Flight Test Performance Calculation Package – Piper PA44 Seminole

You must prepare a full set of planning documents for your flight test and can use this package for that purpose.

These flight planning documents must include:

- weight and balance
- flight plan
- performance predictions
    - Accelerate-Stop Distance Required
    - Take-Off Distance Required
    - Single Engine Service Ceiling
    - Etc.

Performance predictions should cover all phases of flight for which charts are available in the POH. We suggest that you prepare these in a package in advance of your flight test using an estimate of the examiner's weight, the forecast weather conditions applicable to the time of your flight test and of course the actual aerodrome data.

The charts and performance information provided in this package are based on a 1978 model Piper PA-44-180 Seminole. You should check to confirm that the information given in this package is applicable for the year or model aircraft that you will use on your flight test. If the information differs then you should use the charts provided by your flight school or the actual POH information when preparing for your flight test, or any other flight.

Often the examiner will give you a questionnaire ahead of time so that you can have this information determined before the examiner arrives. You should of course be capable of explaining how you determined it during the pre-flight oral briefing.

Your documentation should be put together in a package or binder so that it is neat, clear and professional. This will make a good impression with the examiner and will set you up for success.

Using information for your specific aircraft, airfield and the latest weather information, fill in the information below for use in the weight & balance and performance calculations:

Aeroplane and loading information:

- **Aeroplane empty weight:** _______ lbs
- **Aeroplane empty moment:** _______ in-lbs
- **Pilot weight:** _______ lbs
- **Examiner weight:** _______ lbs
- **Baggage weight:** _______ lbs
  (Mostly flight bags, jackets and documentation, normally located in the aft baggage area)
- **Fuel quantity:** _______ USG, and **Fuel weight:** _______ lbs
  (Sufficient fuel for at least a two hour flight test plus day VFR reserves)

Aerodrome and Weather information:

- **Aerodrome elevation:** _______ feet
- **Altimeter setting:** _______" Hg
- **Runway in use:** _______, length of runway: _______ feet
- **OAT:** _______°C
- **Wind:** ____/___ by ATIS
- **Flight test altitude:** _______' (sufficient to allow recovery at least 2,000' AGL)
- **Temperature at flight-test altitude:** ___°C from FD

Most aeroplane charts require one to input the pressure altitude and the aeroplane weight so the first steps are to calculate these.

Use the information for the airfield where you will be conducting your flight test and the latest weather information information

Pressure Altitude at take-off = (airfield elevation) + ((altimeter setting) – 29.92) x 1,000'
= _______ ft

Select an altitude for the flight test that will allow at recovery at least 2,000' AGL.

Pressure Altitude at test altitude = (test altitude) + ((altimeter setting) – 29.92) x 1,000'
=_______ ft

The second step in pre-flight planning is to estimate the aeroplane weight at take-off. To do this we must estimate the weight of fuel that will be carried.

For a typical flight test, sufficient fuel must be carried for about 2 hours of flying plus VFR reserves which correspond to 30 minutes of fuel at normal cruise power. Of course there will have to be fuel for taxi, take-off, climb, descent and landing so we can estimate the fuel using a total flight time of 3 hours at normal cruise power. We can verify that this will be sufficient and then make any adjustments necessary at the end.

Refer to the “Fuel and Power Chart”. By interpolation at flight test altitude, the fuel flow is ___ GPH per engine or ___ GPH total

Estimated fuel required is 3 hours x ____ GPH = ____ USG = _____ lbs

Actual fuel on board = ____ USG = _____ lbs

Using this information, we can now calculate the weight and balance for the flight test

Use the weight and balance chart to determine your take-off and landing weights and center of gravity positions

Take-off weight: _____ lbs, **Center of Gravity:** Within Limits / Outside Limits

Landing weight: _____ lbs, **Center of Gravity:** Within Limits / Outside Limits

Accelerate-Stop Distance Required (ASDR)

The total distance needed to accelerate to the maximum abort speed (sometimes called the decision speed) and then stop on the remaining runway. This is the distance that will be required if you had an engine failure at the abort speed and decided to abort the take-off.

It is not a legal requirement that the accelerate-stop distance available exceed the accelerate-stop distance required by the aeroplane. However you should calculate the distance required, compare it to the distance available and be aware of the implications of the result should an engine fail just prior to lift off.

Knowing that you do or don't have enough distance available to stop on the runway following an engine failure just before lift off can be used to help in your decision making. Be sure to include this as part of your pre-takeoff briefing; for example, if you brief that there is not distance available to stop on the runway then you can mentally prepare for running off the end of the runway (and for performing the critical action items to secure the aircraft) if you have an engine failure just before lift off.

Refer to the "Normal Procedure Accelerate-Stop Distance" graph and the local aerodrome information

Accelerate-Stop Distance Required: _____ ft

Accelerate-Stop Distance Available: _____ ft

Take-off Distance Required (TODR)

The total take-off distance needed to clear a 50 ft tall obstacle. Where there are existing obstacles at your departure airport you should determine the distance required to clear these obstacles.

Refer to the "Normal Procedure Take-off Distance Over 50 ft Barrier" chart and the local aerodrome data

Take-off Distance Required: _____ ft

Take-off Distance Available: _____ ft

Time, Fuel and Distance to Climb

This is the time, fuel and distance needed to climb from an initial altitude up to a specified altitude, usually the cruising altitude. For the flight test the initial altitude is usually the elevation of the departure airport and the final altitude is the altitude that you will use when manoeuvring or demonstrating your engine failure procedures.

The chart is read by finding the time, fuel and distance to climb from sea level to the departure aerodrome altitude and then subtracting these from the time, fuel and distance to climb from sea level to the flight test altitude.

Refer to the "Time, Fuel and Distance to Climb" chart

Climb from sea level to flight test altitude	
Time	__ minutes
Fuel	__ USG
Distance	__ nm

-

Climb from sea level to aerodrome elevation	
Time	__ minutes
Fuel	__ USG
Distance	__ nm

=

Climb from aerodrome to flight test altitude	
Time	__ minutes
Fuel	__ USG
Distance	__ nm

Single Engine Climb Rate

The single engine rate of climb is usually determined for two situations – firstly following an engine failure after take-off and secondly at your cruising altitude.

Refer to the "Climb Performance – One Engine Operating" chart

After liftoff

Single engine rate of climb: _____ fpm (_____% gradient)

At flight test altitude

Single engine rate of climb: _____ fpm (_____% gradient)

Single Engine Cruise Performance

If you are above your single engine absolute ceiling when an engine fails then you will be unable to maintain altitude. You will gradually descend down to the single engine absolute ceiling even if you are at full power on the operating engine and are maintaining the best single engine rate of climb speed (blue line, V_{YSE}). You need to check that you still will be able to maintain an altitude above terrain. This is particularly important during instrument conditions when you can't see the terrain, so you should always check that your single engine absolute ceiling is above the Minimum Obstacle Clearance Altitude (MOCA) if you are flying IFR.

Refer to the "Climb Performance – One Engine Operating" chart to determine the single engine service ceiling, where climb rate is only 50 fpm

Single Engine Service Ceiling: _____ ft

Time, Fuel and Distance to Descend

This chart enables you to determine the time, fuel and distance needed to descend from an initial altitude to some final altitude. The chart is similar in its form and usage to the one used to determine fuel, time and distance to climb. For the flight test the initial altitude is usually the altitude that you will use when manoeuvring or demonstrating your engine failure procedures and the final altitude is the altitude of the aerodrome that you will be landing at.

The chart is used by finding the time, fuel and distance to descend from aerodrome elevation to sea level and then subtracting these from the time, fuel and distance to descend from flight test maneuvering altitude to sea level.

Refer to the "Time, Fuel and Distance to Descend" chart

Descend from flight test altitude to sea level	
Time	__ minutes
Fuel	__ USG
Distance	__ nm

\-

Descend from aerodrome elevation to sea level	
Time	__ minutes
Fuel	__ USG
Distance	__ nm

=

Descend from flight test altitude to aerodrome elevation	
Time	__ minutes
Fuel	__ USG
Distance	__ nm

Landing Distance Required

The total landing distance needed to clear a 50 ft tall obstacle situated at the threshold. Where there are existing obstacles at your arrival airport you should determine the distance required to clear these obstacles and land.

The landing distance chart requires the pressure altitude and temperature (to take into account the effects of density altitude) and the wind component to calculate landing distance but do not usually take into account the effect of weight on landing distance.

Refer to the “Landing Distance Over 50 ft Barrier, Short Field Effort” chart and the local aerodrome information

Landing Distance Required: _____ ft

Landing Distance Available: _____ ft sharperedge solutions

PERFORMANCE CALCULATIONS SUMMARY

WEIGHT AND BALANCE

Estimated fuel required: ____ USG = _____ lbs

Actual fuel on board: ____ USG = _____ lbs

Take-off weight: _____ lbs, **Center of Gravity:** Within Limits / Outside Limits

Landing weight: _____ lbs, **Center of Gravity:** Within Limits / Outside Limits

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TAKE OFF

Pressure Altitude: _____ ft **Take-off Decision Speed:** _____ KIAS

Accelerate-Stop Distance Required: _____ ft, **Distance Available:** _____ ft

Take-off Distance Required: _____ ft, **Distance Available:** _____ ft

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CLIMB

NORMAL

Airspeed: _____ KIAS

Time: _____ minutes

Fuel: _____ USG

Distance: _____ nm

ONE ENGINE INOPERATIVE

Airspeed: _____ KIAS

After Liftoff:
Single Engine Rate of Climb: _____ fpm
(_____% gradient)

At Flight Test Altitude:
Single Engine Rate of Climb: _____ fpm
(_____% gradient)

CRUISE

Pressure Altitude: _____ ft **Single Engine Service Ceiling:** _____ ft

Power Setting: _____ in. Hg, _____ RPM

Performance: _____ KIAS, _____ KTAS, _____ GPH per Engine

DESCENT

Airspeed: _____ KIAS **Time:** _____ minutes

Fuel: _____ USG **Distance:** _____ nm

LANDING

Approach Airspeed: _____ KIAS

Landing Distance Required: _____ ft, **Distance Available:** _____ ft

FUEL AND POWER CHART – LYCOMING (L) O-360-E SEROES (PER ENGINE)

Press. Alt. Feet	Std. Alt. Temp. °C	99 BHP – 55% Rated Power Approx Fuel Flow 9.3 Gal/hr RPM AND MAN. PRESS.				117 BHP – 65% Rated Power Approx Fuel Flow 10.3 Gal/hr RPM AND MAN. PRESS.				135 BHP – 75% Rated Power Approx Fuel Flow 11.2 Gal/hr RPM AND MAN. PRESS.		
		2100	2200	2300	2400	2100	2200	2300	2400	2200	2300	2400
SL	15	22.2	21.7	21.2	20.7	24.5	24.0	23.4	22.9	26.4	25.8	25.2
1000	13	21.9	21.4	21.0	20.4	24.2	23.7	23.1	22.6	26.1	25.5	24.9
2000	11	21.6	21.1	20.7	20.2	23.9	23.4	22.9	22.3	25.8	25.2	24.6
3000	9	21.3	20.8	20.4	19.9	23.6	23.1	22.6	22.1	25.4	24.9	24.4
4000	7	21.0	20.6	20.1	19.7	23.2	22.7	22.3	21.8	FT	24.7	24.1
5000	5	20.8	20.3	19.9	19.4	22.9	22.4	22.0	21.5	-	FT	23.8
6000	3	20.5	20.2	19.6	19.2	22.6	22.1	21.7	21.3	-	-	FT
7000	1	20.2	19.7	19.3	18.9	FT	21.8	21.5	21.0			
8000	-1	19.9	19.5	19.1	18.6	-	FT	21.2	20.7			
9000	-3	19.6	19.2	18.8	18.4	-	-	FT	20.5			
10000	-5	19.3	18.9	18.5	18.1	-	-	-	FT			
11000	-7	FT	18.6	18.3	17.9							
12000	-9	-	FT	18.0	17.6							
13000	-11	-	-	FT	17.4							
14000	-13	-	-	-	FT							

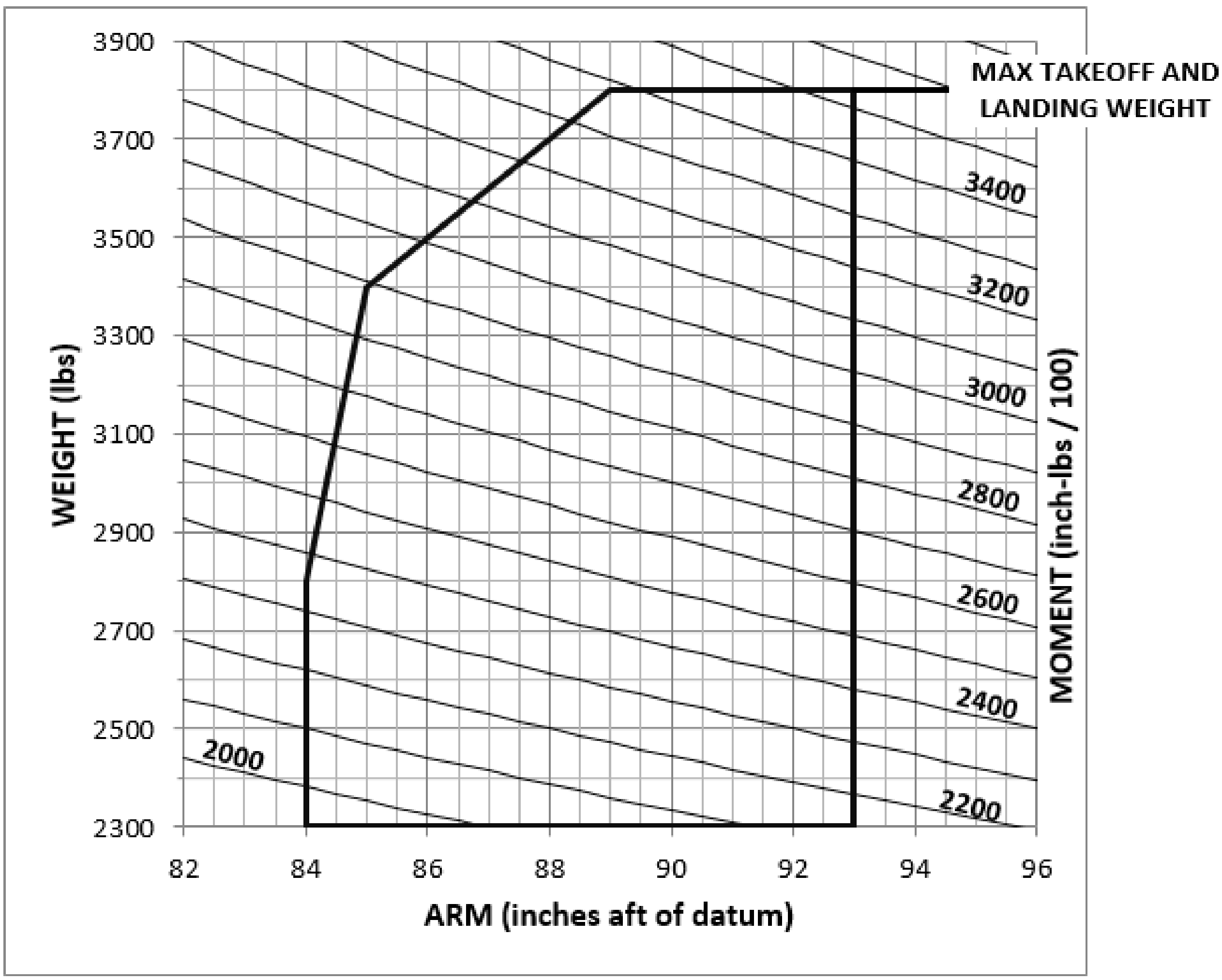
NOTES:
1. To maintain constant power, add approximately 1% manifold pressure for each 6°C above standard, subtract approximately 1% for each 6°C below standard.
2. Fuel flow provided for Best Power mixture

NOTE:

Mark up these charts in red so that it is easy for the examiner to see how you came up with your performance figures

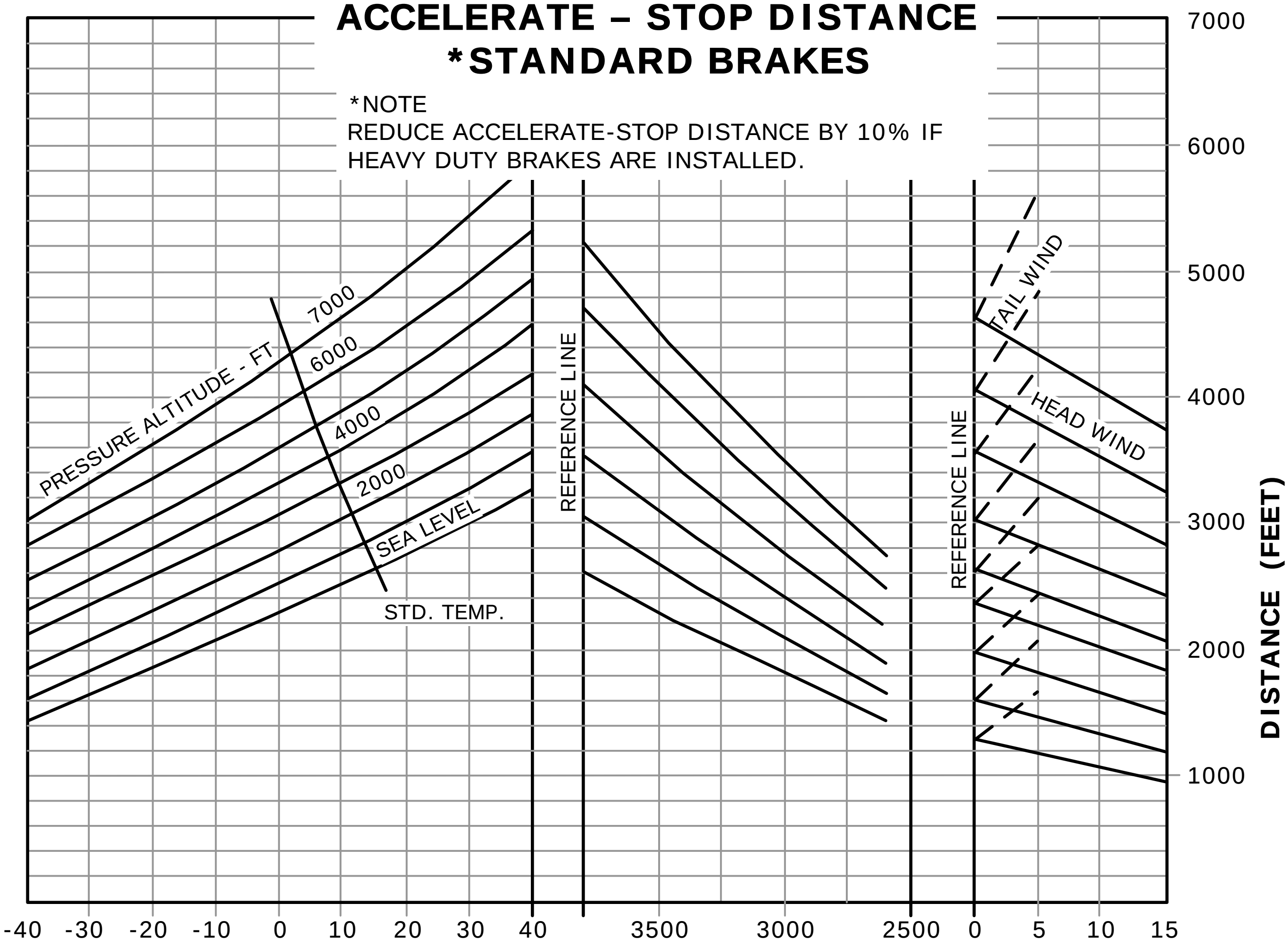
	Weight (lbs)	Arm (inches)	Moment (inch-lbs)
Basic Empty Weight			
Pilot & Co-Pilot		80.5	
Rear Passengers		118.1	
Baggage (Max 200lb)		142.8	
Zero Fuel Total			
Fuel (6lb / USG)		95.0	
Ramp Weight (Max 3816lb)			
Start & Taxi Fuel	16	95.0	1520
Take-Off Weight (Max 3800lb)			
Trip Fuel (6lb / USG)		95.0	
Landing Weight (Max 3800lb)			

NOTE:
Weight and CG location must be within limitations at all times during the flight. It is not sufficient to simply calculate the weight and balance at take-off



NORMAL PROCEDURE
ACCELERATE – STOP DISTANCE
*STANDARD BRAKES

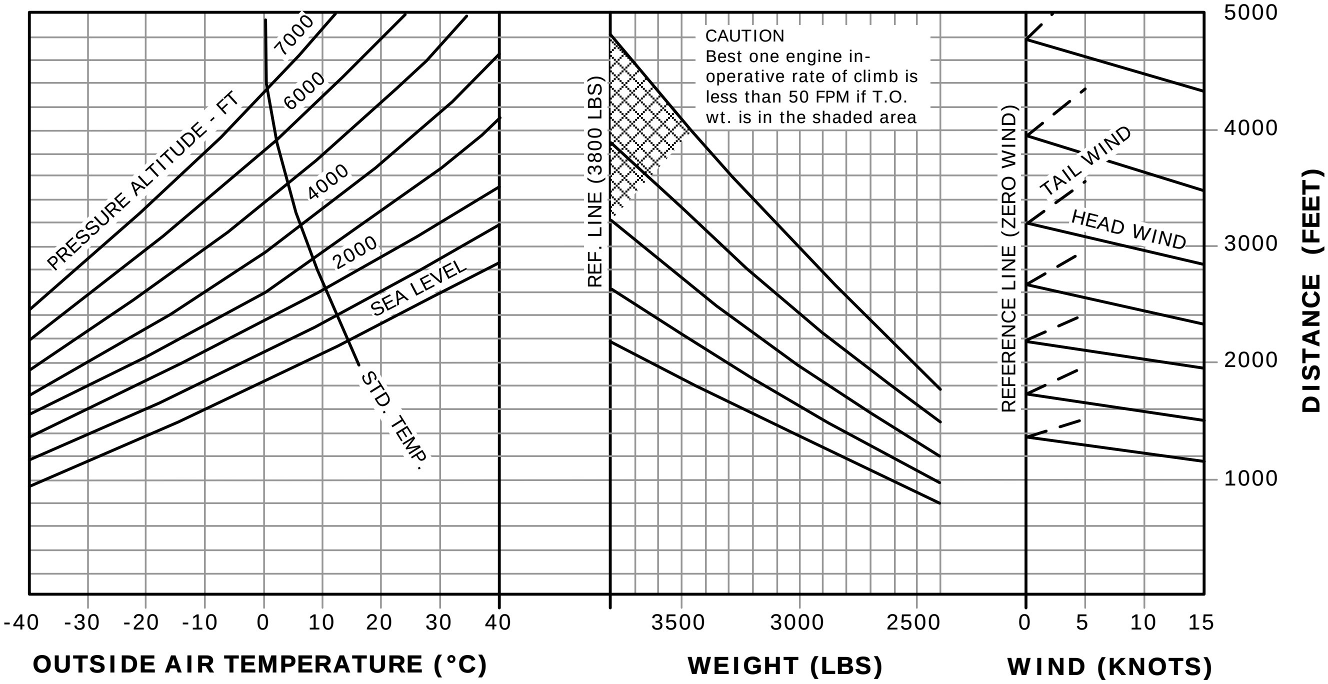
*NOTE
REDUCE ACCELERATE-STOP DISTANCE BY 10% IF HEAVY DUTY BRAKES ARE INSTALLED.



ASSOCIATED CONDITIONS:

POWER	- BOTH ENGINES AT 2700 RPM AND FULL THROTTLE
MIXTURE	- FULL RICH
FLAPS	- 0°
BRAKING	- MAX
COWL FLAPS	- OPEN
RUNWAY	- PAVED, LEVEL, DRY SURFACE
ABORT SPEED	- 75 KIAS

NORMAL PROCEDURE
TAKEOFF DISTANCE OVER 50 FT. BARRIER



WEIGHT POUNDS	LIFT OFF SPEED KIAS	BARRIER SPEED KIAS
3800	75	88
3400	71	83
3000	66	78
2600	62	73

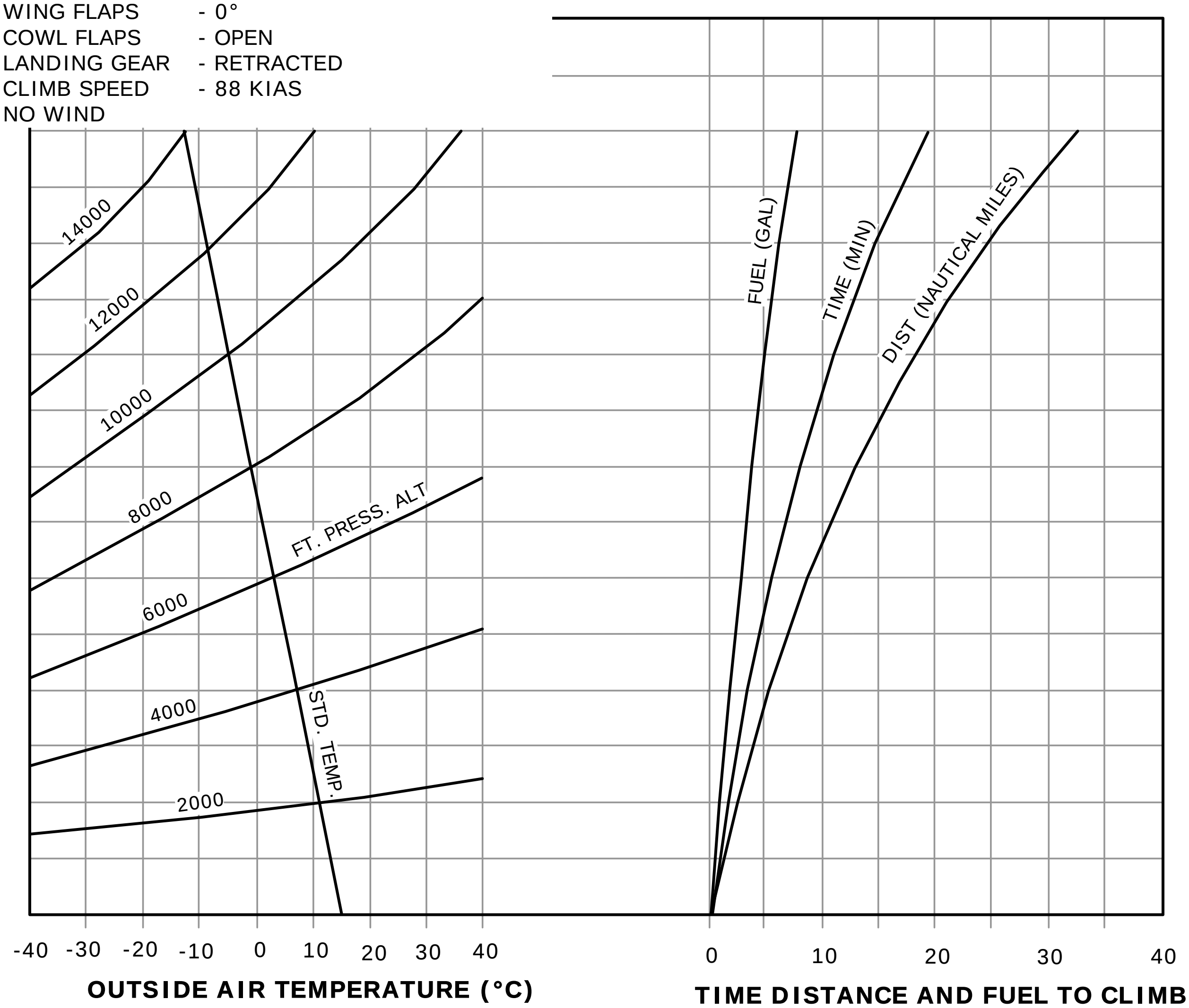
ASSOCIATED CONDITIONS:

POWER	- BOTH ENGINES AT 2700 RPM AND FULL THROTTLE BEFORE BRAKE RELEASE
FLAPS	- 0°
RUNWAY	- PAVED, LEVEL, DRY SURFACE

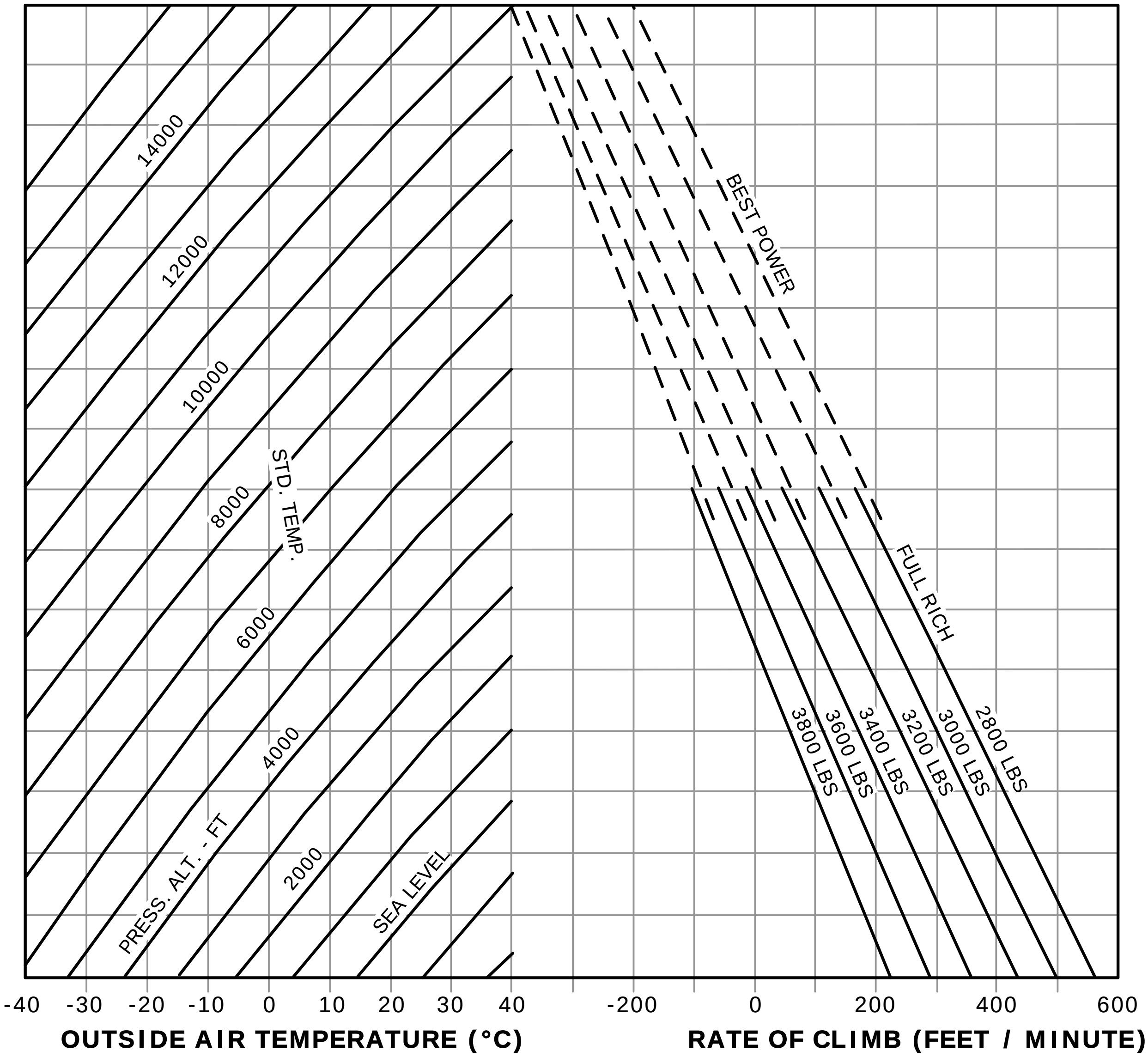
TIME, FUEL AND DISTANCE TO CLIMB

ASSOCIATED CONDITIONS:

POWER	- FULL THROTTLE AT 2700 RPM
WING FLAPS	- 0°
COWL FLAPS	- OPEN
LANDING GEAR	- RETRACTED
CLIMB SPEED	- 88 KIAS
NO WIND	



CLIMB PERFORMANCE – ONE ENGINE OPERATING



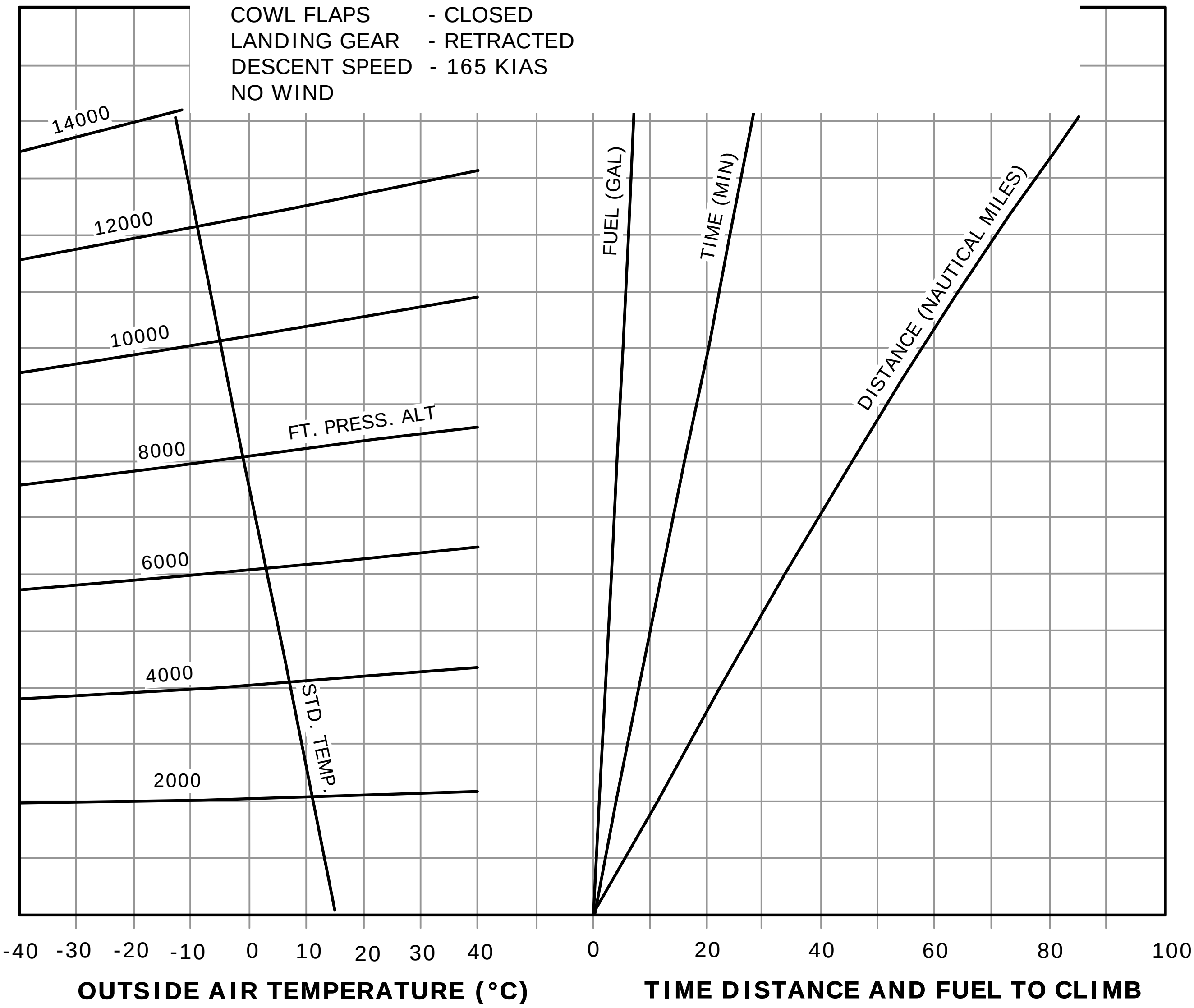
<u>ASSOCIATED CONDITIONS:</u>

POWER	- FULL THROTTLE AND 2700 RPM
MIXTURE	- FULL RICH (ABOVE 75% POWER)
	- BEST POWER (BELOW 75% POWER)
INOPERATIVE PROPELLER	- FEATHERED
FLAPS	- 0°
LANDING GEAR	- UP
COWL FLAPS	- OPEN (OPERATING ENGINE)
	- CLOSED (INOPERATIVE ENGINE)
AIRSPEED	- 88 KIAS
BANK ANGLE	- 3° - 5° BANK TOWARD OPERATIVE ENGINE

TIME, FUEL AND DISTANCE TO DESCEND

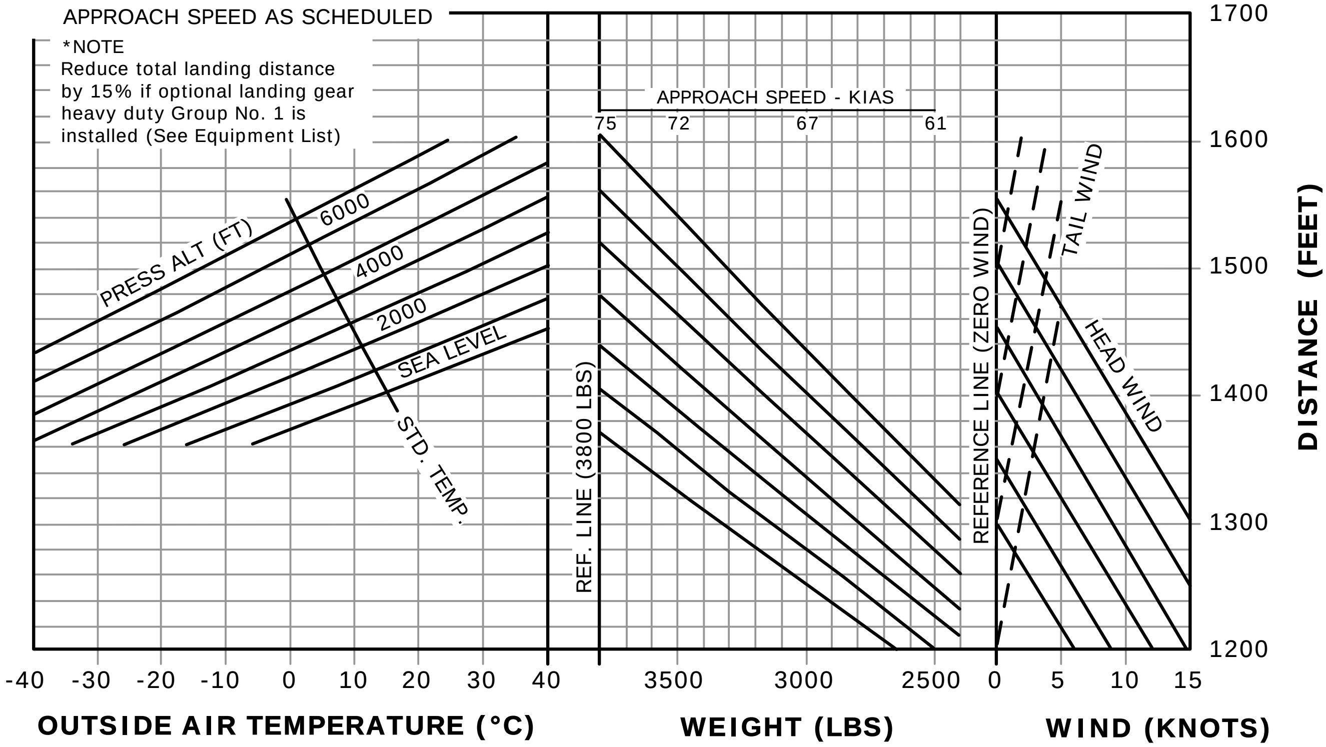
ASSOCIATED CONDITIONS:

POWER	- 2400 RPM & THROTTLE TO MAINTAIN 500 FPM DESCENT
WING FLAPS	- 0°
COWL FLAPS	- CLOSED
LANDING GEAR	- RETRACTED
DESCENT SPEED	- 165 KIAS
NO WIND	



LANDING DISTANCE OVER 50 FT. BARRIER
SHORT FIELD EFFORT
STANDARD BRAKES*

<u>ASSOCIATED CONDITIONS:</u>
POWER - OFF
FLAPS - 40°
FULL STALL TOUCHDOWN
APPROACH SPEED AS SCHEDULED



NAV CANADA

CANADIAN FLIGHT PLAN AND FLIGHT ITINERARY
PLAN DE VOL ET ITINÉRAIRE DE VOL CANADIEN

ICAO FLIGHT PLAN
PLAN DE VOL OACI

PRIORITY / PRIORITÉ — ADDRESSEE(S) / DESTINATAIRE(S)

<< ≡ FF → ______ << ≡

FILING TIME / HEURE DE DÉPÔT — ORIGINATOR / EXPÉDITEUR

______ → ______ << ≡

SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGINATOR / IDENTIFICATION PRÉCISE DU(DES) DESTINATAIRE(S) ET/OU DE L'EXPÉDITEUR

3 MESSAGE TYPE / TYPE DE MESSAGE — 7 AIRCRAFT IDENTIFICATION / IDENTIFICATION DE L'AÉRONEF — 8 FLIGHT RULES / RÈGLES DE VOL — TYPE OF FLIGHT / TYPE DE VOL

<< ≡ (FPL – ______ – ______ ______ <<

9 NUMBER / NOMBRE — TYPE OF AIRCRAFT / TYPE D'AÉRONEF — WAKE TURBULENCE CAT. / CAT. DE TURBULENCE DE SILLAGE — 10 EQUIPMENT / ÉQUIPEMENT

– ______ ______ / ______ – ______ << ≡

13 DEPARTURE AERODROME / AÉRODROME DE DÉPART — TIME / HEURE

– ______ ______ << ≡

15 CRUISING SPEED / VITESSE DE CROISIÈRE — ALTITUDE / LEVEL / NIVEAU — ROUTE / ROUTE

– 0 0 0 0 0 — 0 0 0 0 0 → ______ << ≡

16 DESTINATION AERODROME / AÉRODROME DE DESTINATION — TOTAL EET / DURÉE TOTALE ESTIMÉE (DAYS/JOURS, HRS, MINS) — SAR (HRS, MINS) — ALTN AERODROME / AÉRODROME DE DÉGAGEMENT — 2ND ALTN AERODROME / 2e AÉRODROME DE DÉGAGEMENT

– ______ ______ ______ → ______ → ______ << ≡

18 **OTHER INFORMATION / RENSEIGNEMENTS DIVERS**

– ______)<< ≡

19 ENDURANCE / AUTONOMIE (HRS, MINS) — PERSONS ON BOARD / PERSONNES À BORD — EMERGENCY RADIO / RADIO DE SECOURS (UHF, VHF, ELT) — ELT TYPE / TYPE D'ELT

– E / ______ → P / ______ → R / U V E ______

SURVIVAL EQUIPMENT / ÉQUIPEMENT DE SURVIE — POLAR / POLAIRE — DESERT / DÉSERT — MARITIME / MARITIME — JUNGLE / JUNGLE — **JACKETS / GILETS DE SAUVETAGE** — LIGHT / LAMPES — FLUORES / FLUORES — UHF — VHF

→ S / P D M J → J / L F U V

DINGHIES / CANOTS — NUMBER / NOMBRE — CAPACITY / CAPACITÉ — COVER / COUVERTURE — COLOUR / COULEUR

→ D / ______ → ______ → C → ______ << ≡

AIRCRAFT COLOUR AND MARKINGS / COULEUR ET MARQUES DE L'AÉRONEF — WHEELS / ROUES — SEAPLANE / HYDRAVION — SKIS — AMPHIBIAN / AMPHIBIE

A / ______ ☐ ☐ ☐ ☐

REMARKS / REMARQUES

→ N / ______ << ≡

AN ARRIVAL REPORT WILL BE FILED WITH / UN COMPTE RENDU D'ARRIVÉE SERA NOTIFIÉ À :

NAME AND PHONE NUMBER OR ADDRESS OF PERSONS(S) OR COMPANY TO BE NOTIFIED IF SEARCH AND RESCUE ACTION INITIATED / NOM ET NUMÉRO DE TÉLÉPHONE OU ADRESSE DE LA (DES) PERSONNE(S) OU COMPAGNIE À AVISER SI DES RECHERCHES SONT ENTREPRISES

PILOT-IN-COMMAND / PILOTE COMMANDANT DE BORD — PILOT'S LICENCE NO. / N° DE LICENCE DU PILOTE

C / ______ ______)<< ≡

FILED BY / DÉPOSÉ PAR — SPACE RESERVED FOR ADDITIONAL REQUIREMENTS / ESPACE RÉSERVÉ À DES FINS SUPPLÉMENTAIRES