



DOCUMENT
GSM-AUS-CPL.001

DOCUMENT TITLE
INSTRUMENT RATING

CHAPTER 11 – ALTERNATE REQUIREMENTS

Version 2.0
December 2017

This is a controlled document. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form, or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission, in writing, from the Chief Executive Officer of Flight Training Adelaide.

CONTENTS.....

ALTERNATE REQUIREMENTS	3
11.1 GENERAL	3
11.2 WEATHER.....	3
11.2.1 Special Alternate Minima	4
11.3 RADIO NAVIGATION AIDS.....	4
11.4 RUNWAY LIGHTING	6
11.4.1 Operational requirements: Runway lighting	8
11.5 TAF INTERPRETATION.....	8
11.6 SUMMARY	9
11.6.1 Nomination of a Suitable Destination or Alternate Aerodrome	9
11.7 FINAL SELECTION OF A SUITABLE ALTERNATE AERODROME	10
11.8 RADIO NAVIGATION AIDS.....	10
11.8.1 For Charter (CHTR) Operations	10
11.8.2 For private (PVT) and Aerial Work (AWK) Operations.....	10
11.8.3 Night VFR.....	11
11.9 RUNWAY LIGHTING.....	11
11.10 OPERATIONAL REQUIREMENTS—RUNWAY LIGHTING (<i>ATC AU304</i>).....	12
11.10.1 Portable Runway Lighting	12
11.10.2 Electric Runway Lighting	12
11.10.3 Pilot Activated Lighting (PAL).....	12
11.11 INSTRUMENT RATING EXAMINATION	13
11.12 SPECIFIC WEATHER CONDITIONS	14
11.13 METAR, TTF AND TAF.....	16
11.13.1 TAF Examples	16
11.13.2 TTF Examples.....	17
11.13.3 METAR Examples.....	19
11.1 CLOUD TYPES AND ASSOCIATED TURBULENCE	22

ALTERNATE REQUIREMENTS

11.1 General

(TERMINAL AU8)

A pilot may have to make provision for flight to an alternate aerodrome, or carry fuel for holding purposes, for the following reasons:

- The suitability of the forecast weather at the destination aerodrome
- The suitability of the radio navigation aid(s) at the destination
- The suitability of the aerodrome lighting system, for arrivals at night.

When determining the operational requirements that apply to a particular destination, the following points should be remembered:

- Operational requirements are planned in accordance with the FLIGHT PROCEDURE that is expected to be used on the final route segment.
- When considering weather conditions for an aerodrome the TAF or TTF shall be the reference.
- When considering weather conditions for a route segment the ARFOR or flight forecast shall be the reference.

11.2 Weather

When an aerodrome forecast is 'provisional', (PROV TAF), or there is no TAF issued for a particular aerodrome, then a suitable alternate with a firm forecast is required.

The pilot of an IFR aircraft shall provide a suitable alternate aerodrome when he expects to arrive at his destination during the currency of, or up to 30 minutes prior to the forecast commencement time and up to 30 minutes after the forecast cessation time of any of the following conditions:

- **CLOUD:** more than SCT below the alternate minima
- **VISIBILITY:** less than the alternate minima
- **VISIBILITY:** greater than the alternate minima but the forecast includes a probability of fog, mist, dust which will restrict visibility to below the alternate minima
- **CROSSWIND:** (or downwind) greater than the maximum for the type
- **THUNDERSTORMS:** or their associated severe turbulence.

Note: These 30 minute buffers do not apply to a TTF.

Due to the ability to obtain an accurate QNH, ATIS, AWIS or AWIB offer 100 FT lower minima.

For aerodromes with a published instrument approach, the alternate minima shall be the applicable minima published on the relevant aerodrome chart.

For aerodromes without a published instrument approach, the alternate minima is more than SCT cloud below the LSALT for the final route segment plus (+) 500 FT and a visibility less than 8 KM.

11.2.1 Special Alternate Minima

Special alternate weather minima are available for specified approaches at some aerodromes for use by aircraft equipped with dual ILS/VOR approach capability (i.e. with duplicated LOC, G/P, marker, and VOR receivers.)

The requirement for duplicated marker receivers may be satisfied by one marker receiver and DME. These aircraft will also have two ADF systems when an NDB or locator is used for the ILS.

Special alternate minima will not be available, and will revert to the standard alternate minima, during periods when the local METAR/SPECI or forecasting services are not available or when the aerodrome ATS service is not provided.

Note: The non-availability of MET or ATS services will be notified by NOTAM.

11.3 Radio Navigation Aids

A flight operated under the instrument flight rules shall be planned on the basis of executing an instrument approach at its destination aerodrome for all operations at night, or when by day more than SCT cloud is forecast to exist below the lowest safe altitude plus 500 FT on the final route segment. A flight which is planned to be conducted in accordance with IFR flight procedures on the last route segment to its destination shall provide for a suitable alternate aerodrome, unless:

- For charter operations. The destination is served by one or more navaids for which an appropriate procedure has been prescribed, and the aircraft is fitted with two independent and separate systems each of which is capable of using one of the aids.
- a. For private and aerial work operations. The destination is served by a navaid for which an appropriate procedure has been prescribed and the aircraft is fitted with the appropriate system capable of using the navaid. (*JEPPESEN ATC- AIRPORTS AND GROUND AIDS, AU300 section*)

GNSS/(RNAV) approach capability using a TSO C145a or C146a receiver may be used to satisfy these requirements. CASA may approve other receivers on the basis of equivalent safety performance. (*JEPPESEN-RADIO AIDS: (IFR Operations paragraph.))*

A pilot conducting a VFR operation **at night** must provide for an alternate aerodrome within 1 hour's flight time of the destination unless:

- The destination is served by a suitable navaid. The alternate aerodrome must be served by a radio navigation aid (NDB/VOR) which the aircraft is equipped to use.
- The aircraft is fitted with an approved GNSS receiver, and the pilot and aircraft meet the requirements of Radio Aids - Air Navigation Systems. *(JEPPESEN ATC, AU 300 section.)*

When determining operational requirements with respect to navaids at the destination, you must ensure that either:

- The requirements for navaids are satisfied
- Prove that the aircraft will be in VMC on the last route segment to its destination and subsequently plan VFR flight procedures on the last route segment (the navaid requirements apply to an aircraft using IFR procedures).

Example 1: **Aircraft** equipment that meets requirement(s) above:

Type of Operation	Systems		Conditions
	Number	Type	
CTR/AWK 5,700 KG or less MTOW and PVT in CTA	2 Or 1	ADF, or VOR, or DME, or GNSS Or TSO-C145a or TSO-C146a GNSS	Applicable to Ops in controlled airspace. Any combination that includes at least 1 ADF or VOR. Note 2, Notes 3 and 4
CTR/AWK 5,700 KG or less MTOW and PVT in non-CTA	1	ADF or VOR or TSO-C145a or C146a GNSS	Applicable to Ops in non-controlled airspace. Notes 3 and 4
NGT VFR	1	ADF, VOR or GNSS	Note 2

Note 1: To meet the requirements above the navaid concerned must have an approved instrument approach procedure, and the pilot must be endorsed on that aid.

Note 2: GNSS in this case is certified to TSO-C129, C129a, C145a, C146a or equivalent as determined by CASA

Note 3: CASA may approve GNSS receivers certified to TSO-C129, C129a, C145a, and C146a.

Note 4: GNSS receivers must be fitted in accordance with AC 21-36 (on or after 13 Apr 05) or other equivalent advisory information applicable at the time of fitment.

Destination not served by a radio navigation aid.

A flight may be planned under the IFR **by day** to a destination not served by a radio navigation aid without the requirement to provide for a suitable alternate aerodrome, provided that:

- a. Not more than SCT cloud is forecast below the final route segment LSALT plus 500 FT and forecast visibility at the destination aerodrome is not less than 8 KM.
- b. The aircraft can be navigated to the destination aerodrome in accordance with *ATC-GENERAL FLIGHT PROCEDURES*.

Consider the following extract from an ARFOR:

CLOUD SCT ST 1000 / 3000. BKN CU 4000 / 8000 ISOL TOPS 14000

Provided that the final route segment LSALT is not higher than 3500 FT you could consider that VFR flight procedures are available. Two layers of scattered clouds (up to 4 OKTAS per layer) below LSALT + 500 FT would not be acceptable as this would amount to more than four OKTAS cloud. The area forecast must also indicate that the visibility will be in excess of 8 KM on the route segment in question (the ALT MNM visibility for aerodromes without an instrument approach is 8 KM).

11.4 Runway Lighting

Information regarding the availability of aerodrome lighting is contained in the *JEPPESEN ATC-AU300* section and on the *Aerodrome Chart in JEPPESEN* for that particular aerodrome. In most instances, a responsible person is required to be in attendance at the destination aerodrome, or an alternate will be required. At unattended aerodromes, you cannot assume that a responsible person will be available. The attendance of a responsible person is only assured when the aerodromes controlling authority has been contacted and attendance confirmed. An alternate aerodrome will be required when arriving at night at a destination aerodrome with lighting that does not meet the following requirements:

Lighting System

Requirements

Portable

A responsible person to be in attendance.

Manually
switched
electric lights.

Standby power; or standby portable lights and a responsible person.

Pilot activated
electric lights.

Standby power and a responsible person; or standby portable lights and a responsible person.

The alternate may have pilot activated lights if the aircraft has 2 VHF or VHF, HF and 30 minutes holding fuel.

A responsible person is not required at an alternate with pilot activated lights for Non-RPT aircraft (*JEPPESEN ATC, AU300 section.*)

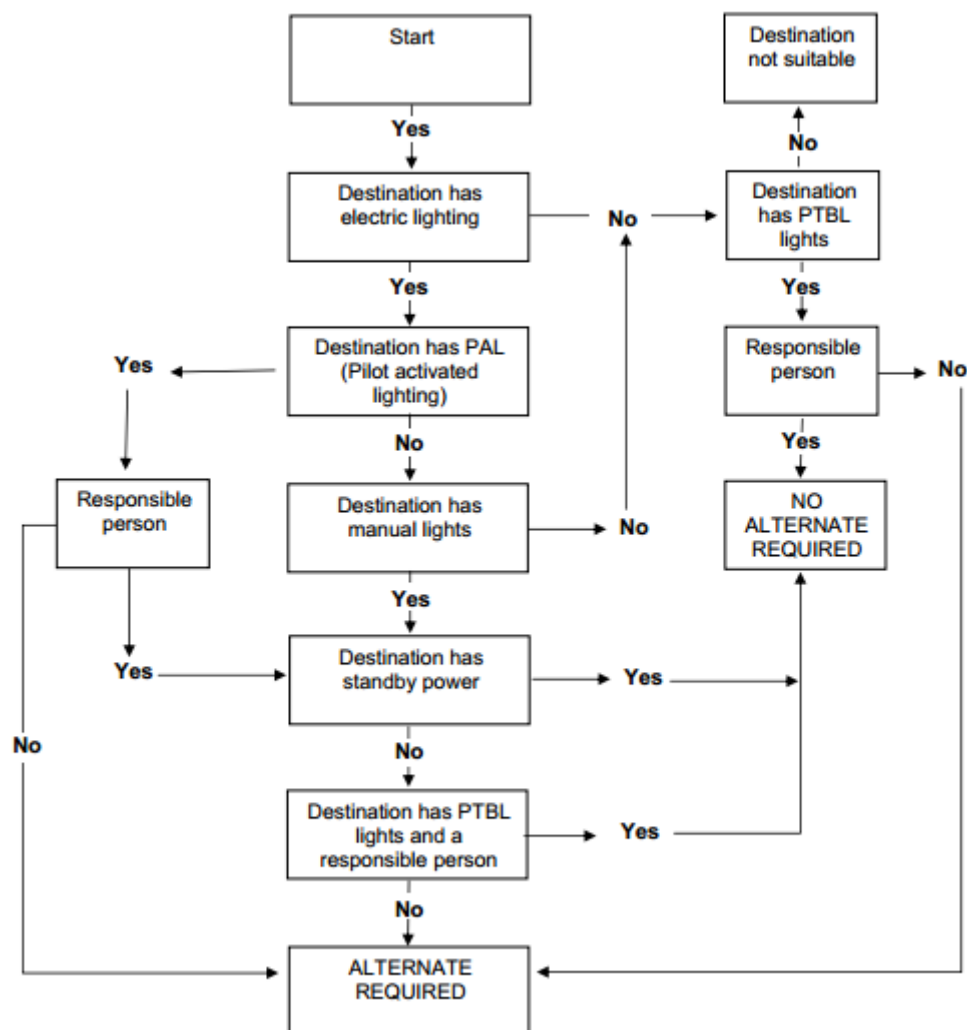
The alternate need not have standby power or standby portable lights.

Aerodrome lights when required shall be displayed during the following times:

- a. ARRIVAL: From at least 30 minutes before ETA to the time landing and taxiing has been completed.
- b. DEPARTURE: From at least 10 minutes before ETD to at least 30 minutes after take-off.

Summary: Unless a responsible person turns on the electric runway lighting manually and those lights have standby power, then an alternate aerodrome will be required.

11.4.1 Operational requirements: Runway lighting



(Ref. ATC, AU300 section)

11.5 TAF Interpretation

Correct interpretation of TAF weather is necessary if operational requirements are to be accurately determined. Firstly an understanding of TAF language is important. A summary of the common TAF codes is provided below.

Conditions**Requirement**

TEMPO (below ALT minima)

60 min holding or an alternate from 30 min before TEMPO conditions starts until 30 min after TEMPO conditions ends.

INTER (below ALT minima)

30 min holding or an alternate from 30 min before INTER conditions starts until 30 min after INTER condition end.

FM (to below ALT minima)	Alternate required from 30 min before onset of FM period (holding applicable only when forecast improvement is included in the TAF).
FM (to above ALT minima)	Alternate or holding requirements are lifted 30 min after the end of the FM period.

The following method of TAF interpretation is recommended:

- a. Consider each line of the TAF in turn
- b. Summarise requirements for various ETAs.

11.6 Summary

11.6.1 Nomination of a Suitable Destination or Alternate Aerodrome

After checking the weather, radio navigation aids and aerodrome lighting requirements (if a night operation) at the destination, your attention is drawn to *JEPPESEN ATC, AIRPORTS AND GROUND AIDS: SUITABILITY OF AERODROMES*. The significant sections of which are:

A pilot in command shall plan his flight to comply with the following conditions for the use of an aerodrome, including an alternate aerodrome:

- a. An aircraft shall not take off or land at a place not authorised for the purpose.
- b. An aircraft shall not take off or land at an aerodrome at night unless the following lighting is operating:

For a PVT, AWK or CHTR aircraft; runway edge lighting, illuminated wind direction indicator, obstacle lighting where specified in local procedures, e.g. HOBART RWY 30; VISUAL TAKE OFF PROCEDURE.

- c. An aircraft shall not take off or land at an aerodrome when the surface or strength of the manoeuvring area is unsuitable for operations of the aircraft type:

For example an aeroplane that is not confined to operations on hard surfaced runways shall not take off or land unless the minimum runway width meets the following requirements:

An aeroplane operating at night or under IFR flight procedures with a maximum take off weight not exceeding 5700 KG ...18 metres width runways (RWY WID).

For aeroplanes requiring 18 M width runways, the minimum width of runway stop (RSW WID shall be at least 90 M (graded and overall).

Note: Comprehensive information on aerodrome runway dimensions can be found in the *JEPPESEN AIRPORT DIRECTORY*. Limited information is available in IAL landing charts. ('Aerodrome Charts' for ICAO PANS OPS 4 charts).

- For aerodromes for which NO Instrument approach procedure is prescribed, e.g. BALRANALD, NSW; the alternate minima shall be the LSALT for the final 'route segment' plus 500 feet and a visibility of 8 kilometres. (*JEPPESEN, AU300 Section.*)
- When an aerodrome forecast (TAF) is 'Provisional', the pilot in command shall make provision for a suitable alternate aerodrome for which a 'firm' forecast is available. (*Ref. ATC, AU300 section.*)

11.7 Final Selection of a Suitable Alternate Aerodrome

When a flight is required to provide an alternate aerodrome, any aerodrome may be so nominated for that flight provided:

- a. It is suitable (operationally) as a destination for that flight
- b. It is not an aerodrome for which that flight would require to provide for an alternate aerodrome.

11.8 Radio Navigation Aids

Irrespective of the forecast weather at the destination aerodrome, all flights may be required to provide for an alternate due to Radio Navigational aid limitations. A flight which is planned to be conducted in accordance with IFR flight procedures on the last route segment (*) to its destination, shall provide for a suitable alternate aerodrome. (*Ref. JEPPESEN ATC, AU300 section.*)

11.8.1 For Charter (CHTR) Operations

The destination is served by one or more radio navigation aids for which an appropriate procedure has been prescribed, and the aircraft is fitted with TWO independent and separate radio navigation systems, each of which is capable of using ONE of the aids.

11.8.2 For private (PVT) and Aerial Work (AWK) Operations

The destination is served by a radio navigation aid for which an appropriate procedure has been prescribed, and the aircraft is fitted with the appropriate radio navigation system capable of using the aid. (*Ref. JEPPESEN, ATC AU300 Section.*)

(*) The term 'route segment' means that part of a route between radio navigation aids, reporting points or turning points or any combination of these.

Note: Read each question carefully and do not attempt to dissect the area forecast (ARFOR) to assess your visual status. Simply assume that unless otherwise stated, you are operating in IMC and IFR flight procedure. A typical situation which frequently arises is that your destination is served by only one radio navigation aid (whether by design or by system malfunction) ; and we are told for example, that one ADF is U/S in the aircraft. If the destination has only an NDB, then that location will require an alternate irrespective of the TAF if it is a CHTR flight. The TAF encompasses the airspace within a radius of 5 nm of the centre of the aerodrome or runway complex (*Ref. JEPPESEN METEOROLOGY*) and is not considered as the last route segment.

11.8.3 Night VFR

A CHTR, AWK or PVT flight operated at night under the VFR shall provide for an alternate aerodrome within one hour's flight time of the destination unless the destination is served by a radio navigation aid, and the aircraft is fitted with the appropriate radio navigation system capable of using the aid. The alternate aerodrome shall be served by a radio navigation aid which the aircraft is equipped to use.

11.9 Runway lighting

When a flight is planned to land at its destination aerodrome at night (*), the pilot in command may also need to provide for a suitable alternate under certain conditions. The criteria is dependent upon the type of lighting available at the aerodrome (**) and whether or not a responsible person (***) would be in attendance for the ETA.

(*) When the pilot activated lighting (PAL) is not being used, the pilot in command or operator shall ensure that arrangements have been made for the lighting to be operating during the following periods:

- **Departure** for at least 10 min before ETD to at least 30 min after take-off.
- **Arrival** from at least 30 min before ETA to the time landing and taxiing has been completed.

The above shall apply to runway, obstruction and taxiway lighting.

(**) Comprehensive information on aerodrome lighting can be obtained from the ERSA or the AIRPORT DIRECTORY in JEPPESEN. Limited information is available in Aerodrome Charts.

(***) **A responsible person** is one who has been instructed in, and is competent to display the standard runway lighting with portable lights. A responsible person may also be required, where necessary, to manually switch on electric lighting.

11.10 Operational Requirements–Runway Lighting *(ATC AU304)*

11.10.1 Portable Runway Lighting

When a flight is planned to land at night at an aerodrome where portable lights are used to provide the runway lighting, provision shall be made for flight to an alternate aerodrome unless arrangements are made for a responsible person to be in attendance during the period specified in (b) above to ensure that the runway lights are available and arrangements are made for a responsible person to be in attendance during (b) above to display the portable lights in the event of failure of the primary lighting.

11.10.2 Electric Runway Lighting

When a flight is planned at night at an aerodrome with electric runway lighting, whether PAL or otherwise, but without standby power for this lighting, provision shall be made for flight to an alternate aerodrome unless arrangements are made for a responsible person to be in attendance during the period specified in (b) above to ensure that the runway lights are available during that period.

11.10.3 Pilot Activated Lighting (PAL)

When a flight is planned to land at night at an aerodrome with PAL and standby power, provision must be made for a flight to an alternate aerodrome equipped with runway lighting unless a responsible person is in attendance to manually switch on the aerodrome lighting.

In choosing a suitable alternate aerodrome for night operations, an alternate aerodrome nominated in accordance with (a) (b) or (c) above need not have standby power or standby portable runway lighting.

In the case of an aerodrome equipped with PAL, this may be nominated as an alternate without a responsible person being in attendance provided that the aircraft is equipped with:

- a. Dual VHF
- b. Single VHF and HF communications and carried 30 minutes of holding fuel to allow for the alerting of ground staff in the event of a failure of the aircraft's VHF communication.

11.11 Instrument Rating Examination

SUMMARY 1 OPERATIONAL REQUIREMENTS - ALTERNATE AERODROMES

Except when operating an aeroplane with a MTOW not exceeding 1930 KG on VFR flight procedures by DAY, the pilot in command shall provide for a suitable alternate aerodrome when he expects to arrive at his destination during the currency of, or up to 30 minutes PRIOR to the forecast commencement of the following weather conditions:

- a. **(a)** CLOUD more than SCT (4 OKTAS) below the ALTERNATE MINIMUM or SPECIAL ALTERNATE MINIMUM situated in the minima title box on the aerodrome chart. Specific details of these minima are given in the NOTES area at lower right hand side of respective aerodrome chart.

Note: To use the SPECIAL ALTERNATE MINIMA you attention to JEPPESEN TERMINAL which quotes that to use this minima, aircraft must be equipped with dual ILS/VOR approach capability, i.e. duplicated LLZ (LOC), G/P, marker and VOR receivers. One marker receiver and a DME is satisfactory in place of duplicated marker receivers. The aircraft will also have two ADF systems when NDB or locator is used for the ILS.

OR

- b. **(b)** VISIBILITY, less than the ALTERNATE MINIMUM or the SPECIAL ALTERNATE MINIMUM. This figure is expressed in kilometres.
- c. **(c)** VISIBILITY, greater than the alternate minimum but the forecast is endorsed with a percentage probability (PROB) of fog, mist, dust or any other phenomenon restricting visibility below the alternate minimum (e.g. PROB 30 FG).

This situation would be identified in a TAFOR as follows:

TAF YCOM 071834Z 0720/0808 08005KT 8000 BKN018 BKN030
 PROB30 0721/0724 0500 FG
 T02 04 06 07 Q1010 1012 1014 1012

The above example is a TAF for COOMA in NSW, which is valid between the hours of 2000Z to 0800Z. The surface wind forecast from 080 (true) at 5 knots and the visibility is 8000 metres. Therefore, the cloud base of 1800 feet (measured above aerodrome elevation) and the basic visibility are both well above alternate minima (refer YCOM NDB approach).

However, between the hours of 2100Z and 2400Z there is a 30% probability that the visibility at YCOM will be reduced to 500 metres due to fog.

From MET this can be decoded to mean that fog will exist, obscuring the sky with no appreciable change predicted until at least 2400Z.

If our ETA for YCOM was between 2030Z and 2400Z, then we must plan for an alternate for YCOM. If this is not practical another option would be to carry holding fuel so that we could hold overhead YCOM in the NDB holding pattern until at least 0030Z. ATC, AU 300 section enables this proviso.

- **(d)** WIND a crosswind or downwind component more than the maximum presented in the approved flight manual for the aircraft. This may present a problem when planning into locations provided with a single runway.

The option details in ATC AU300 Section is also available for situations as detailed in **(a), (b) or (d)** i.e. Cloud, visibility or wind less than the alternate minimum.

11.12 Specific Weather Conditions

When weather conditions at the destination are forecast to deteriorate TEMPOrarily or INTERmittently below the values as specified on the previous page (a), (b) or (d), provision for an alternate need not be made if sufficient additional fuel is carried to allow the aircraft to hold for:

- (a) 30 minutes when the TAFOR is endorsed INTER
- (b) 60 minutes when the TAFOR is endorsed TEMPO.

Note: ATC 300 Series requires that the additional fuel is to be carried when the ETA of the aircraft at its destination or alternate falls within the 30 minutes before the forecast commencement time to 30 minutes after the expected time of cessation of these deteriorations. This is required in the case of INTER, TEMPO and in the case of (a), (b), (c) and (d) on the previous paragraph.

If a Trend Type Forecast (TTF) is available, this requirement is not applicable as a TTF is considered more accurate.

Examples of TAFOR including INTER and TEMPO:

TAF ABCS 070045Z 0702/0714 17015KT 9999 BKN020 BKN025

TEMPO 0708/0712 2000 +TSSH SCT025CB BKN030

T27 28 30 32 Q1022 1023 1025 024

TAF ABTL 040115Z 0402/0414 15015KT 9999 BKN020 SCT030

INTER 0407/0410 3000 + TSGR BKN030CB

T25 27 29 31 Q1023 1021 1019 1017

When visibility is greater than the alternate minimum but forecast to deteriorate **temporarily** or **intermittently** below the alternate minimum due dust (e.g. dust caused by thunderstorms) then 30 to 60 minutes holding fuel shall be carried respectively.

For example INTER 0408/0410 2000 +TSSA.

When thunderstorms or their associated severe turbulence are forecast, or the PROBability of thunderstorms or their associated severe turbulence is forecast at the destination, sufficient additional fuel shall be carried to permit the aircraft to proceed to a suitable alternate or to hold for:

- a. **(a)** 30 minutes when forecast is endorsed INTER
- b. **(b)** 60 minutes when forecast is endorsed TEMPO.

Note: Whenever cumulonimbus (CB) cloud is forecast, the degree of associated thunderstorm activity or PROBability of occurrence is included. Ref. MET 39.

Therefore, if a TAF is shown to indicate TS activity and no endorsed INTER or TEMPO, there is no option other than to provide for an alternate for that location.

In some cases, the terminology PROB INTER may appear on a TAFOR. e.g. 'PROB 30 INTER 0608'. This could also apply to a TEMPO; however, it is of no significance to us as we are still required to carry the respective holding fuel or fuel to divert to a suitable alternate. PROB 30 is suggesting that there is a 30% change of the predicted weather occurring. The PROB percentage is only used when the probability is 50% or less.

When TAFs include FM period, during which time an operational requirement will either become effective or be removed, the timing for the change in operational requirements is as follows:

- a. When the weather during the FM period is forecast to create an operational requirement, that operational requirement will become effective 30 minutes before the onset of the FM period.
- b. When the weather during the FM period is forecast to remove an operational requirement, that operational requirement will remain effective until 30 minutes after the onset of the FM period.

TAF YPAD 071840Z 0720/0708 35020KT 9999 SCT040 BKN100
FM070400 29035KT 2000 RATS BKN030CB
T15 18 20 22 Q1022 1016 1010

The above example is a TAF for ADELAIDE. At a predicated time of 0400 conditions are forecast to change within a 30 minute period resulting in an OPR being placed on AD from 0330 to 0800 Z. Note that a 30 minute buffer is provided for in this case.

If the situation were reversed.

```
TAF YPAD 071840Z 0720/0708 29035KT 2000 +TSRA BKN030CB
FM070400 35020KT 9999 SCT040 BKN100
T15 18 20 22 Q1022 1020 1016 1018
```

In this case AD would require an alternate until 0430Z as from this time conditions are predicated to be above the alternate minima, thereby cancelling the OPS.

11.13 Metar, TTF and TAF

11.13.1 TAF Examples

1. TAF YSSY 010435Z 0106/0206 VRBO4KT CAVOK
FM011400 16015KT 8000 SH BKN008 SCT030
FM012300 23010KT 9999 NO SIG WX SCT030
T25 21 18 15 Q1012 1013 1014 1014
2. TAF YSCB 270648Z 2708/2720 33015G28KT 3000 RA BKN010 OVC100
FM271400 16015KT 8000 SH FEW010 BKN040 SCT100
INTER 2710/2715 1000 +TSGR BKN005 SCT040CB
RMK FM270800 MOD TURB BLW 5000FT TILL271500
T14 13 13 11 Q1016 1015 1013 1016

In this example, conditions change from 1400, for the remainder of the forecast. An intermittent period straddles these changed conditions from 1000 to 1500, as does a period of turbulence between 0800 and 1500.

3. TAF YMML 292250Z 3000/3024 15004KT CAVOK
FM301100 15001KT 3000 HZ BKN009 PROB40 3017/3023 0400 FG
T14 15 17 14 Q1016 1014 1013 1014

In this example, conditions change significantly from 1100. The probability of fog is forecast between 1700 and 2300.

4. TAF YMHB 100645Z 1008/1020 00000KT 3500 DZ OVC008
FM101200 14005KT 0300 FG
T12 11 10 10 Q1018 1019 1012 1011
5. TAF YCOM 070635Z 0708/0720 18015KT 9999 SCT005 FEW020
PROB30 TEMPO 0710/0714 5000 -SNSH BKN005 SCT020
T03 00 M02 M04 Q1008 1007 1006 1006
6. TAF YMML 120430Z 1206/1306 35005KT 9999 SCT030
FM121200 VRB02KT 9999 -DZ BKN009
FM121800 00000KT 0500 FG
FM122300 30006KT 1500 BR SCT010
T13 12 11 10 Q1012 1012 1013 1012

This example is an indication of how each period is in itself a self-contained forecast.

11.13.2 TTF Examples

1. TTF SPECI YBBN 2000Z 02001KT 0400S 8000N BCFG 18/17 Q1022
FM2030 02003KT 8000 NO SIG WX SKC

This example indicates that there is a significant change in the conditions from 2030. The visibility increases from a minimum of 400M to the south, maximum of 8KM to the north (neither covering more than half the aerodrome), to 8KM over the whole aerodrome. The observed weather changes from patches of fog to no weather and no cloud.

2. TTF SPECI YBBN 1745Z 23014G29KT 1200NE 6000 TS FEW030CB BKN 100 26/22 Q1003 FM 1815 23010KT 9999 NO SIG WX SCT040

In this example the visibility recorded indicates that the minimum visibility is 1200M to the northeast, and the maximum visibility is 6KM, observed over more than half the aerodrome. There is an improvement in the visibility, weather and cloud from 1815. Note that cloud is reported in the change group, as one set of prevailing conditions is succeeded by another.

3. TTF SPECI YBTL 0800Z 03010KT 4000 TS BKN030CB SCT120 27/24
Q1008 FM0830 03010KT 9999 SH SCT035 INTER 0830/1100 4000 TS
SCT010 SCT030CB

This example indicates that the currently observed storm is reduced to showers from 0830, but an intermittent deterioration from 0830 is still forecast.

4. TTF SPECI YBBN 2100Z 24001KT 0900 FG 17/17 Q1018 FM2100
24003KT 1500 BR FM2220 24005KT CAVOK

This example indicates that there is a change to the conditions at 2100. Another change takes place from 2200, with improved conditions.

5. TTF SPECI YAKV 0400Z 36025G40KT 9999 FEW040 35/10 Q1005
FM0430 24015KT 9999 SH FEW010 BKN030 FM0400 MOD TURB BLW
5000 FT TL 0630

In this example, the weather and cloud deteriorate from 0430. Note that visibility is provided to ensure that the changes in conditions are self-contained. Additionally, a period of turbulence, commencing from 0400 and ceasing at 0630, is expected.

6. TTF METAR YPPH 0500Z 36015KT CAVOK 32/08 Q1014 FM0630
28025KT 9999 NO SIG WX BKN030 INTER 0530/0730 5000 RASH BKN008

In this example the weather is expected to deteriorate from 0630, with intermittent periods of rain, showers and low cloud between 0530 and 0730.

7. TTF SPECI YSSY 2100Z 00000KT 3000 BR BKN010 16/15 Q1021
FM2200 00000KT 5000 NO SIG WX FEW010 FM2300 VRB02KT 7000 NO
SIG WX SKC

In this example there is an improvement from 2200, when the mist disappears. Note that the group is self-contained. From 2300 there is another improvement, although as the visibility is less than 10KM, CAVOK cannot be reported. Consequently, the weather and cloud groups are reported.

8. TTF METAR YMML 1300Z 04010KT 9999 16/10 Q1030 NOSIG

In this example the reported conditions are expected to remain for the next 3 hours

11.13.3 METAR Examples

1. METAR YLRE 0200Z 06010KT 9999 VCPO 33/19 Q1005
2. SPECI YAKV 1130Z 28028KT 3000 +SH FEW005 SCT025TCU 26/17 Q1007

This is an example of the new cloud group, towering cumulus.

3. SPECI YJHV 2122Z VRB01KT 0600 FG M01/M01 Q1022
4. SPECI YGJV 1745Z 23014G49KT 1200NE 6000S TSSQ FEW030CB
BKN100 26/22 Q1003

In this example the visibility is reduced to 1200M to the north east (minimum visibility observed), and maximum visibility of 6KM to the south (maximum visibility observed). Neither cover more than half the aerodrome. The remainder of the aerodrome has a visibility somewhere between those reported.

5. SPECI YSSY 1900Z VRB01KT 3000 HZ VCFG FEW030 18/17 Q1018

In this example, there is haze at the aerodrome, and fog is observed within 8KM of the aerodrome, but not at the aerodrome.

6. METAR YPBR 1400Z 00000KT //// 14/03 Q1014

This example is an indication of an automatic weather station readout where no visibility, weather or cloud is recorded. (However, //// can be used to indicate any missing information)

7. METAR YSWG 0200Z 03002KT 9999 -RASH FEW030 BKN100 17/11
Q1012.

8. METAR YRAV 0330Z 25010KT 9999 RASH SCT035 18/10 Q1003
RMK RF00.3/017.6

(00.3 is the rainfall recorded in the 10 minute period prior to the report and 017.6 is the amount of rainfall recorded since the previous 9AM **LOCAL** time and accumulates for the next 24hrs until 9AM the following day

CHAPTER 11 ALTERNATE REQUIREMENT



INSTRUMENT RATING

Type	Abbr.	Level	Altitude of Base			2 Appearance	Approx. Depth	Flying Conditions		Precipitation	Icing
			Tropics	Mid Lat.	Polar			TURB	Visibility in (M)		
Stratus	ST	Low	ALL BELOW 7500'			Grey layer, uniform base, sun discernible sometimes, (no halo)	1000'	Usually nil, occas. Light	40 to 200 M	Occasional drizzle	Usually nil
Cumulus	CU	Low	ALL BELOW 7500'			Detached, rising mounds, dense, sharp outlines, domes, towers, dark base, brilliant when sunlit.	Up to 15,000'. Large up to 30,000'	Light in small, severe in large	0 - 200	Occasional showers	Small cloud - nil. Large cloud - rime and clear
Strato-Cumulus	SC	Low	ALL BELOW 7500'			Grey, whitish, patch, layer, rounded masses, rolls, may be merged.	1000' to 2500'	Light to moderate	30 - 200	Light rain or drizzle	Occasional light rime.
Cumulo-Nimbus	CB	Low	ALL BELOW 7500'			Heavy & dense, huge towering shape, very dark base, often flattened top, anvil.	Up to 60000'	Severe to extreme	Usually nil	Showers of rain, snow hail, heavy showers	Definite risk or rime & clear.
Alto-Stratus	AS	Medium (Middle)	7500 to 25,000	7500 to 25,000	7500 to 13,000	Greyish/bluish sheet, or layer, fibrous or uniform, sun vaguely shows.	1000' to 4000'	Nil except in a front	300 to 1000	Intermittent rain and virga	Some risk of light to moderate rime.
Alto-Cumulus	AC	Medium (Middle)	8500 to 25,000	8500 to 25,000	8500 to 13,000	White/grey patches or sheets, rounded masses, rolls, diffuse.	Up to 1000'	Light to moderate	Approx. 500	Usually nil, occasional light rain, snow, virga	Some risk of light to moderate rime.

CHAPTER 11 ALTERNATE REQUIREMENT



INSTRUMENT RATING

Type	Abbr.	Level	Altitude of Base			3 Appearance	Approx. Depth	Flying Conditions		Precipitation	Icing
			Tropics	Mid Lat.	Polar			TURB	Visibility in (M)		
Nimbo-Stratus Can be low cloud	NS	Medium (Middle)	8500 to 25,000	8500 to 25,000	8500 to 13,000	Grey/dark, immense-covers sky, diffuse, blots out sun. Can merge with lower stratus cloud.	5000' to 30,000'	Nil to light except in a front	20 - 100	Moderate to heavy continuous rain, snow or virga.	Definite risk of clear & rime.
Cirrus	CI	High	20,000 to 60,000	16,500 to 45,000	10,000 to 25,000	Detached white filaments with fibrous look.	100' to 1000'	Usually nil	1000	Nil	Nil
Cirro-Stratus	CS	High	20,000 to 60,000	16,500 to 45,000	10,000 to 25,000	Transparent whitish cloud veil, smooth, produces halo.	Up to 1000'	Usually nil	1000	Nil	Nil
Cirro-Cumulus	CC	High	20,000 to 60,000	16,500 to 45,000	10,000 to 25,000	Thin white patches, - small clumps, - merged or separate	Up to 1000'	Light	1000	Nil	Nil

11.1 Cloud Types and Associated Turbulence

Cirrus	Ci	Little unless associated with a jet stream
Anvil Cirrus	Ci	Turbulence due to association with Cb
Cirrostratus	Cs	May be felt on entering cloud - usually only light
Cirrocumulus	Cc	Globular form of cloud indicates presence of turbulence
Thin altostratus	As	Little in cloud. Distinct bumps felt on entering or leaving cloud
Thick Altostratus	As	<u>Generally light in cloud</u> ; may be moderate to severe at fronts, over highlands. Bumps on entering and leaving
Alto cumulus	Ac	Usually light
Alto cumulus Lenticularis	Ac(lent)	Form of cloud indicates wave form in atmosphere with consequent turbulence; usually not severe
Alto cumulus Castellanus	Ac(cast)	Moderate to severe
Nimbostratus	Ns	<u>Generally light in cloud</u> . May be moderate to severe at fronts, over highlands. Bumps on entering or leaving
Cumulus (fine weather)	Cu	Light to moderate
Large Cumulus	Cu	Moderate to severe both in and below cloud. Violent on entering or leaving
Cumulonimbus	Cb	Severe both in and below cloud. Very violent on entering and leaving cloud
Stratocumulus	Sc	Light to moderate beneath and in cloud - bumpiness passing through inversion at cloud top, smooth above.
Stratus	St	Light. May be inversion as with Sc