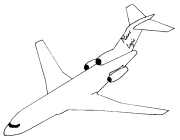


Minimum fuel for ETP

General:

When assessing the minimum fuel required for a particular flight, we must condsider 5 possible occurences. They are the minimum fuel required for:

- Normal (3 engine) operations from departure to destination.
- Normal (3 engine) operations from departure to destination, and then on to an alternate airport if an alternate is required.
- Normal operations from departure to destination, and then on to an alternate airport, assuming a loss of one engine at the 1, 500 ft missed approach point.
- Normal operations out to the depressurised ETP, then depressurised cruise ON or RETURN to an "ACCEPTABLE" airport.
- Normal operations out to the 1 Engine Inoperative ETP, then one engine inoperative ON or RETURN to a

Whichever of the above operations requires the most fuel determines the fuel we will load aboard the aircraft.

In this part of the flight planning texts, we will learn how to calculate the minimum fuel for the 1 Engine Inop ETP, and Depressurised ETP cases. First the Depressurised ETP minimum fuel.

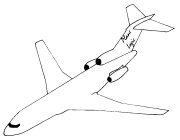
Depressurised ETP minumum fuel calculations

Loss of cabin pressure exactly at the depressurised ETP requires more fuel than if it occurs at any other point enroute.

Always assume normal operations out to the ETP, then depressurised from that point to an "ACCEPTABLE" airport when assessing fuel.

You do not need to consider the loss of cabin pressure then an engine failure. (ie: no double contingencies).

Questions such as this will be stand alone, NOT as part of another flight planning scenario. Scenarios will be of a similar type shown in these texts.



Pre-flight calculation of depressurised ETP fuel required

General:

These will probably worth 5 marks in an exam. You will be at the pre-flight planning stage in the crew room at the departure airport, considering the fuel required for cabin depressurisation at the worst point enroute (ie: at the depressurised ETP). You will be using the forecast route sector winds and temperatures for the flight (ie: RSWT information). You will also assess any holding fuel reserves based on TAF information.

No holding fuel of any kind is required to be carried for depressurised calculations if the airports you will use are of "ACCEPTABLE" standard or better.

The fuel policy for depressurised operations is published on page 1-17 of the B727 manual. Refer below.

Reserve fuel for **pre-flight** ETP depressurised operations is:

Item	Kg
V/R	Nil
Fixed Reserve	2, 250
Wx Hold	Nil
Traffic Hold	Nil
WIP Hold	Nil
Final Taxi	100
Initial Taxi	150

Note: In-flight reserves are identical, except that neither initial nor final taxi fuel is required.

Depressurised cruise will be at 310 KIAS/FL130, which equates to Mach 0.59. In ISA conditions this will produce a TAS of 372 kt. Correct this TAS for ISA deviation 3 kt/ISA +/-5 degree.
eg: FL130 temp is ISA +5, TAS is 375 kt.
FL130 temp is ISA -10, TAS is 366 kt.

Depressurised cruise tables are on pages 5-18/5-19 of the B727 manual. The only level of interest to us is FL130.

Use the winds/ISA deviations at FL185 for the FL130 level.

Dep ETP min fuel example 1.

A B727 is to fly the sector Curtin (YCIN) to Darwin (YPDN) via ERC H2 route J151.

Cruise Sched: M 0.80/FL330. BRW YCIN is 72, 000 kg

The ETP depressurised is calculated as 287 nm from YCIN, and assumes a RETURN to YCIN at FL130, or continuing ON to YPDN at FL 130 if the cabin pressure is lost enroute.

RSWT information

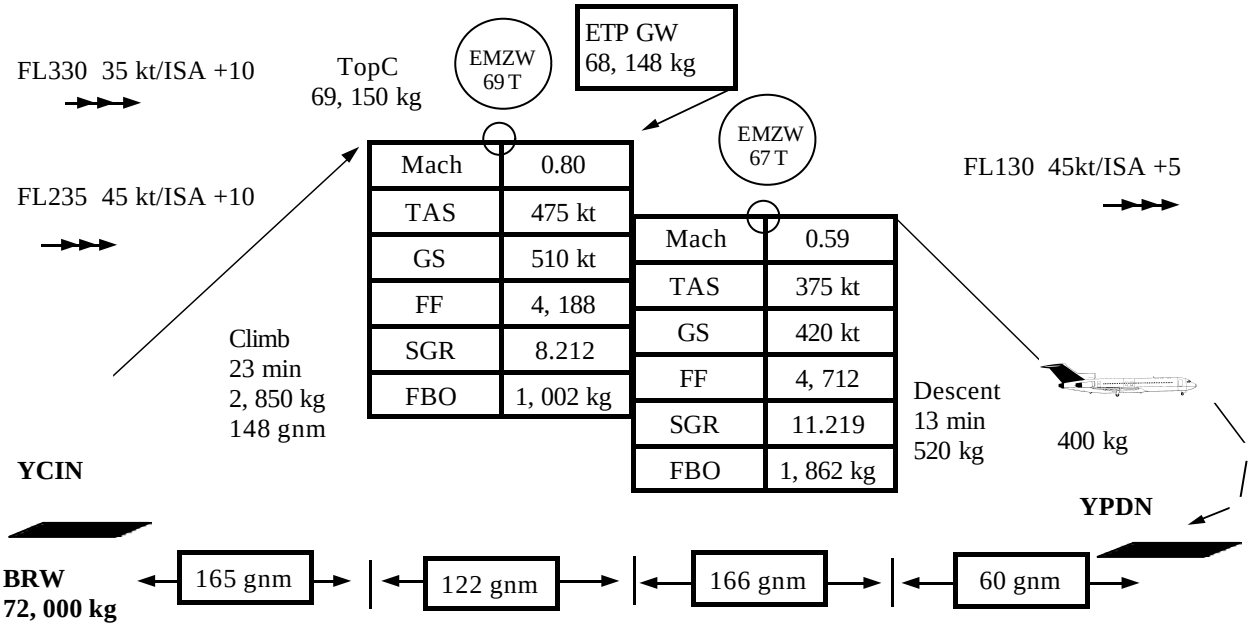
FL	ISA	YCIN/YPDN
445	-56	3010059
385	-56	3208553
340	-53	2805543
300	-45	3005533
235	-32	2605022
185	-22	2404517

Airport TAF information:

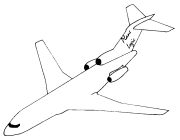
YCIN is forecast to be below alternate minima for the period of possible use. It will however be a SUITABLE airport provided weather holding fuel to cover INTER deteriorations is carried.

YPDN is forecast to be below alternate minima for the period of possible use. It will however be a SUITABLE airport provided weather holding fuel to cover TEMPO deteriorations is carried. Additionally, a traffic holding requirement of 15 minutes applies to cover military flying operations in progress.

What is the minimum amount of fuel which must be on board at start up YCIN (ie: ramp fuel) to allow for depressurised operations between Curtin and Darwin ?



Flight profile.



Step 1. Find climb data (manual page 2-9).

Climb data SL to FL330 ISA +10 72, 000 kg
23 min/2, 850 kg/165 gnm.

Step 2. Find descent data (manual page 4-3).

13 min/520 kg/50 anm/+10/60 gnm.

Step 3. Find cruise zone length TopC-ETP.

YCIN-ETP	287g nm
YCIN-TopC	-165 gnm
TopC-ETP	**122 gnm**

Step 4. Find EMZW TopC-ETP.

69, 150 kg -(61 nm x 8.8) = 68, 613 kg
(Say 69, 000 kg)

Step 5. Calculate FBO from TopC to ETP.
In this example it is 1, 002 kg.

Step 6. Calculate GW at ETP.

69, 150 kg - FBO 1, 002 kg = 67, 683 kg.

Step 7. Find cruise distance ETP-TopD.

ETP-YPDN	226g nm
Descent	-60 gnm
ETP-TopD	**166 gnm**

Step 8. Find EMZW ETP-TopD.

67, 683 kg - (84 gnm x 11.6) = 67, 174 kg
(say 67, 000 kg)

Step 9. Calculate FBO for depressurised cruise zone
from ETP to TopD (FL130).

Step 10. Fuel summary.

Item	Kg
Flight fuel	6, 634 kg
V/R	NIL
Fixed Reserve	2, 250
Wx Hold	Nil
Traffic Hold	Nil
WIP Hold	Nil
Final Taxi	100
Initial Taxi	150
Min Ramp FOB Dep ops	**9, 134 kg**

Min FOB at ramp for depressurised ops is 9**, 134 kg**. ***Answer !***

Dep ETP min fuel example 2.

A B727 is to fly the sector Perth (YPPH) to Alice Springs (YPAS) via ERC H2 route J141/W173.

Cruise Sched: M 0.80/FL330. BRW YPPH is 76, 000 kg

The ETP depressurised between Kalgoorlie and Alice Springs is calculated as 350 nm from YPKG, and assumes a RETURN to Kalgoorlie (YPKG) at FL130, or continuing ON to YPAS at FL 130 if the cabin pressure is lost in that sector of the flight.

RSWT information

FL	ISA	YPPH/YPKG
445	-56	2710059
385	-56	2610553
340	-53	2710542
300	-45	2609533
235	-32	2607020
185	-22	2704511

FL	ISA	YPKG/YPAS
445	-56	2609061
385	-56	2509054
340	-53	2809042
300	-45	2609032
235	-32	2507519
185	-22	2504009

Airport TAF information:

YPKG is forecast to be below alternate minima for the period of possible use. It will however be a SUITABLE airport provided weather holding fuel to cover INTER deteriorations is carried.

YPAS is forecast to be below alternate minima for the period of possible use. It will however be a SUITABLE airport provided weather holding fuel to cover INTER deteriorations is carried. Additionally, a traffic holding requirement of 15 minutes applies to cover military flying operations in progress.

What is the minimum amount of fuel which must be on board at start up YPPH (ie: ramp fuel) to allow for depressurised operations between Kalgoorlie and Alice Springs ?