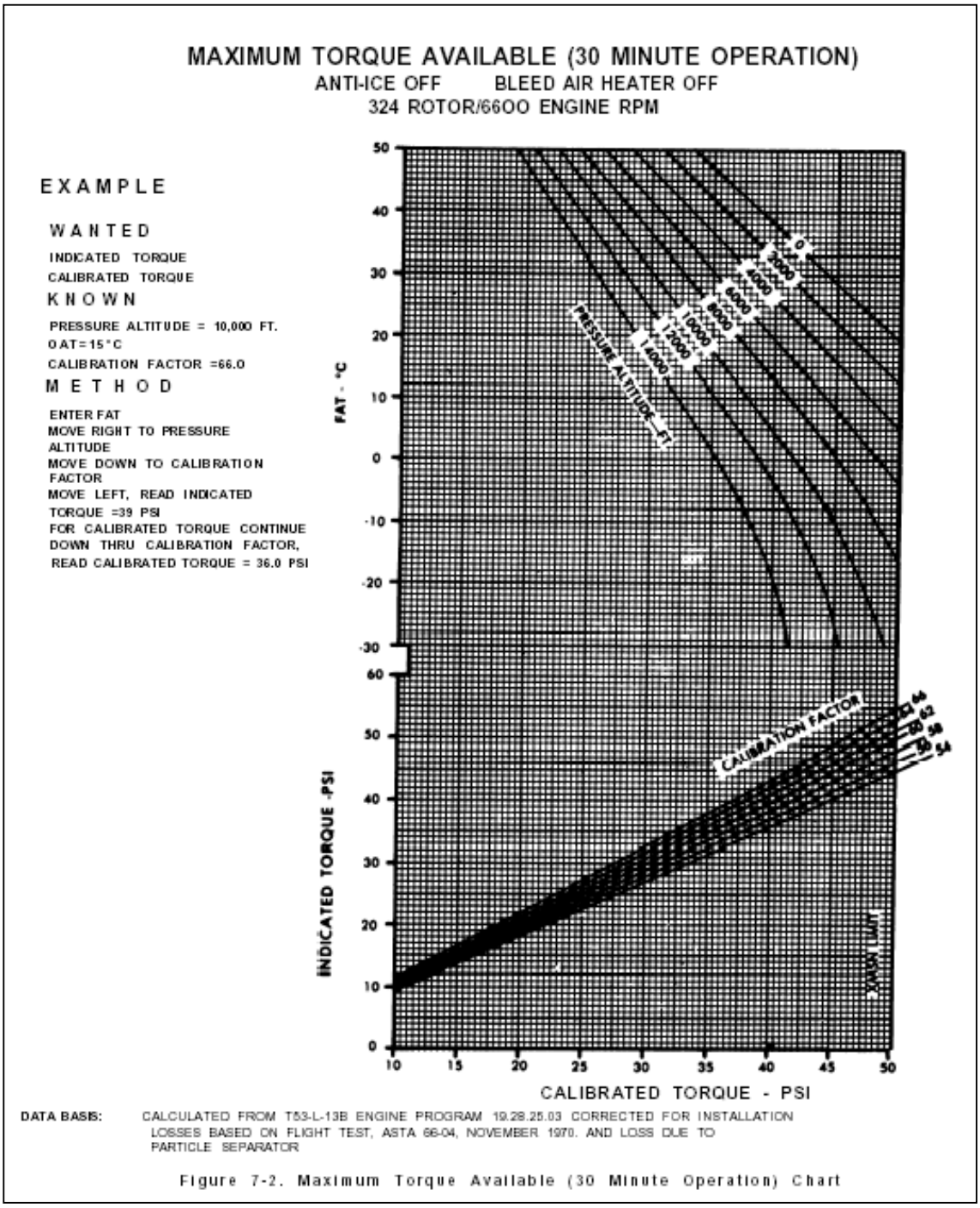


Figure 7-2. Maximum Torque Available (30 Minute Operation) Chart

HOVER CEILING

MAXIMUM TORQUE AVAILABLE (30 MINUTE OPERATION)
324 ROTOR/6600 ENGINE RPM

EXAMPLE

WANTED

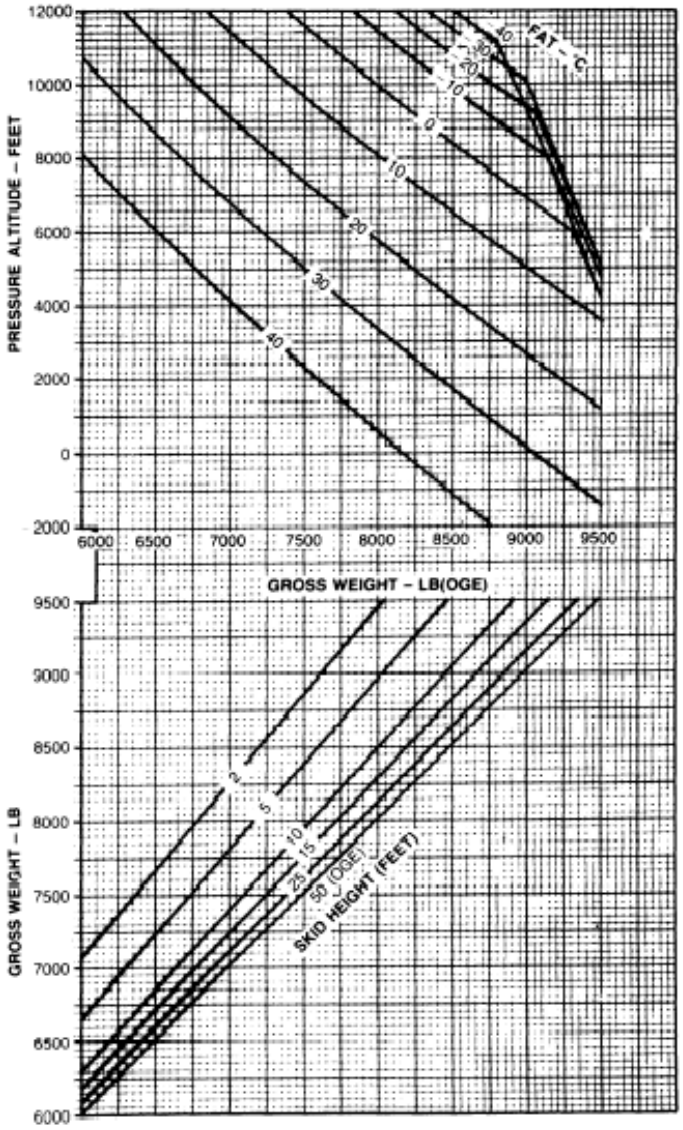
GROSS WEIGHT TO HOVER

KNOWN

PRESSURE ALTITUDE = 10600 FEET
FAT = 10°C
SKID HEIGHT = 2 FEET

METHOD

ENTER PRESSURE ALTITUDE
MOVE RIGHT TO FAT
MOVE DOWN TO SKID HEIGHT
MOVE LEFT, READ GROSS WEIGHT
TO HOVER = 8500 POUNDS



CORRECTION TABLE

TORQUE CORRECTION PSI *				
	CALIBRATED TORQUE-PSI			
FAT	20	30	40	50
0°C	.2	.3	.4	.5
-20°C	.4	.6	.8	1.0
-40°C	1.4	2.1	2.8	3.5
-50°C	2.4	3.6	4.8	6.0
-60°C	4.0	6.0	8.0	10.0

*When operating at or below 0°C increase the calibrated torque determined from sheet 2 by the amount shown in the table to determine torque required. See example on sheet 2.

DATA BASIS: DERIVED FROM YUH-1H FLIGHT TEST, ASTA-TDR 66-04 NOVEMBER 1970

Figure 7-3. Hover (Ceiling) Chart (Sheet 1 of 2)

HOVER POWER REQUIRED

LEVEL SURFACE CALM WIND
324 ROTOR/6600 ENGINE RPM

EXAMPLE

WANTED

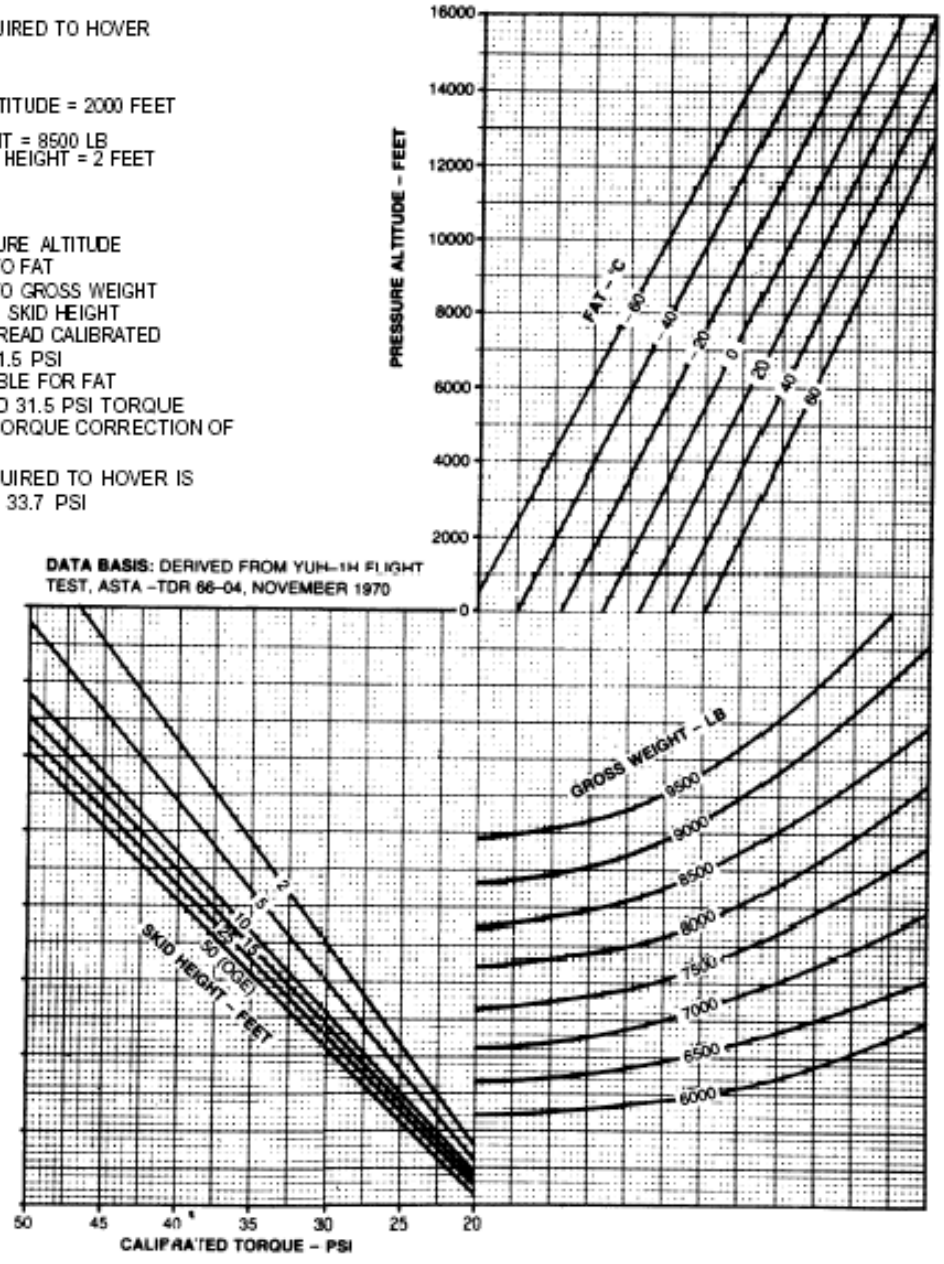
TORQUE REQUIRED TO HOVER

KNOWN

PRESSURE ALTITUDE = 2000 FEET
FAT = -40°C
GROSS WEIGHT = 8500 LB
DESIRED SKID HEIGHT = 2 FEET

METHOD

ENTER PRESSURE ALTITUDE
MOVE RIGHT TO FAT
MOVE DOWN TO GROSS WEIGHT
MOVE LEFT TO SKID HEIGHT
MOVE DOWN, READ CALIBRATED
TORQUE = 31.5 PSI
FROM THE TABLE FOR FAT
= -40°C AND 31.5 PSI TORQUE
DETERMINE TORQUE CORRECTION OF
2.2 PSI
TORQUE REQUIRED TO HOVER IS
31.5 +2.2 = 33.7 PSI

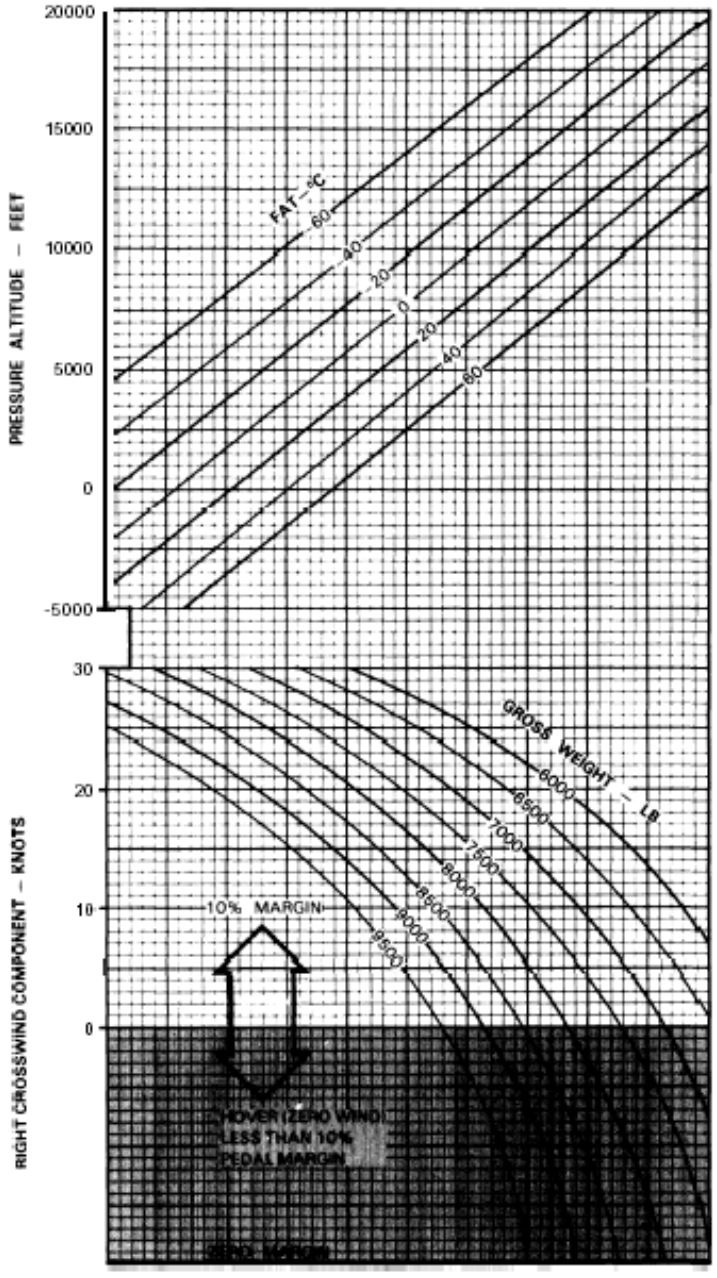


DATA BASIS: DERIVED FROM YUH-1H FLIGHT TEST, ASTA –TDR 66-04, NOVEMBER 1970

Figure 7–3. Hover (Power Required) Chart (Sheet 2 of 2)

CONTROL MARGIN

TRANSITIONAL FLIGHT 324 ROTOR/6600 ENGINE RPM



EXAMPLE

WANTED

MAXIMUM RIGHT CROSSWIND COMPONENT WITH 10% SAFE PEDAL MARGIN

KNOWN

PRESSURE ALTITUDE = 5000 FEET
FAT = 0°C
GROSS WEIGHT = 8500 POUNDS

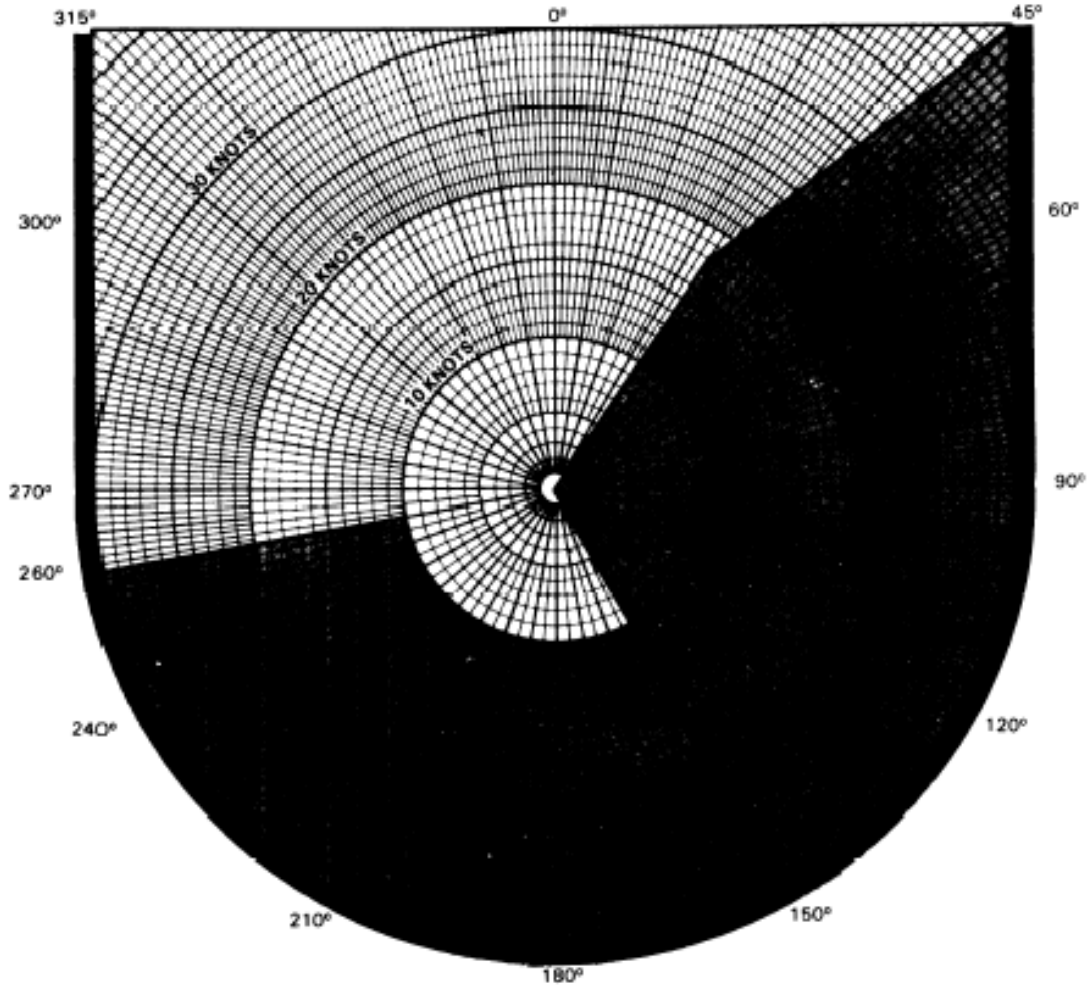
METHOD

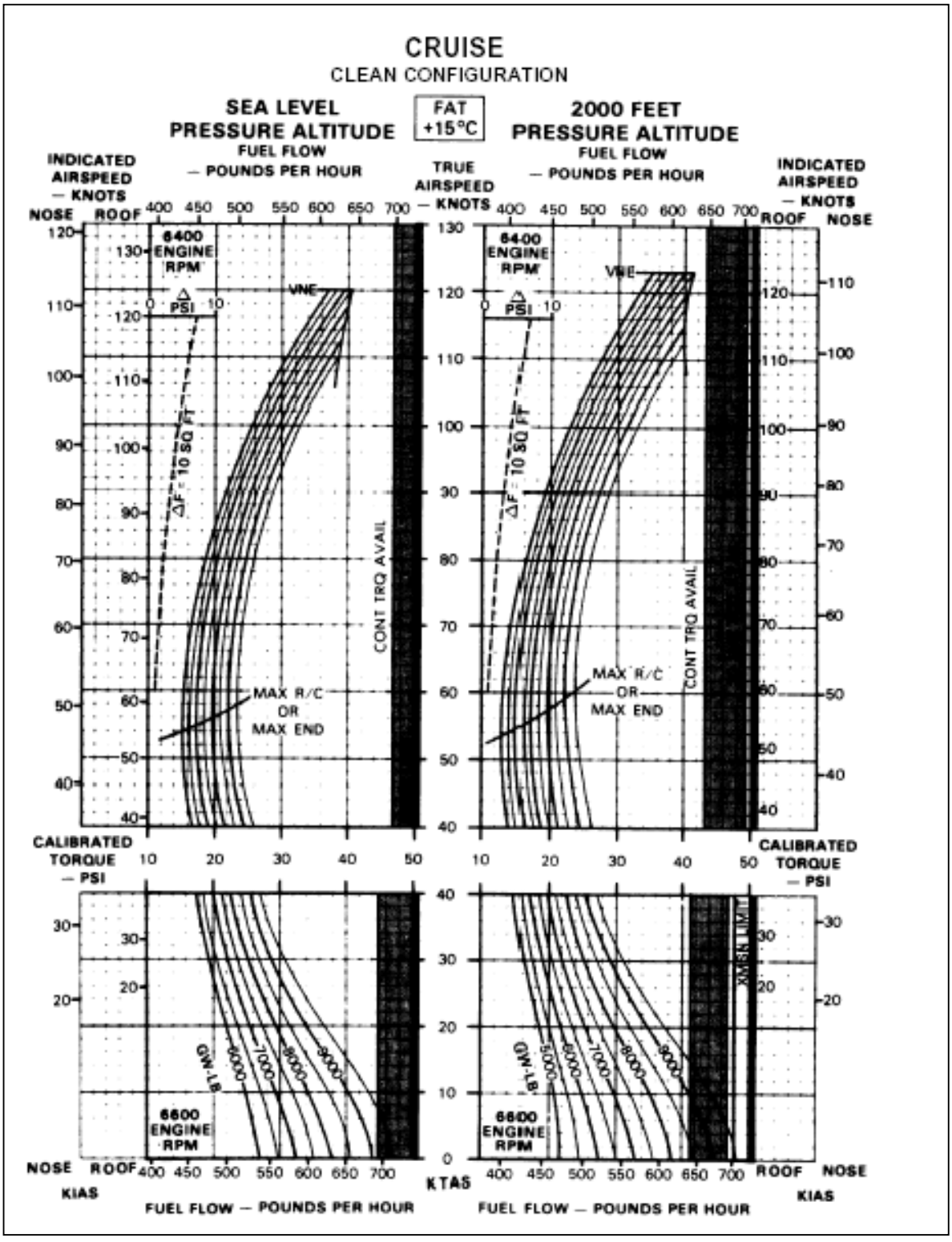
ENTER PRESSURE ALTITUDE
MOVE RIGHT TO FAT
MOVE DOWN TO KNOWN GROSS WEIGHT
MOVE LEFT AND READ 18.8
RIGHT CROSSWIND COMPONENT
REFER TO SHEET 2. SAFE PEDAL MARGIN MAY BE LESS THAN 10% FOR CROSSWIND COMPONENTS GREATER THAN 18.8 KNOTS IN THE SHADED AREA LABELED DIRECTIONAL

CONTROL MARGIN

TRANSLATIONAL FLIGHT 324 ROTOR/6600 ENGINE RPM

CONDITIONS WHERE THE CONTROL
MARGIN MAY BE LESS THAN 10%
ARE SHOWN IN SHADED AREA

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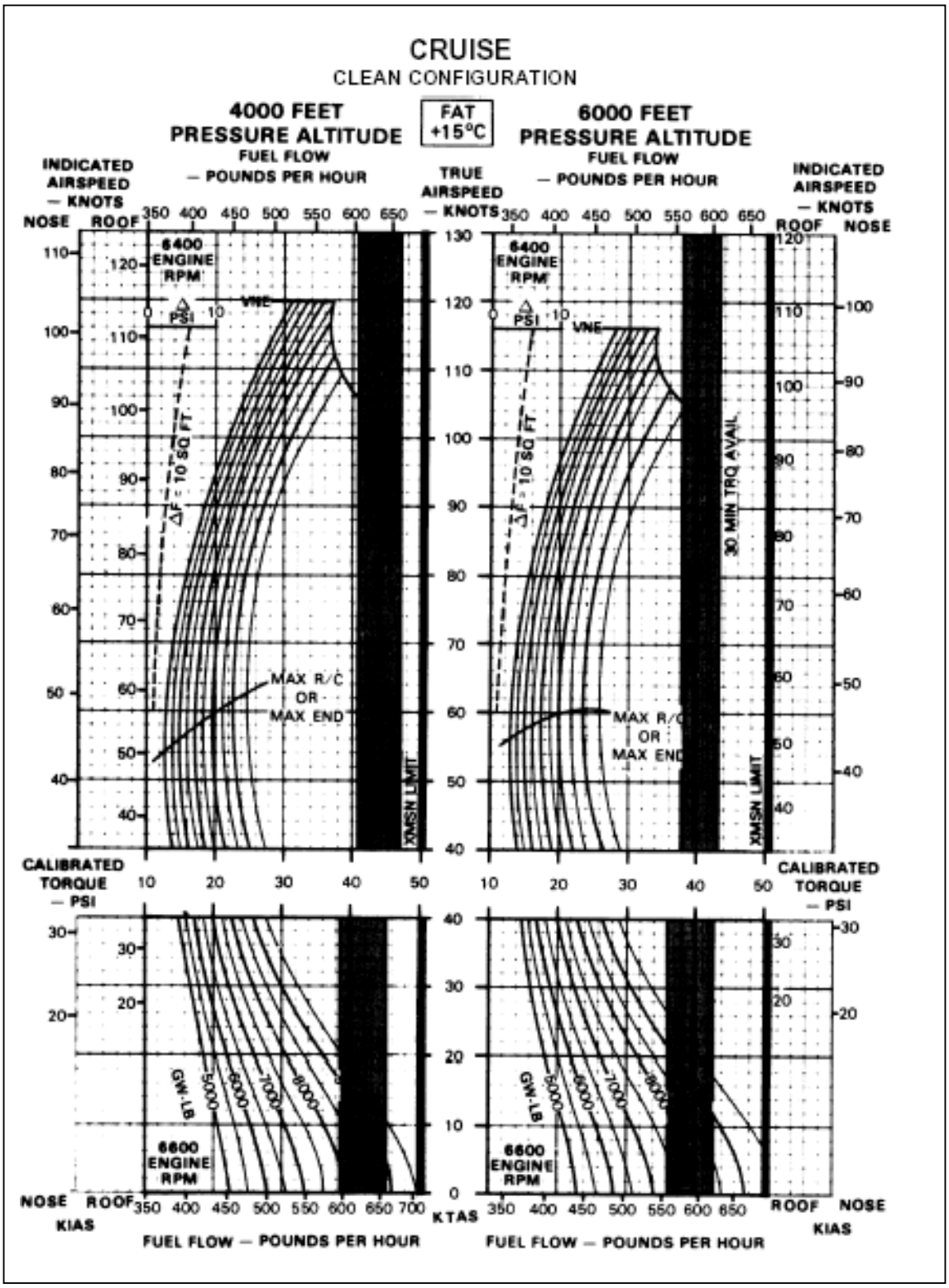
SEA LEVEL PRESSURE ALTITUDE
FAT +15°C
2000 FEET PRESSURE ALTITUDE
FUEL FLOW — POUNDS PER HOUR
INDICATED AIRSPEED — KNOTS
TRUE AIRSPEED — KNOTS
NOSE ROOF
6400 ENGINE RPM
VNE
ΔPSI
ΔF - 10 SQ FT
CONT TRQ AVAIL
MAX R/C OR MAX END
CALIBRATED TORQUE — PSI
6600 ENGINE RPM
GW-LB
5000
6000
7000
8000
9000
XMSN LIMIT
KIAS
KTAS
FUEL FLOW — POUNDS PER HOUR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FAT +15°C
6000 FEET PRESSURE ALTITUDE
FUEL FLOW — POUNDS PER HOUR
INDICATED AIRSPEED — KNOTS
TRUE AIRSPEED — KNOTS
NOSE ROOF
ROOF NOSE
6400 ENGINE RPM
VNE
ΔF = 10 SQ FT
MAX R/C OR MAX END
XMSN LIMIT
30 MIN TRQ AVAIL
CALIBRATED TORQUE — PSI
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GW-LB
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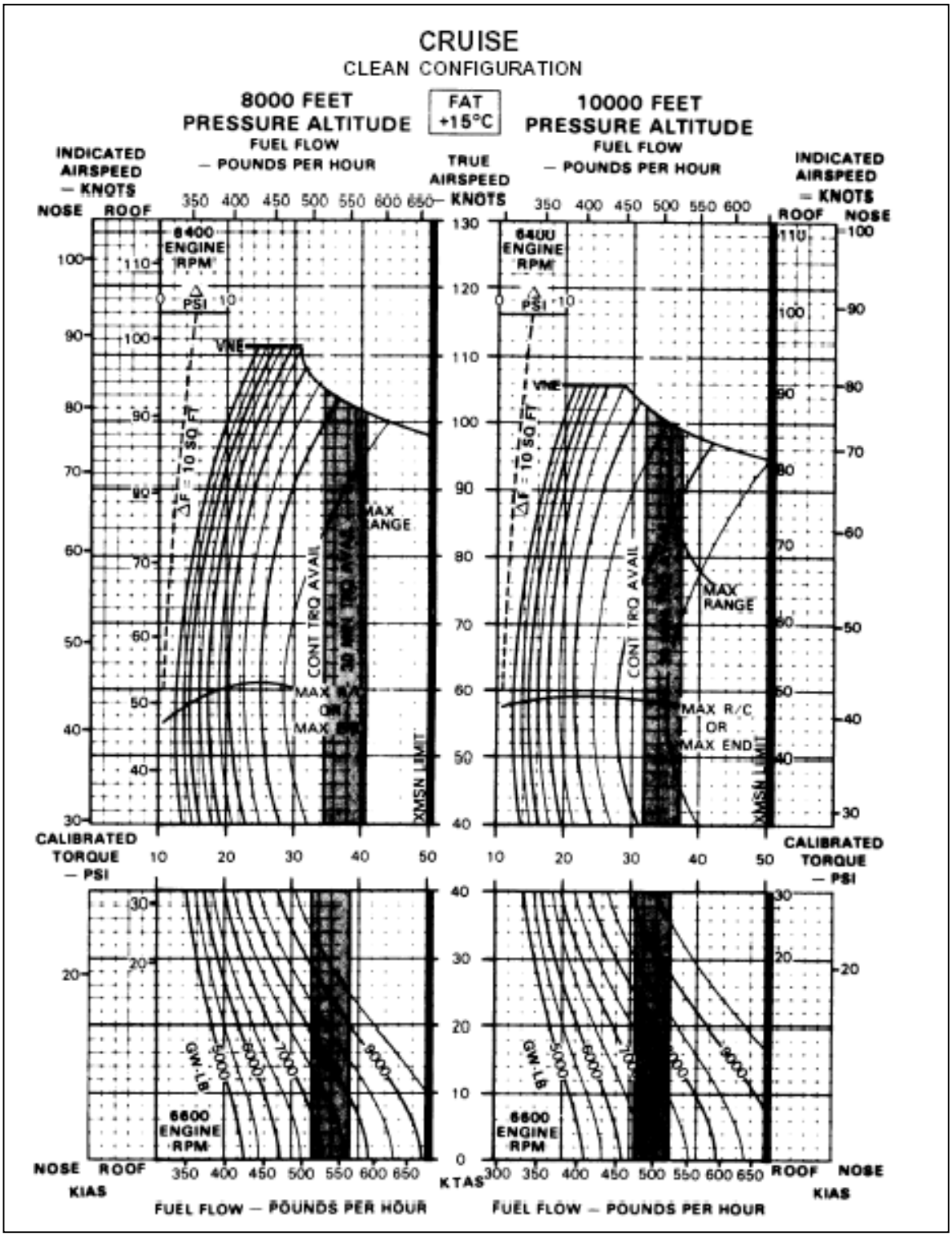
6000
7000
8000
KIAS
KTAS
FUEL FLOW — POUNDS PER HOUR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6400 ENGINE RPM
6600 ENGINE RPM
PSI
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CONT TRQ AVAIL
MAX RANGE
MAX R/C OR MAX END
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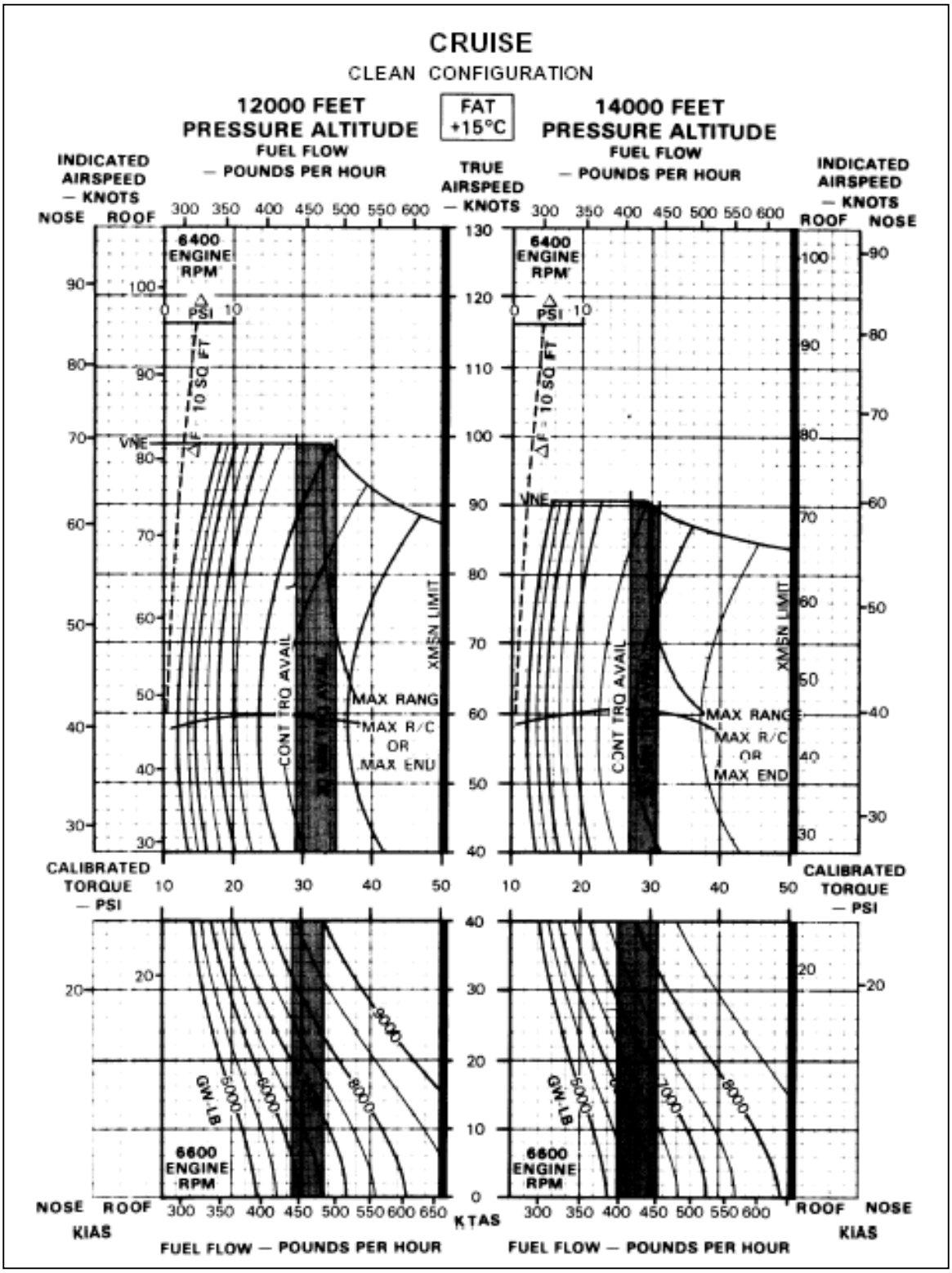
CALIBRATED TORQUE — PSI
GW-LB
KTAS
KIAS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FAT +15°C
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FUEL FLOW — POUNDS PER HOUR
INDICATED AIRSPEED — KNOTS
NOSE ROOF
TRUE AIRSPEED — KNOTS
6400 ENGINE RPM
10 SQ FT
VNE
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XMSN LIMIT
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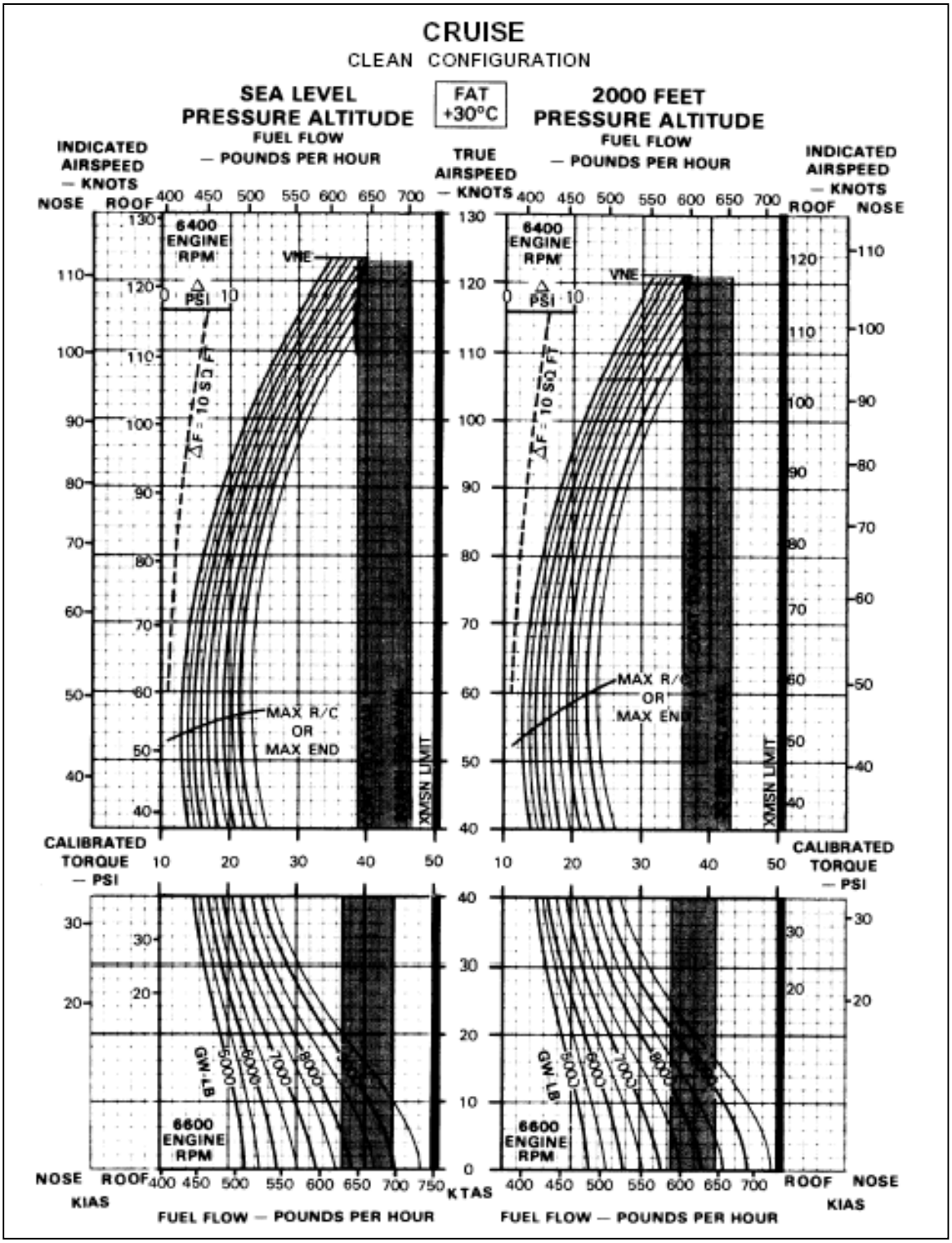
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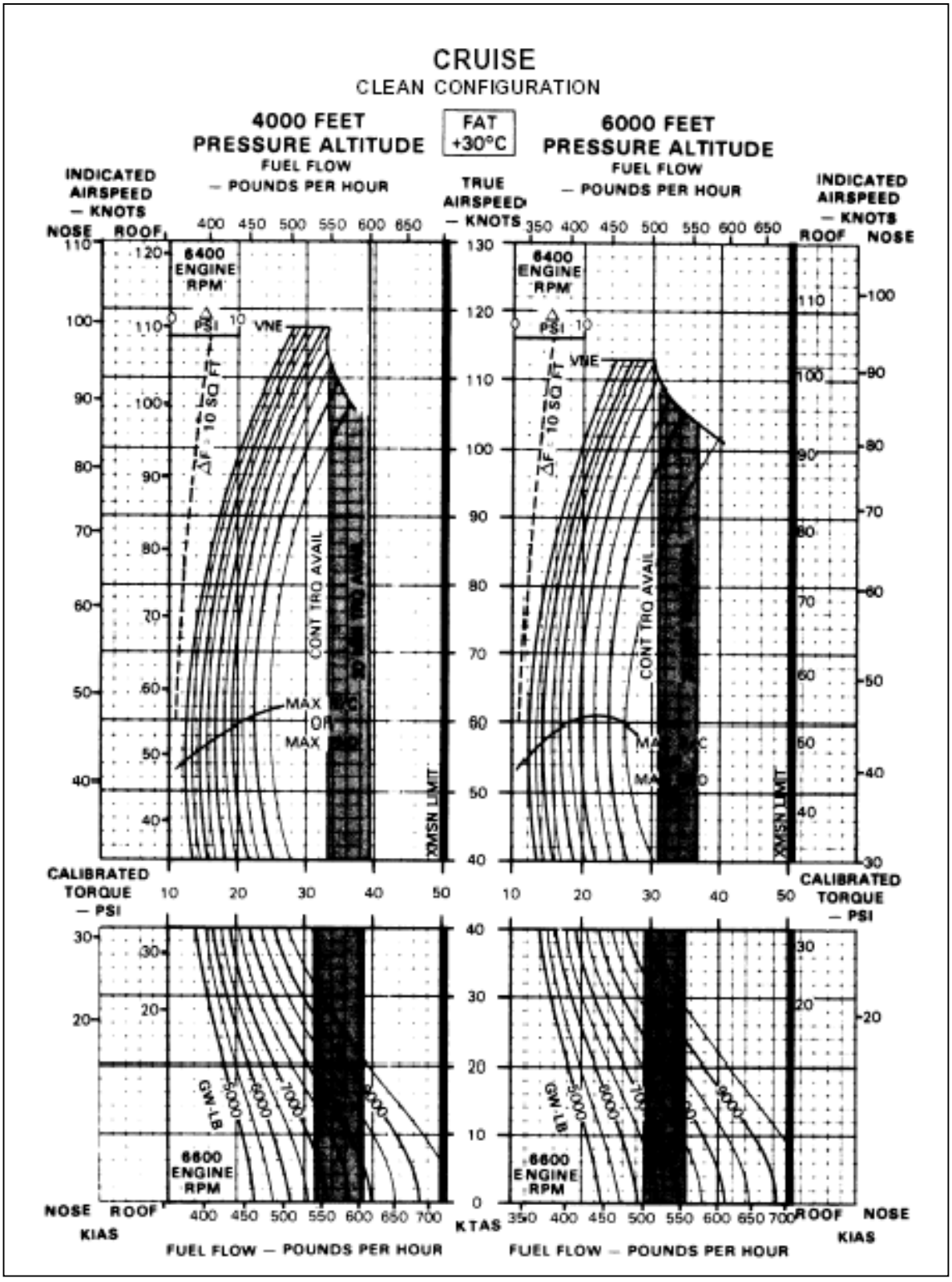
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FAT +30°C
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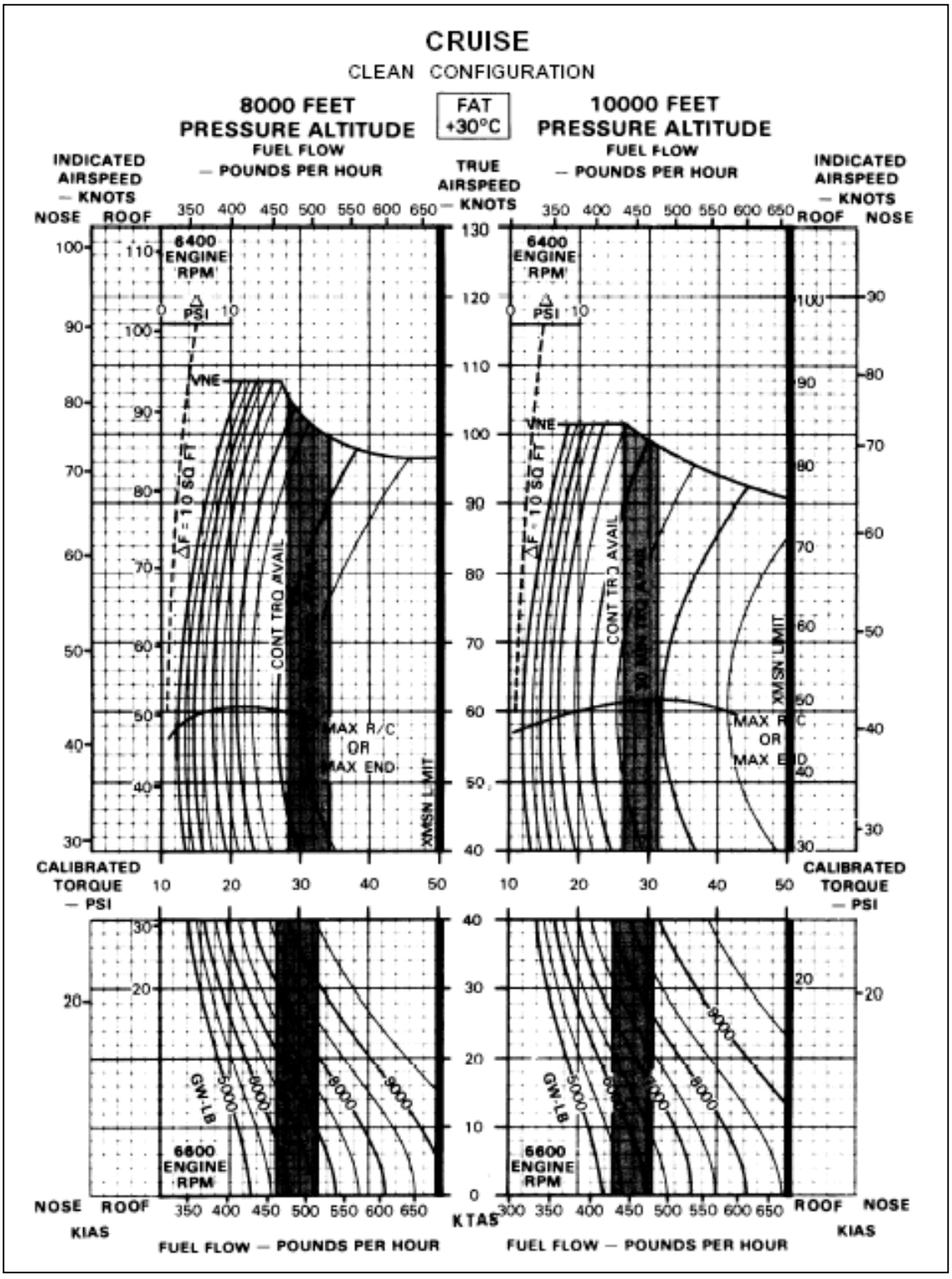
GW-LB
KTAS
KIAS
NOSE
ROOF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TRUE AIRSPEED — KNOTS
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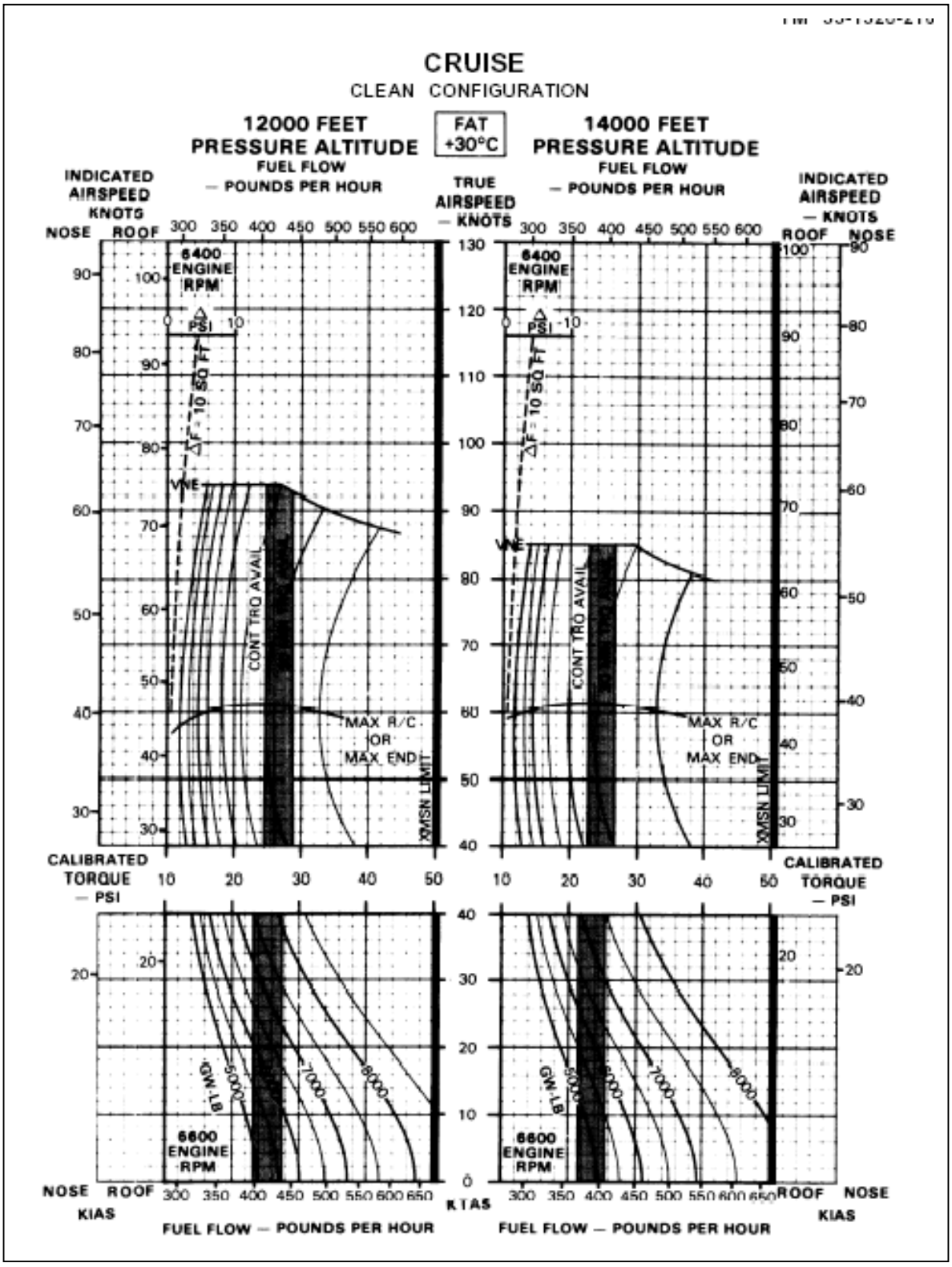
6400 ENGINE RPM
ΔPSI
VNE
ΔF = 10 SQ FT
CONT TRQ AVAIL
MAX R/C OR MAX END
XMSN LIMIT
CALIBRATED TORQUE — PSI
6600 ENGINE RPM
GW-LB
KTAS
KIAS
FUEL FLOW — POUNDS PER HOUR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FAT +30°C
14000 FEET PRESSURE ALTITUDE
FUEL FLOW — POUNDS PER HOUR
INDICATED AIRSPEED KNOTS
TRUE AIRSPEED — KNOTS
NOSE ROOF
300 350 400 450 500 550 600
6400 ENGINE RPM
ΔF = 10 SQ FT
PSI
VNE
CONT TRQ AVAIL
MAX R/C OR MAX END
XMSN LIMIT
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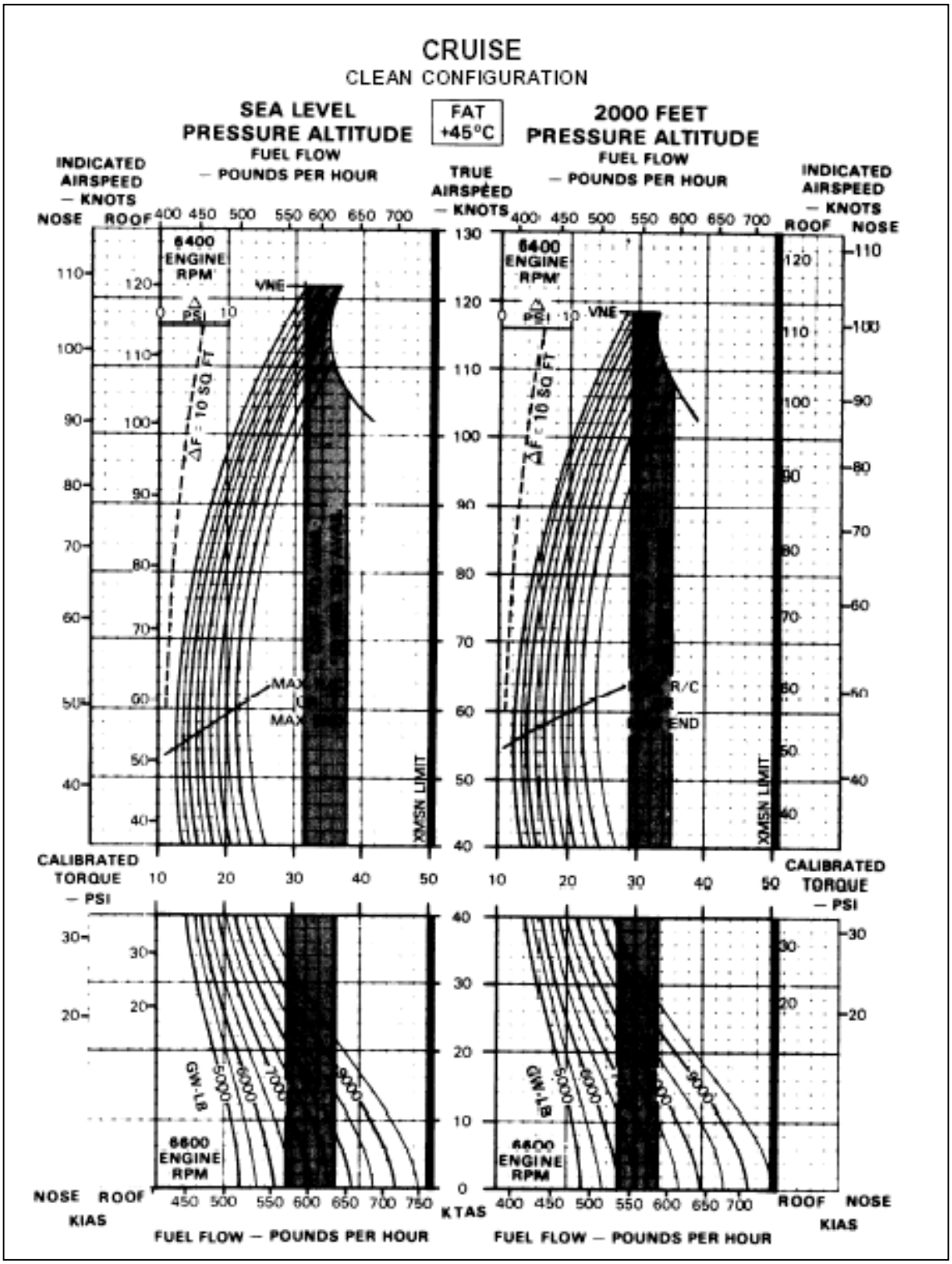
8000
9000
KIAS
FUEL FLOW — POUNDS PER HOUR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PRESSURE ALTITUDE
FAT
+45°C
2000 FEET
PRESSURE ALTITUDE
FUEL FLOW
— POUNDS PER HOUR
INDICATED
AIRSPEED
— KNOTS
TRUE
AIRSPEED
— KNOTS
NOSE
ROOF
6400
ENGINE
RPM
VNE
ΔF = 10 SQ FT
MAX
R/C
END
XMSN LIMIT
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RPM
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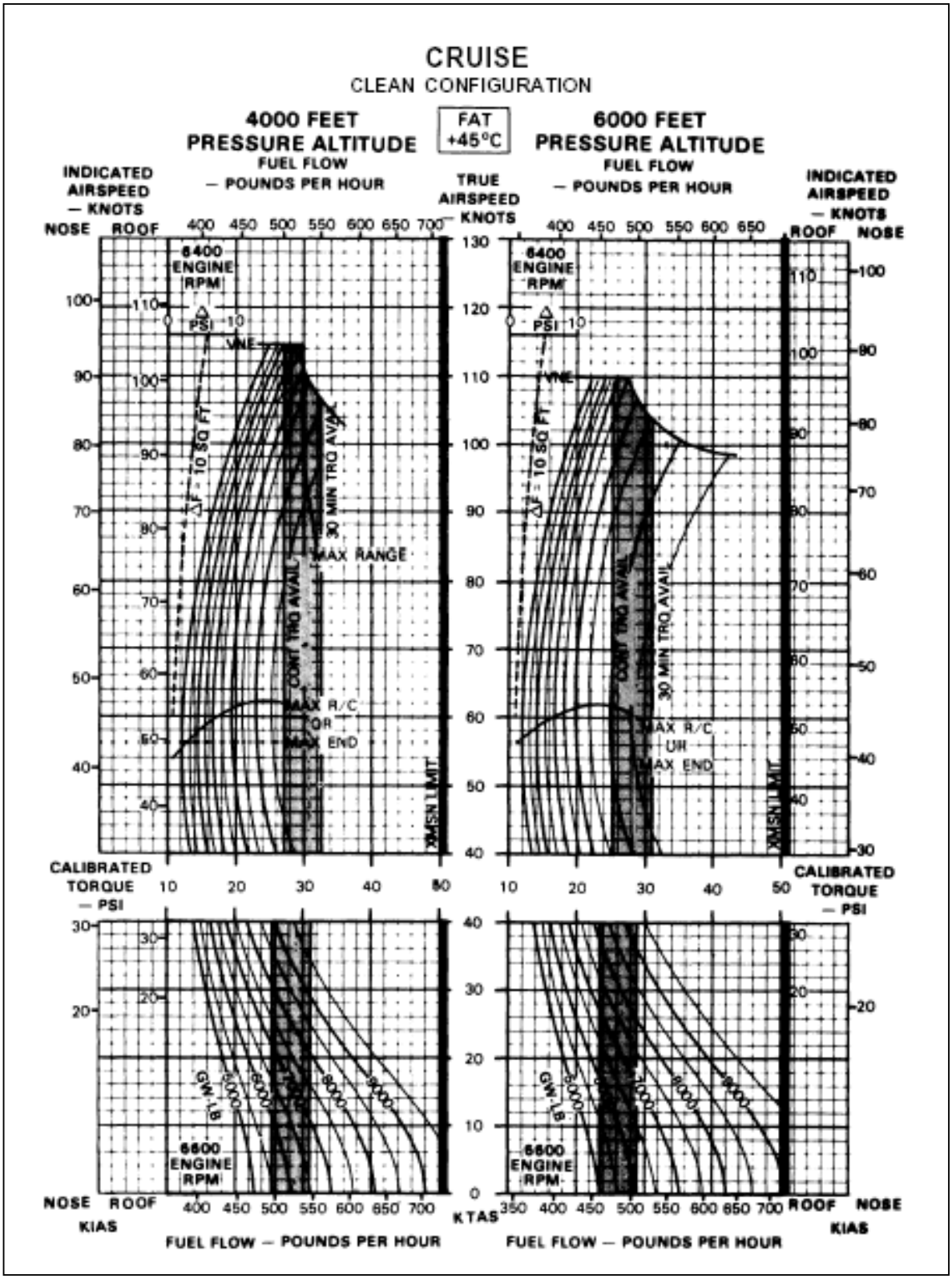
KTAS
FUEL FLOW — POUNDS PER HOUR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4000 FEET PRESSURE ALTITUDE
FAT +45°C
6000 FEET PRESSURE ALTITUDE
FUEL FLOW — POUNDS PER HOUR
INDICATED AIRSPEED — KNOTS
TRUE AIRSPEED KNOTS
NOSE ROOF
6400 ENGINE RPM
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10 SQ FT
30 MIN TRQ AVAIL
CONT TRQ AVAIL
MAX RANGE
MAX R/C OR MAX END
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KTAS
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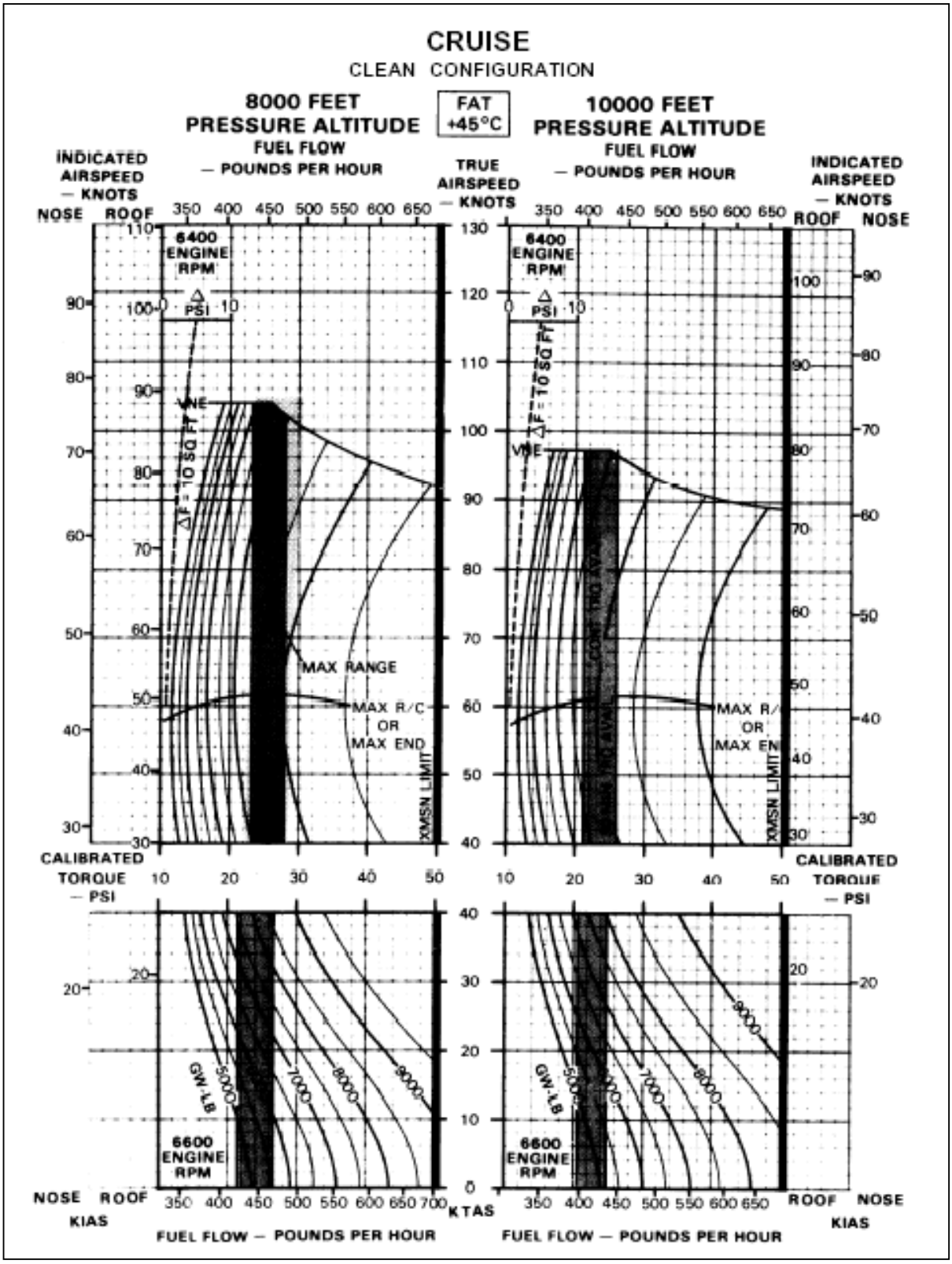
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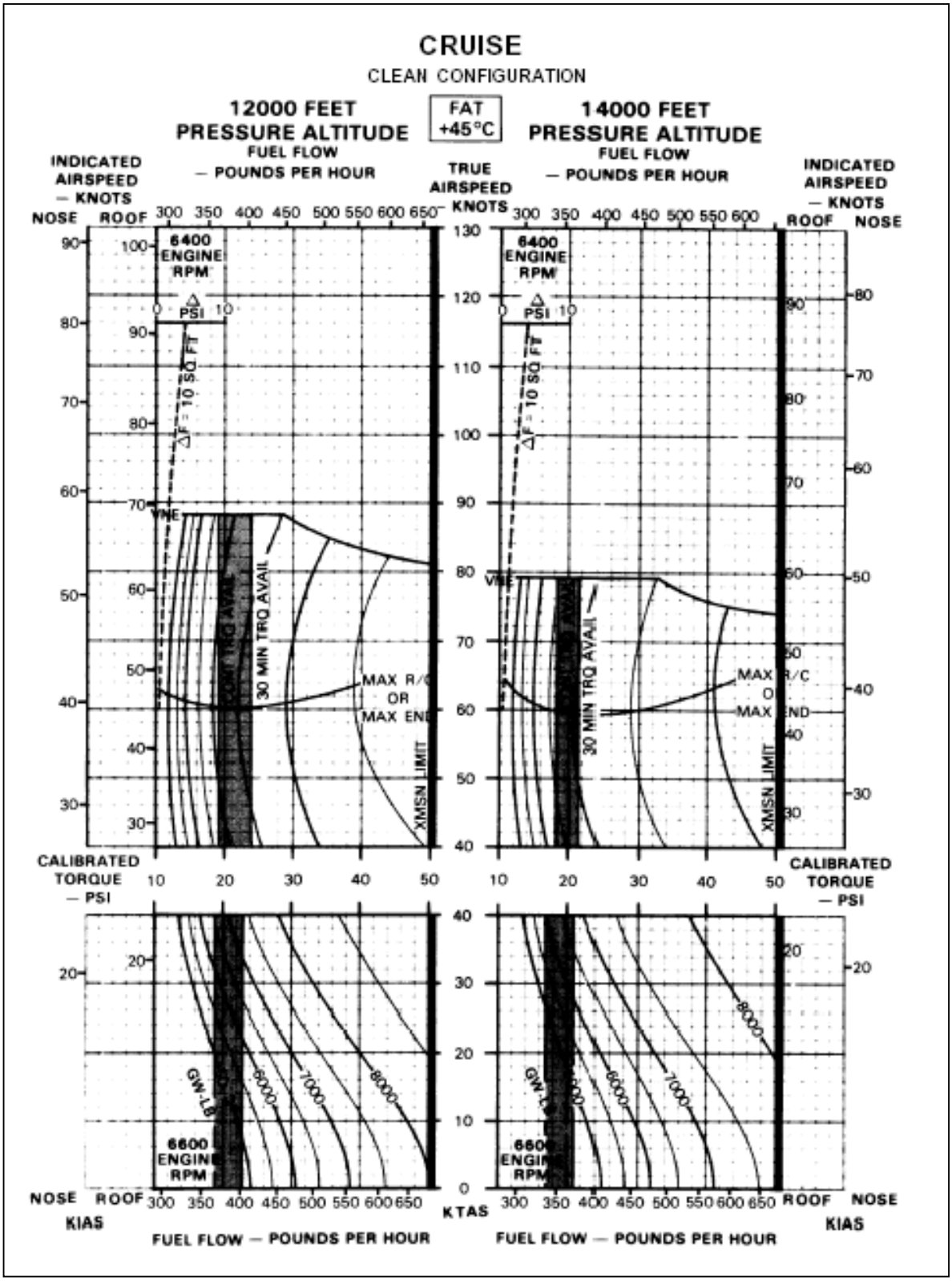
KTAS
FUEL FLOW — POUNDS PER HOUR


CRUISE
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14000 FEET PRESSURE ALTITUDE
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INDICATED AIRSPEED — KNOTS
NOSE ROOF
TRUE AIRSPEED KNOTS
6400 ENGINE RPM
ΔPSI
ΔF = 10 SQ FT
VNE
30 MIN TRQ AVAIL
MAX R/C OR MAX END
XMSN LIMIT
CALIBRATED TORQUE — PSI
6600 ENGINE RPM
GW-LB
6000
7000
8000
KIAS
KTAS
FUEL FLOW — POUNDS PER HOUR

AIRSPEED OPERATING LIMITS