Australian Government

Civil Aviation Safety Authority

Instrument number CASA 29/18

I, GRAEME MILLS CRAWFORD, Acting Director of Aviation Safety, on behalf of CASA, make this instrument under regulation 234 of the *Civil Aviation Regulations 1988.*

[Signed G.M. Crawford]
Graeme M. Crawford
Acting Director of Aviation Safety

17 May 2018

CASA 29/18 — Civil Aviation (Fuel Requirements) Instrument 2018

Contents

1 Name

This instrument is *CASA 29/18 — Civil Aviation (Fuel Requirements) Instrument 2018*.

1A Commencement

This instrument commences immediately after the commencement of the *Civil Aviation Amendment (Fuel and Oil Requirements) Regulations 2018*.

2 Definitions

In this instrument:

additional fuel means the supplementary amount of fuel (if any) required to allow the aircraft, if engine failure or loss of pressurisation (if applicable), whichever results in the greater subsequent fuel consumption, occurs at the most critical point:

(a) to proceed to an alternate aerodrome; and

(b) to fly for 15 minutes at holding speed at 1 500 feet above aerodrome elevation in ISA conditions; and

(c) to make an approach and landing.

Note Fuel planning in accordance with subsections 5 (2), (3) and (4) may place the aircraft in a fuel emergency situation if an engine failure or loss of pressurisation occurs as described above.

alternate aerodrome means an aerodrome:

(a) to which an aircraft may proceed, when it becomes either impossible or inadvisable to proceed to, or land at, the destination aerodrome; and

(b) where the necessary services and facilities are available; and

(c) where aircraft performance requirements can be met; and

(d) which is operational at the expected time of use.

Note Despite paragraph 13 (1) (b) of the *Legislation Act* 2003, the expression ***alternate aerodrome*** has a different meaning in this instrument to the meaning of that expression as defined in regulation 2 of CAR.

alternate fuel means the amount of fuel required to enable an aircraft to do the following in a sequence:

(a) a missed approach at the destination aerodrome;

(b) fly the expected routing to the destination alternate;

(c) conduct the approach;

(d) land at the destination alternate.

ATC means air traffic control.

CAO means Civil Aviation Order.

certificate holder means a Part 141 operator or a holder of an AOC.

decision point means a point en route at which an aircraft can:

(a) if the flight arrives at the point with adequate fuel to complete the flight to the destination aerodrome while maintaining the required amount of fuel — continue to the destination aerodrome; or

(b) otherwise — divert to an en-route alternate with adequate fuel to complete the flight to the en-route alternate while maintaining the required amount of fuel.

destination aerodrome means the aerodrome to which a flight is planned.

destination alternate means an alternate aerodrome at which an aircraft may land if it becomes either impossible or inadvisable to land at the destination aerodrome.

Note The aerodrome from which a flight departs may also be a destination alternate for the flight.

EDTO means an extended diversion time operation as defined in CAO 82.0 as in force from time to time.

en-route alternate means an alternate aerodrome at which an aircraft may land in the event that a diversion becomes necessary while en route.

Note The aerodrome from which a flight departs may also be an en-route alternate for the flight.

fixed fuel reserve means the amount of fuel:

(a) required to fly at 1 500 feet above aerodrome elevation in ISA conditions for the period of time specified for the flight in column 3 of Table 1:

(i) for a helicopter conducting an I.F.R. flight, an aeroplane or an airship — at holding speed; or

(ii) for a helicopter conducting an V.F.R. flight — at range speed; and

(b) calculated with the estimated weight on arrival at the destination alternate (or the destination aerodrome when no destination alternate is required); and

(c) which is usable fuel remaining in the fuel tanks until completion of the final landing.

flight commencement means the moment an aircraft vacates its parking position (whether pushed back or on its own power), also known as off-block time, for the purpose of take-off.

holding fuel means the amount of fuel required to fly for the period of time anticipated to be required for holding (taking into account the operating conditions) calculated at the holding fuel consumption rate established for the aircraft for the anticipated meteorological conditions or ISA.

ISA, or ***international standard atmosphere***, means the atmospheric standard as described in ICAO Document 7488 — *Manual of the ICAO Standard Atmosphere* as existing from time to time.

large aeroplane means an ***aeroplane*** with a maximum take-off weight of more than 5 700 kg.

necessary services and facilities means the services and facilities that are required under civil aviation legislation for the landing of the aircraft conducting the type of operation under which the flight is to be conducted.

operational variation means an alternative requirement to a requirement of this instrument.

power-assisted sailplane has the meaning given by subsection 2 of CAO 95.4 as at the date of commencement of this instrument.

powered sailplane has the meaning given by subsection 2 of CAO 95.4 as at the date of commencement of this instrument.

remote island means any of the following:

(a) Christmas Island;

(b) the Cocos (Keeling) Islands;

(c) Lord Howe Island;

(d) Norfolk Island.

RPT means regular public transport.

small aeroplane means an aeroplane with a maximum take-off weight of not more than 5 700 kg.

Table 1 means the table in subsection 5 (6).

taxi fuel means the amount of fuel expected to be used before take-off, taking into account local conditions at the departure aerodrome and auxiliary power unit consumption (if applicable).

Note For helicopter operations requiring a hover taxi to position to the take-off departure point, taxi fuel is the fuel expected to be consumed before the take-off for departure.

trip fuel means the amount of fuel required to enable the aircraft to fly until landing at the destination aerodrome taking into account the operating conditions, including (as applicable):

(a) fuel for take-off and climb from departure aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing; and

(b) fuel for cruise from top of climb to top of descent, including any step climb or descent from the initial cruising level/altitude mentioned in paragraph (a); and

(c) fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

(d) fuel for executing an approach and landing at the destination aerodrome.

unforeseen factors means factors that could have an influence on the fuel consumption to the destination aerodrome, including, without limitation, the following:

(a) deviation of an individual aircraft from the expected fuel consumption data;

(b) deviation from forecast meteorological conditions;

(c) extended delays and deviations from planned routings or cruising levels.

variable fuel reserve means the amount of fuel that is the highest of:

(a) the percentage specified in column 4 of Table 1 of the trip fuel for the flight; and

(b) in the event of in-flight re-planning — the percentage specified in column 4 of Table 1 of the trip fuel, based on the consumption rate used to plan the in-flight re-planning trip fuel, from the point of in-flight re-planning to the destination aerodrome; and

(c) for an RPT or charter flight in an aeroplane — an amount of fuel to fly for 5 minutes at holding speed at 1 500 feet above the destination aerodrome in ISA conditions.

Note 1 Other expressions used in this instrument have the same meaning as in the *Civil Aviation Act 1988*. For example, ***AOC*** is defined in section 3 of that Act.

Note 2 Other expressions used in this instrument have the same meaning as in CAR. For example, ***I.F.R.*** and ***V.F.R.*** are defined in regulation 2 of those regulations.

Note 3 Other expressions used in this instrument have the same meaning as in CASR. For example, ***flight crew member*** is defined in the Dictionary at the end of those regulations.

3 Application

(1) Subject to subsections (2) and (3), this instrument applies to all Australian aircraft.

(2) This instrument does not apply to a private operation in a power-assisted sailplane or a powered sailplane that complies with the conditions in CAO 95.4.

(3) This instrument, other than section 11, does not apply to a charter operation in a power-assisted sailplane or a powered sailplane that complies with the conditions in CAO 95.4.

Note For AOC holders and Part 141 operators, the requirements of this instrument may be affected by section 8.

4 Usable fuel required for flight

In determining the quantity of usable fuel required by this instrument, the operator and the pilot in command must determine the quantity by reference to the following matters:

(a) aircraft specific fuel consumption data, being:

(i) current aircraft specific fuel consumption data derived from a fuel consumption monitoring system (if available); or

(ii) fuel consumption data provided by the aircraft manufacturer;

(b) operating conditions for the planned flight, including the following:

(i) anticipated weight of the aircraft;

(ii) NOTAMS;

(iii) meteorological reports and forecasts;

(iv) ATC procedures, restrictions and anticipated delays;

(v) the effects of any deferred maintenance items and configuration deviation, if applicable;

(c) the potential for deviations from the planned flight because of unforeseen factors.

5 The amount of fuel that must be carried for a flight

(1) The operator and the pilot in command must ensure that the aircraft carries at least the fuel required by this section.

(2) The amount of usable fuel on board at flight commencement must include:

(a) taxi fuel; and

(b) trip fuel from take-off; and

(c) holding fuel (as required); and

(d) variable fuel reserve (if specified in Table 1); and

(e) alternate fuel (if required); and

(f) fixed fuel reserve; and

(g) additional fuel (if applicable).

(3) The amount of usable fuel on board from a decision point must include:

(a) trip fuel from the decision point; and

(b) holding fuel (as required); and

(c) variable fuel reserve (if specified in Table 1); and

(d) alternate fuel (if required); and

(e) fixed fuel reserve; and

(f) additional fuel (if applicable).

(4) The amount of usable fuel on board at any time to continue a flight safely must include:

(a) trip fuel from that time; and

(b) holding fuel (as required); and

(c) alternate fuel (if required); and

(d) fixed fuel reserve; and

(e) additional fuel (if applicable).

(5) If, after flight commencement, fuel is used for a purpose other than that originally intended during pre-flight planning, the pilot in command must reanalyse and, if applicable, adjust the planned flight.

(6) Table 1 specifies factors for the fixed fuel reserve and variable fuel reserve by aircraft type, flight rules and class of operation.

Table 1 — Fixed fuel reserve and variable fuel reserve requirements

Item	Column 1 Aircraft	Column 2 Flight rules	Column 3 Fixed fuel reserve	Column 4 Variable fuel reserve
	Other than RPT and charter			
1	Small aeroplane (piston or turboprop)	Day V.F.R.	30 minutes	N/A
2	Small aeroplane (piston or turboprop)	I.F.R. or night V.F.R.	45 minutes	N/A
3	Turbojet or large aeroplane (turboprop)	I.F.R. or V.F.R.	30 minutes	5%
4	Large aeroplane (piston)	I.F.R. or V.F.R.	45 minutes	5%
5	Helicopter	V.F.R.	20 minutes	N/A
6	Helicopter	I.F.R.	30 minutes	N/A
7	Airship	I.F.R. or V.F.R.	30 minutes	N/A
	RPT and charter			
8	Piston aeroplane	I.F.R. or V.F.R.	45 minutes	10%
9	Turbojet or turboprop aeroplane	I.F.R. or V.F.R.	30 minutes	5%
10	Helicopter	V.F.R.	20 minutes	10%
11	Helicopter	I.F.R.	30 minutes	10%
12	Airship	I.F.R. or V.F.R.	30 minutes	N/A

Note For RPT and charter operations in aeroplanes, the variable fuel reserve is the higher of: (a) the specified percentage of the trip fuel; and (b) an amount to fly for 5 minutes in particular conditions (see definition of ***variable fuel reserve*** in section 2).

6 Determining and monitoring fuel quantity

Pre-flight fuel quantity determination

(1) Before flight commencement, the pilot in command must ensure that a determination of the quantity of usable fuel on board the aircraft is conducted.

In-flight fuel quantity checks

(2) During a flight, the pilot in command must ensure that fuel quantity checks are carried out at regular intervals and the usable fuel remaining is evaluated to:

(a) compare planned fuel consumption with actual fuel consumption; and

(b) determine whether the usable fuel remaining is sufficient to complete the planned flight in accordance with subsection 5 (3) (if applicable) and subsection 5 (4); and

(c) determine the expected usable fuel remaining on arrival at the destination aerodrome.

Instructions and procedures for recording fuel quantity — certificate holders

(3) If the operation of an aircraft is authorised by an AOC or a Part 141 certificate, the certificate holder's operations manual must contain instructions and procedures for recording:

(a) before flight commencement, the quantity of usable fuel on board; and

(b) after each fuel quantity check conducted during a flight, the fuel quantity data evaluated and determined in accordance with subsection (2).

7 Procedures in the event of fuel quantity below specified levels

(1) If, as a result of an in-flight fuel quantity check in accordance with subsection 6 (2), the usable fuel expected to be remaining on arrival at the destination aerodrome is less than the required alternate fuel plus fixed fuel reserve:

(a) the pilot in command must consider the traffic and the operational conditions prevailing at the destination aerodrome, at the destination alternate and at any other en-route alternate; and

(b) if insufficient fuel is available to account for the traffic or operational conditions at the destination aerodrome, then the pilot in command must ensure a safe landing can be made at the destination alternate or an en-route alternate with not less than fixed fuel reserve remaining.

(2) The pilot in command must request delay information from ATC when unforeseen factors may result in landing at the destination aerodrome with less than the following:

(a) if alternate fuel is required — alternate fuel plus fixed fuel reserve;

(b) if alternate fuel is not required — fixed fuel reserve.

(3) If, as a result of an in-flight fuel quantity check in accordance with subsection 6 (2), the usable fuel expected to be remaining on arrival at the destination aerodrome is less than the fixed fuel reserve (where no alternate aerodrome is required), then the pilot in command must take appropriate action and proceed to an en-route alternate so as to perform a safe landing with not less than the fixed fuel reserve remaining.

(4) The pilot in command must advise ATC of a minimum fuel state when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than the fixed fuel reserve for the flight.

Note 1 The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than fixed fuel reserve. This is not an emergency

situation but an indication that an emergency situation is possible should any additional delay occur.

Note 2 Pilots should not expect any form of priority handling as a result of a MINIMUM FUEL declaration. ATC will, however, advise the flight crew of any additional expected delays as well as coordinate when transferring control of the aircraft to ensure other ATC units are aware of the flight's fuel state.

(5) The pilot in command must declare a situation of ***emergency fuel*** when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the fixed fuel reserve for the flight. The pilot in command must declare an emergency fuel state by broadcasting MAYDAY, MAYDAY, MAYDAY FUEL.

Note The emergency fuel declaration is a distress message.

8 Fuel requirements for AOC holders and Part 141 operators — operational variations

(1) A certificate holder's operations manual may include an operational variation relating to the calculation of any of the following:

(a) taxi fuel;

(b) trip fuel;

(c) variable fuel reserve;

(d) alternate fuel;

(e) additional fuel.

(2) A certificate holder's operations manual may include an operational variation relating to the calculation of fixed fuel reserve for an aerial work operation in which the only occupants of the aircraft are flight crew members.

(3) Subject to subsection (2), a certificate holder's operations manual must not include an operational variation relating to the calculation of holding fuel or fixed fuel reserve.

(4) If the certificate holder's operations manual includes an operational variation mentioned in subsection (1) or (2), the certificate holder must give CASA evidence of at least 1 of the following which demonstrates how the operational variation will maintain or improve aviation safety:

(a) documented in-service experience;

(b) the results of a specific safety risk assessment conducted by the certificate holder that meets the requirements of subsection (5).

(5) For paragraph (4) (b), a specific safety risk assessment must include at least the following:

(a) flight fuel calculations;

(b) the capabilities of the certificate holder, including:

(i) a data-driven method that includes a fuel consumption monitoring program; and

(ii) the use of sophisticated techniques for determining the suitability of alternate aerodromes; and

(iii) specific risk mitigating measures.

(6) Subsection (7) applies if:

(a) the certificate holder's operations manual includes an operational variation mentioned in subsection (1) or (2); and

(b) the certificate holder has met the requirement mentioned in subsection (4).

(7) If, at a point in time, there is an inconsistency between a provision of this instrument and a provision of the certificate holder's operations manual, as it exists at the point in time, relating to the calculation of fuel in accordance with the operational variation, the provision of the certificate holder's operations manual prevails to the extent of the inconsistency.

(8) Subsection (9) applies if, immediately before the commencement of this instrument, a certificate holder's operations manual contained an operational variation mentioned in subsection (1) or (2).

(9) The certificate holder is taken to have met the requirement mentioned in subsection (4) for the operational variation until the earlier of the following:

(a) the certificate holder's current AOC or Part 141 certificate expires;

(b) 12 months after commencement of this instrument.

9 Fuel requirements for AOC holders — EDTO

For the avoidance of doubt, if the flight is an EDTO, the AOC holder must also comply with the requirements in clause 6 of Appendix 5 to CAO 82.0 as in force from time to time.

10 Fuel requirements for AOC holders — passenger-carrying and medical transport aeroplane operations to remote islands

(1) The ***minimum safe fuel*** for an aeroplane undertaking a flight to a remote island is:

(a) the minimum amount of fuel that the aeroplane should carry on that flight, according to the operations manual of the aeroplane's operator; or

(b) if the operations manual does not make provision for the calculation of that amount — whichever of the amounts of fuel mentioned in subsection (2), worked out in accordance with subsections (3) to (7), is the greater.

Note AOCs authorising certain types of operations are subject to a condition that a passenger must not be carried on a flight to a remote island unless, when the flight commences, the aeroplane is carrying not less than the minimum safe fuel for the flight, see paragraph 3A.1 of CAO 82.0.

(2) For paragraph (1) (b), the amounts of fuel are:

(a) the minimum amount of fuel that will, whatever the weather conditions, enable the aeroplane to fly, with all its engines operating, to its destination aerodrome on the remote island and then from the destination aerodrome to its destination alternate, plus any variable fuel reserve and fixed fuel reserve required under section 5; and

(b) the minimum amount of fuel that would, if the failure of an engine or a loss of pressurisation were to occur during the flight, enable the aeroplane:

(i) to fly to its destination aerodrome on the remote island or to its destination alternate for the flight; and

(ii) to fly for 15 minutes at holding speed at 1 500 feet above that aerodrome in ISA conditions; and

(iii) to make an approach and landing at that aerodrome.

(3) Subject to subsection (6), if the aeroplane is a transport category aircraft, an amount of fuel mentioned in subsection (2) must be worked out using the

performance data and fuel consumption data in the flight manual for the aeroplane.

(4) Subsection (5) applies to an aeroplane that is not a transport category aircraft and for which:

(a) the performance data:

(i) has been provided by the manufacturer of the aeroplane's airframe; or

(ii) is contained in the aeroplane's flight manual; or

(iii) is contained in the operations manual or exposition of the aeroplane's operator; or

(iv) is contained in the pilot's operating handbook for the aeroplane; and

(b) the fuel consumption data:

(i) is available from 1 of the sources mentioned in paragraph (a); or

(ii) has been provided by the manufacturer of the aeroplane's engines.

(5) Subject to subsection (6), an amount of fuel mentioned in subsection (2) must be worked out using the performance data and fuel consumption data for the aeroplane obtained from the relevant source mentioned in subsection (4).

(6) If any of the data mentioned in subsection (3) or (5) need to be amended because of the issue of a supplemental type certificate for the aeroplane, an amount of fuel mentioned in subsection (2) must be worked out using those data as so amended.

(7) If neither subsection (3) nor (5) apply to the aeroplane, an amount of fuel mentioned in subsection (2) must be worked out using performance data and fuel consumption data for the aeroplane obtained during a flight test of the aeroplane carried out in an approved manner.

11 Fuel requirements for charter operation in certain sailplanes

The operator and the pilot in command of a power-assisted sailplane or powered sailplane engaged in a charter operation must ensure that the aircraft carries at least the fuel required to allow the aircraft's engine to be in operation during all times that the aircraft is out of gliding range of the aerodrome from which it took off.