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## Chapter 7—Fuel requirements

### Division 1—Preliminary

#### 7.01 Scope of Chapter 7

This Chapter:

- (a) is made for subregulation 121.235(1) of CASR; and
- (b) prescribes requirements relating to fuel for aeroplanes.

#### 7.02 Definition of *destination alternate fuel*

*Destination alternate aerodrome*

- (1) If a destination alternate aerodrome is required for a flight of an aeroplane, the ***destination alternate fuel*** is the amount of fuel required to:
  - (a) perform a missed approach at the destination aerodrome; and
  - (b) climb to the expected cruising altitude; and
  - (c) fly the expected routing to the destination alternate aerodrome; and
  - (d) descend to the point where the expected approach is initiated; and
  - (e) conduct the approach; and
  - (f) land at the destination alternate aerodrome.

*If there are 2 destination alternate aerodromes*

- (2) If 2 destination alternate aerodromes are required for a flight of the aeroplane, the ***destination alternate fuel*** is the amount of fuel required to enable the aeroplane to proceed to the destination alternate aerodrome that requires the greater amount of destination alternate fuel under subsection (1).

*No destination alternate aerodrome*

- (3) If the aeroplane is operated without a destination alternate aerodrome (other than because the planned destination aerodrome is an isolated destination aerodrome), the ***destination alternate fuel*** is the amount of fuel required to enable the aeroplane to fly for 15 minutes at holding speed at 1 500 ft above the destination aerodrome elevation in ISA conditions.

*Planned destination aerodrome that is isolated*

- (4) If the planned destination aerodrome for a flight of the aeroplane is an isolated destination aerodrome, the ***destination alternate fuel*** is the amount of fuel required to enable the aeroplane:
  - (a) for a piston-engine aeroplane—to fly for 45 minutes plus 15% of the flight time planned to be spent at cruising levels, including final reserve fuel, or 2 hours, whichever is less; and

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- (b) for a turbine-engine aeroplane—to fly for 2 hours at normal cruise consumption above the isolated destination aerodrome, including final reserve fuel.

### 7.03 Definition of *contingency fuel*

- (1) The *contingency fuel* for an aeroplane and a flight, is the amount of fuel required to compensate for unforeseen factors, which must not be less than the amount required under subsection (2) or (3).
  - (2) Subject to subsection (3), contingency fuel must include:
    - (a) either:
      - (i) 5% of the trip fuel to the planned destination aerodrome, in the case of a turbine-engine aeroplane; or
      - (ii) 10% of the trip fuel to the planned destination aerodrome, in the case of a piston-engine aeroplane; but
    - (b) not less than the amount of fuel required to fly, in ISA conditions, for 5 minutes at the holding speed at 1 500 ft above the planned destination aerodrome.
  - (3) If a point of in-flight replanning has been specified by the operator for the flight, contingency fuel must include:
    - (a) either:
      - (i) 5% of the trip fuel required for the flight from the point of in-flight replanning to the planned destination aerodrome, in the case of a turbine-engine aeroplane; or
      - (ii) 10% of the trip fuel required for the flight from the point of in-flight replanning to the planned destination aerodrome, in the case of a piston-engine aeroplane; but
    - (b) not less than the amount of fuel required to fly, in ISA conditions, for 5 minutes at the holding speed at 1 500 ft above the planned destination aerodrome.
- Note: A point of in-flight replanning for a flight is a point that is determined by the operator for the flight before its commencement: see the definition of *point of in-flight replanning* in section 1.04.

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## Division 2—Fuel requirements

### 7.04 General requirements

#### *Fuel consumption data*

- (1) When determining the amount of usable fuel required under this Chapter for a flight of an aeroplane, the operator and the pilot in command must each use one of the following fuel consumption data sources:
  - (a) the most recent aeroplane-specific fuel consumption data derived from a fuel consumption monitoring system used by the operator, if available; or
  - (b) the aeroplane manufacturer's data for the aeroplane.

Note: The aeroplane manufacturer's data includes electronic flight planning data. The manufacturer's data may be in the flight manual, cruise performance manuals or other publications.

#### *Operational conditions etc.*

- (2) In determining the amount of usable fuel required under this Chapter, the operator and the pilot in command must each consider the effect of the following matters:
  - (a) the operating conditions for the proposed flight, including the following:
    - (i) the actual (if known or available) or anticipated weight of the aeroplane;
    - (ii) relevant NOTAMs;
    - (iii) relevant meteorological reports and forecasts;
    - (iv) relevant Air Traffic Services procedures, restrictions and anticipated delays;
    - (v) the effects of deferred maintenance items and configuration deviations;
  - (b) the potential for deviations from the planned flight because of unforeseen factors.

### 7.05 Amount of fuel that must be carried for a flight

- (1) The operator and the pilot in command of an aeroplane must each ensure that, when a flight of the aeroplane commences, the aeroplane is carrying on board at least the following amounts of usable fuel:
  - (a) taxi fuel;
  - (b) trip fuel to the planned destination aerodrome;
  - (c) destination alternate fuel;
  - (d) holding fuel (if required);
  - (e) contingency fuel;
  - (f) final reserve fuel;
  - (g) additional fuel (if applicable);

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- (h) if the flight is planned as an EDTO flight—any supplementary amount of fuel required to ensure the flight can meet the requirements of subsections 7.06(1) and (2).
- (2) The operator and the pilot in command must each ensure that, at any point of in-flight replanning, the aeroplane is carrying on board at least the following amounts of usable fuel:
    - (a) trip fuel from that point to the destination aerodrome for the flight;
    - (b) destination alternate fuel;
    - (c) holding fuel (if required);
    - (d) final reserve fuel;
    - (e) contingency fuel;
    - (f) additional fuel (if applicable);
    - (g) for a flight being conducted as an EDTO flight—any supplementary amount of fuel required to ensure the flight can meet the requirements of subsections 7.06(1) and (2).
  - (3) The operator and the pilot in command must each ensure that the aeroplane is carrying on board at least the following amounts of usable fuel, required at any time to continue the flight safely:
    - (a) trip fuel from that time to the destination aerodrome for the flight;
    - (b) destination alternate fuel;
    - (c) holding fuel (if required);
    - (d) final reserve fuel;
    - (e) additional fuel (if applicable);
    - (f) for a flight being conducted as an EDTO flight—any supplementary amount of fuel required to ensure the flight can meet the requirements of subsections 7.06(1) and (2).

Note: Subsection (3) is affected by subsections (5) and (6).

- (4) If, after commencement of the flight, fuel is used for a purpose other than that originally intended during pre-flight planning, the pilot in command must reanalyse the planned use of fuel for the remainder of the flight and adjust the parameters of the flight, if that is necessary to remain in compliance with the requirements of this Division.

*Diversion to planned destination alternate aerodrome*

- (5) Subsection (6) applies if a flight:
  - (a) has been unable to land at the planned destination aerodrome; and
  - (b) is diverting to the planned destination alternate aerodrome.
- (6) Despite subsection (3), the operator and the pilot in command must ensure that the aeroplane is carrying at least the following amounts of usable fuel:
  - (a) trip fuel to the planned destination alternate aerodrome;
  - (b) holding fuel (if required);
  - (c) final reserve fuel.

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Note: This section may be affected by section 7.09 (operational variations relating to the calculation of certain kinds of fuel).

## 7.06 Determining amount of fuel that must be carried for EDTO

### *EDTO critical fuel scenarios*

- (1) The operator and the pilot in command must each ensure that, when a flight of the aeroplane for an EDTO commences, or from a point of in-flight replanning, the aeroplane is carrying at least the amount of usable fuel that is the greatest of the following, plus the fuel mentioned in subsection (2):
  - (a) sufficient fuel to fly to an EDTO en-route alternate aerodrome assuming a rapid decompression at the most critical point followed by a descent to a safe altitude, as required by:
    - (i) regulation 91.305 of CASR (about minimum heights for IFR flights); and
    - (ii) the oxygen requirements in Division 9 of Chapter 11;
  - (b) sufficient fuel to fly to an EDTO en-route alternate aerodrome assuming a rapid decompression and a simultaneous engine failure at the most critical point followed by a descent to a safe altitude, as required by:
    - (i) regulation 91.305 of CASR (about minimum heights for IFR flights); and
    - (ii) the oxygen requirements in Division 9 of Chapter 11;
  - (c) sufficient fuel to fly to an EDTO en-route alternate aerodrome assuming an engine failure at the most critical point.
- (2) For the purposes of subsection (1), the fuel is the amount of usable fuel that is sufficient for the aeroplane to:
  - (a) hold for 15 minutes at 1 500 ft above the aerodrome elevation; and
  - (b) conduct an instrument approach and land.

### *Effect of certain meteorological conditions*

- (3) If the operator is using an authorised weather forecast or an accepted forecast, the operator and the pilot in command must each, in order to allow for errors in wind forecasting, add a 5% wind speed factor (as an increment to a headwind or as a decrement to a tailwind) on the actual or forecast wind used for calculating the fuel requirements of paragraphs (1)(a), (b) and (c).
- (4) If the operator is using a weather forecast that is not an authorised weather forecast or an accepted forecast, the operator and the pilot in command must each, in order to allow for errors in the model's wind data, ensure the aeroplane carries an additional 5% of the fuel calculated in paragraphs (1)(a), (b) and (c).
- (5) When calculating the fuel required under subsection (1), the operator and the pilot in command must each compensate for whichever is the greater of:
  - (a) the effect of airframe icing for 10% of the time during which icing is forecast, including taking into account the fuel that would be used by the use of engine and wing anti-ice during the same period; or

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- (b) the fuel that would be used by use of engine anti-ice, for the entire time during which icing is forecast.

*Other factors to be compensated for*

- (6) When calculating the fuel required under paragraphs (1)(a), (b) and (c), the operator and the pilot in command must each increase the fuel supply by 5% as a performance deterioration allowance, unless the operator:
  - (a) uses the most recent aeroplane-specific fuel consumption data derived from a fuel consumption monitoring system; and
  - (b) includes in fuel supply calculations fuel sufficient to compensate for any such deterioration.
- (7) If an auxiliary power unit is a required power source under the aircraft flight manual instructions, the operator and the pilot in command must each account for the fuel consumption of the auxiliary power unit during all phases of flight where it might be used.
- (8) The operator and the pilot in command must each account for any additional fuel consumption due to the minimum equipment list or the configuration deviation list.
- (9) In this section:

***accepted forecast*** means a weather forecast made by a person or body that holds an authorisation (however described) granted by an authority of the Contracting State, to provide weather forecasts for aviation purposes.

***performance deterioration allowance*** means the difference in fuel consumption determined using the fuel consumption data source mentioned in paragraph 7.04(1)(b) (the aeroplane manufacturer's data) and that mentioned in paragraph 7.04(1)(a) (the aeroplane-specific fuel consumption data).

## **7.07 Requirements for determining fuel before, and monitoring fuel during, flight**

- (1) The operator and the pilot in command of an aeroplane for a flight must each ensure that:
  - (a) the amount of usable fuel on board the aeroplane is determined before the flight commences (the ***relevant fuel***); and
  - (b) for an aeroplane that has a maximum take-off weight greater than 5 700 kg—the relevant fuel is recorded; and
  - (c) regular in-flight fuel amount checks are conducted.

**Note:** Procedures to ensure that a flight of the aeroplane is conducted in accordance with the fuel requirements in this Chapter, including procedures for how regular in-flight fuel amount checks will be conducted for a flight, must be included in the operator's exposition: see regulation 121.225 and paragraphs 119.205(1)(h) and (o) of CASR.

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- (2) The pilot in command must do the following at each in-flight fuel amount check:
    - (a) determine the amount of usable fuel remaining;
    - (b) compare planned fuel consumption with actual fuel consumption;
    - (c) determine whether the remaining usable fuel is sufficient to satisfy:
      - (i) if a point of in-flight replanning has been specified by the operator for the flight and the flight has not proceeded past the point—the requirements of subsection 7.05(2); and
      - (ii) otherwise—the requirements of subsection 7.05(3);
    - (d) determine the amount of usable fuel expected to be remaining when the aeroplane lands at the destination aerodrome for the flight.

## **7.08 Procedures if fuel reaches specified amounts**

- (1) If the pilot in command of an aeroplane for a flight becomes aware that the amount of usable fuel in the aeroplane on landing at the destination aerodrome would be less than the fuel required under subsection 7.05(3), the pilot in command must:
  - (a) take into account the likely air traffic and operational conditions on arrival at:
    - (i) the destination aerodrome; and
    - (ii) if a destination alternate aerodrome is required for the flight—the destination alternate aerodrome; and
    - (iii) any en-route alternate aerodrome; and
  - (b) proceed to an aerodrome mentioned in paragraph (a) that enables the pilot in command to continue to meet the requirements in section 7.05.
- (2) The pilot in command must request from Air Traffic Services the duration of any likely delay in landing if unforeseen factors could result in the aeroplane landing at the destination aerodrome with less than the following amounts of fuel remaining:
  - (a) the final reserve fuel;
  - (b) the destination alternate fuel required by subsection 7.02(1), (2) or (3).
- (3) The pilot in command must declare to Air Traffic Services a “minimum fuel” state if:
  - (a) the pilot in command is committed to land the aeroplane at an aerodrome in accordance with this section; and
  - (b) it is calculated that if there is any change to the existing air traffic control clearance issued to the aeroplane in relation to that aerodrome, the aeroplane will land with less than the final reserve fuel remaining.

Note 1: The declaration of “minimum fuel” informs Air Traffic Services 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 final reserve fuel. This is not an emergency situation, but an indication that an emergency situation is possible should any additional delay occur.

Note 2: A pilot in command should not expect any form of priority handling because of a “minimum fuel” declaration. Air Traffic Services will, however, advise the flight crew of any additional expected delays, and coordinate when transferring control of the aeroplane to ensure other air traffic control units are aware of the aeroplane’s fuel state.

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- (4) If the pilot in command of an aeroplane for a flight becomes aware that the amount of usable fuel remaining on landing at the nearest aerodrome where a safe landing can be made would be less than the final reserve fuel, then the pilot in command must declare a situation of “emergency fuel” by broadcasting “MAYDAY, MAYDAY, MAYDAY FUEL”.

Note: The emergency fuel declaration is a distress message.

## 7.09 Operational variations—fuel calculations

- (1) Despite sections 7.04 and 7.05, an operator may use an operational variation, specified in the operator’s exposition for the purpose of this section, that relates to the calculation of any of the following, if the requirements in subsections (3) and (5) are met:
- (a) taxi fuel;
  - (b) trip fuel;
  - (c) contingency fuel;
  - (d) destination alternate fuel;
  - (e) additional fuel.
- (2) To avoid doubt, an operational variation mentioned in subsection (1) cannot relate to the calculation of holding fuel or final reserve fuel.
- (3) The operator must have submitted to CASA, at least 28 days before using an operational variation:
- (a) evidence of at least one of the following, that demonstrates how the operational variation will maintain or improve aviation safety:
    - (i) documented in-service experience;
    - (ii) the results of a specific safety risk assessment conducted by the operator that meets the requirements of subsection (4); and
  - (b) a copy of the operator’s procedures, proposed for inclusion in the operator’s exposition, in relation to using the operational variation.

Note: Under regulation 119.105 of CASR, CASA may direct the operator to remove or revise the operational variation, if CASA were to find there was insufficient evidence that it would maintain or improve aviation safety.

- (4) For the purposes of subparagraph (3)(a)(ii), the specific safety risk assessment must include at least the following:
- (a) flight fuel calculations;
  - (b) the capabilities of the operator, 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.
- (5) For the purposes of subsection (1), the operator’s exposition must include procedures in relation to the use of the operational variation.