# Chapter 9—Performance

## Division 1—Take-off performance requirements: jet-driven aeroplanes and certain propeller-driven aeroplanes

### 9.01 Scope of Division 1, Chapter 9

This Division:

(a) is made for subregulation 121.395(1) of CASR; and

(b) prescribes requirements relating to take-off performance for a flight of an aeroplane mentioned in section 9.01A.

Note 1: Regulation 121.390 of CASR requires a calculation that relates to an aeroplane's performance to be made using performance data set out in the aircraft flight manual instructions for the aeroplane or approved by CASA. See the CASR Dictionary for the definition of ***aircraft flight manual instructions***.

Note 2: Regulation 91.055 of CASR makes it an offence if an aircraft is operated in a manner that creates a hazard to another aircraft, a person or property.

### 9.01A Application of this Division

This Division applies to an aeroplane that:

(a) is a jet-driven aeroplane; or

(b) is a propeller-driven aeroplane with a maximum take-off weight of more than 5 700 kg.

### 9.02 Maximum permitted take-off weight

An aeroplane operator and the pilot in command of an aeroplane for a flight must each ensure that, at take-off, the weight of the aeroplane does not exceed each of the following:

(a) a weight that would enable the aeroplane to meet the requirements mentioned in sections 9.03, 9.04, 9.05, 9.06, 9.07 and 9.08;

(b) a weight that, taking account of the expected consumption of fuel and oil for the flight, will ensure a landing weight that does not exceed the maximum landing weight;

(c) a weight that will ensure a landing weight that complies with Division 2 of this Chapter.

Note: The weight at take-off for an aeroplane is also limited by the ***maximum take-off weight*** for the aeroplane, which, for a type-certificated aeroplane, means the maximum take-off weight for the aeroplane permitted by its flight manual. It is an offence under regulations 91.055 and 121.095 of CASR if an aeroplane is not operated in accordance with the aeroplane's flight manual.

## 9.03 Take-off distance requirements

(1) For the purposes of paragraph 9.02(a), it is a requirement that, assuming that the critical engine fails at $V_{EF}$ and using a single $V_1$:

(a) the accelerate stop distance required for a take-off from a runway does not exceed the accelerate stop distance available for the runway; and

(b) the take-off distance required for a take-off from the runway does not exceed the take-off distance available for the runway; and

(c) any clearway forming part of the take-off distance available does not exceed half the length of the take-off run available; and

(d) in the case of a wet or contaminated runway, the take-off distance is calculated to the point at which the aeroplane reaches a height of 15 ft above the take-off surface using a reduced $V_1$ not below $V_1$ (wet); and

(e) the take-off run required does not exceed the take-off run available using $V_1$ for the rejected and continued take-off; and

(f) on a wet or contaminated runway, the weight at which the aeroplane can take-off from the runway does not exceed that permitted for a take-off on a dry runway.

(2) For the purposes of paragraphs (1)(a) to (f), the operator and the pilot in command must take into account:

(a) the take-off configuration of the aeroplane;

(b) the pressure altitude and presumed temperature at the aerodrome;

(c) the type of runway surface and the runway surface condition;

(d) the runway slope in the direction of take-off;

(e) unless otherwise accounted for in the performance data stated in the aircraft flight manual instructions for the aeroplane, not more than 50% of the headwind component or not less than 150% of the tailwind component for the runway planned to be used;

(f) the loss of any runway length due to the aligning of the aeroplane for take-off;

(g) any credit for the stopway, and the clearway, at the aerodrome as follows:

(i) stopway that is appropriate for the aeroplane type that can be included in the accelerate stop distance available;

(ii) clearway that is appropriate for the aeroplane type that can be included within take-off distance available.

Note 1: See section 1.04 for definitions of ***accelerate stop distance available***, ***clearway***, ***presumed temperature***, ***take-off distance available***, ***take-off distance required*** and ***take-off run available.***

Note 2: See the CASR Dictionary for definitions of ***dry*** and ***wet*** in relation to a runway.

## 9.04 Net take-off flight path requirements

*Obstacle clearance*

(1) For the purposes of paragraph 9.02(a), it is a requirement that, assuming a failure of an aeroplane engine that is recognised at $V_1$ appropriate to a dry runway at the

aerodrome, the aeroplane vertically clears all obstacles within the net take-off flight path by at least:

(a) 35 ft, if the aeroplane for the take-off will use a bank angle not exceeding 15°; or

(b) 15 ft, if the aeroplane:

(i) is intending to use a bank angle not exceeding 15° for the take-off; and

(ii) the take-off will be conducted in compliance with paragraph 9.03(1)(d); or

(c) 50 ft, if the aeroplane for the take-off will use a bank angle exceeding 15°; or

(d) 30 ft, if the aeroplane:

(i) is intending to use a bank angle exceeding 15° for the take-off; and

(ii) the take-off will be conducted in compliance with paragraph 9.03(1)(d).

(2) For the purposes of subsection (1), an obstacle is deemed to be within the net take-off flight path if the lateral distance from the obstacle to the aeroplane's intended flight path is within a distance calculated in accordance with subsection (2A) or (5).

(2A) For the purposes of subsection (2), the distance is that which does not exceed the following, subject to the limitations mentioned in subsection (3) or (4) (whichever is applicable):

(a) 90 m plus (0.125 x D);

(b) if the aeroplane has a wingspan less than 60 m—the distance worked out using the formula:

(half the wingspan of the aeroplane) + 60 m + (0.125 x D).

(2B) In subsection (2A):

***D*** means the horizontal distance the aeroplane will travel from:

(a) the end of the take-off distance available at the aerodrome; or

(b) if a turn is scheduled before the end of the take-off distance available—the end of the take-off distance required for the take-off.

*Maximum distance limitations*

(3) If the intended flight path does not require a track change exceeding 15°, the distance mentioned in paragraph (2A)(a) or (b) is limited to:

(a) a maximum of 600 m; or

(b) if the portion of the flight from the departure end of the runway to the lowest safe altitude for the route can be conducted with a navigation specification of RNP 0.2 or better—a maximum of 300 m.

(4) If the intended flight path requires a track change exceeding 15°—the distance mentioned in paragraph (2A)(a) or (b) is limited to:

(a) a maximum of 900 m; or

(b) if the portion of the flight from the departure end of the runway to the lowest safe altitude for the route can be conducted with a navigation specification of RNP 0.2 or better—a maximum of 600 m.

(5) Until the end of 1 December2025, for the purposes of subsection (2), the distance is that which does not exceed a distance calculated in accordance with subsection 12A of Civil Aviation Order 20.7.1B, as in force immediately before 2 December 2021.

*Calculating net take-off flight path*

(6) For the purposes of subsection (1), in calculating the net take-off flight path for the flight, the operator and the pilot in command must:

(a) take into account the following factors:

(i) the weight of the aeroplane at the commencement of the take-off run;

(ii) pressure altitude at the aerodrome;

(iii) presumed temperature at the aerodrome;

(iv) either not more than 50% of the headwind component or not less than 150% of the tailwind component; and

(b) ensure the requirements in subsection (7) are complied with.

(7) For paragraph (6)(b), the requirements are:

(a) a track change must not be made before the aeroplane's net take-off flight path has achieved a height equal to the greater of the following:

(i) 50 ft above the take-off surface;

(ii) one half of the aeroplane's wingspan; and

(b) the bank angle may only exceed 15° if the performance data used in accordance with regulation 121.390 of CASR provides for a higher angle of bank; and

(c) the bank angle must not exceed 25°; and

(d) it must be assumed that the point on the net take-off flight path where a level flight segment commences is the same horizontal distance from the end of the runway as the point where the gross take-off flight path intersects the height selected for the level flight acceleration manoeuvre; and

(e) the gross gradient of climb achieved under subsection 9.05(3) and section 9.07 is reduced by:

(i) if the aeroplane is twin-engines—0.8%; or

(ii) if the aeroplane has 3 engines—0.9%; or

(iii) if the aeroplane has 4 engines—1.0%; and

(f) allowance must be made for:

(i) the effect of the bank angle on operating speeds and flight path; and

(ii) distance increments resulting from increased operating speeds; and

(iii) distance increments resulting from the acceleration reduction equivalent to the climb gradient reductions mentioned in paragraph (f); and

(iv) retention of stall margin and loss of climb gradient.

Note 1: Paragraph (7)(d) requires the height selected by the operator for the level flight acceleration manoeuvre to be more than 35 ft higher than the highest obstacles within the new take-off flight path.

Note 2: The net take-off flight path and the gross take-off flight path may be considered identical when the aeroplane is in the take-off configuration described in subsection 9.05(2).

(8) In this section:

***Civil Aviation Order 20.7.1B*** means *Civil Aviation Order 20.7.1B – Aeroplane weight and performance limitations – specified aeroplanes above 5 700 kg, or 2 722 kg if driven by 2 or more jet engines – all operations*.

## 9.05 Gross gradient requirements—take-off configuration

(1) Subsections (2) and (3) set out, for the purposes of paragraph 9.02(a), the requirements relating to gross gradients in the take-off configuration.

(2) In the take-off configuration assuming failure of the critical engine recognised at $V_1$, the aeroplane must be able to climb, without ground effect and without landing gear retraction, at the speed established as the speed at which the aeroplane becomes airborne, and, in doing so, achieve a gross gradient of climb of at least:
  (a) if the aeroplane has 2 engines—positive; or
  (b) if the aeroplane has 3 engines—0.3%; or
  (c) if the aeroplane has 4 engines—0.5%.

(3) In the take-off configuration that exists with the critical engine inoperative and the landing gear fully retracted, the aeroplane at speed $V_2$ is able to achieve a gross gradient of climb of at least:
  (a) if the aeroplane is a commuter type aeroplane—2%; or
  (b) otherwise:
    (i) if the aeroplane has 2 engines—2.4%; or
    (ii) if the aeroplane has 3 engines—2.7%; or
    (iii) if the aeroplane has 4 engines—3.0%.

## 9.06 Level flight acceleration manoeuvre requirements

(1) Subsections (2) and (3) set out, for the purposes of paragraph 9.02(a), the requirements relating to level flight acceleration manoeuvres.

(2) The aeroplane may be accelerated in level flight from $V_2$ speed to final take-off climb speed at a height above the take-off surface that is the greater of:
  (a) 400 ft; and
  (b) the height necessary to achieve obstacle clearance in accordance with subsection 9.04(1).

(3) During the level flight acceleration manoeuvre, the aeroplane, with the critical engine inoperative, must have an available gross gradient of climb of at least:
  (a) if the aeroplane has 2 engines—1.2%; and

(b) if the aeroplane has 3 engines—1.4%; and
(c) if the aeroplane has 4 engines—1.5%.

## 9.07 Gross gradient requirements—en route configuration

(1) This section sets out, for the purposes of paragraph 9.02(a), the requirements relating to gross gradients in the en route configuration.

(2) In the en route configuration existing at the end of the level flight acceleration manoeuvre, the aeroplane must be able to achieve a gross gradient of climb of at least:
(a) if the aeroplane has 2 engines—1.2%; and
(b) if the aeroplane has 3 engines—1.4%; and
(c) if the aeroplane has 4 engines—1.5%.

(3) For the purposes of subsection (2), the gradient of climb must be achievable at final take-off climb speed with the critical engine inoperative and the remaining engines at maximum continuous power or thrust.

## 9.08 En route requirements

*General requirements*

(1) It is a requirement, for the purposes of paragraph 9.02(a), that the aeroplane:
(a) following the critical engine failing at the most critical point along the route; and
(b) in accordance with the one-engine-inoperative net flight path data contained within the performance data, used in accordance with regulation 121.390 of CASR;
is able to comply with the requirements in subsection (2).

(2) For subsection (1), the requirements are that, subject to subsection (4), the net flight path:
(a) during flight from the cruising altitude to an aerodrome where a landing can be made in accordance with Division 2 of this Chapter, must:
(i) have a positive slope at 1 000 ft above all terrain and obstructions within 5 NM of the intended track to be flown; or
(ii) clear all terrain and obstructions by at least 2 000 ft vertically, within 5 NM of the intended track to be flown; and
(b) must have a positive slope at 1 500 ft above the aerodrome where the landing is assumed to be made after the engine failure.

(3) For the purposes of subsection (2), the operator and the pilot in command must take into account:
(a) the effects of forecast wind on the flight path; and
(b) the effect of the icing protection systems if the meteorological conditions require their operation; and
(c) fuel jettisoning to an extent consistent with reaching the aerodrome with the required fuel reserves.

Note: Chapter 4 contains requirements relating to the selection of en-route alternate aerodromes.

(4) Despite subsection (2), the route width margins mentioned in subparagraph (2)(a)(i) or (ii) must be increased to 10 NM if the aeroplane cannot maintain a track using a navigation specification of RNP 2 or better.

*En-route 90-minute limitation for 3- or 4-engine aeroplanes*

(5) Also, for the purposes of paragraph 9.02(a), if the aeroplane is a 3- or 4-engine aeroplane, it is a requirement that the route to be flown by the aeroplane is not more than 90 minutes away from an aerodrome where a landing can be made in accordance with Division 2 of this Chapter.

(6) The aeroplane may be operated more than 90 minutes away from such an aerodrome if:

(a) it is assumed that 2 engines fail simultaneously at the most critical point of that portion of the route where the aeroplane is more than 90 minutes (at normal cruising speed) away from an aerodrome where a landing can be made in accordance with Division 2 of this Chapter; and

(b) the 2-engine inoperative en route flight path data permits the aeroplane to continue the flight, in the expected meteorological conditions, from the point where the 2 engines are assumed to have failed, to an aerodrome at which it is possible to land with 2 engines inoperative; and

(c) the net flight path, taking into account the effect of icing protection systems if the meteorological conditions require their operation, clears all terrain and obstructions by at least 2 000 ft within (subject to subsection (7)) 5 NM of the intended track to be flown; and

(d) the net flight path has a positive slope at an altitude of 1 500 ft above the aerodrome where the landing is assumed to be made after the failure of 2 engines; and

(e) the expected weight of the aeroplane at the point where the 2 engines are assumed to fail must be not less than that which would include sufficient fuel to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at an altitude of at least 1 500 ft directly over the aerodrome and thereafter to fly level for at least 15 minutes.

(7) Despite paragraph (6)(c), the route width margins must be increased to 10 NM if the aeroplane cannot maintain a track using a navigation specification of RNP 2 or better.

## Division 1A—Take-off performance requirements: propeller-driven aeroplanes with maximum take-off weight not more than 5 700 kg

### 9.08A Scope of Division 1A, Chapter 9

This Division:

(a) is made for subregulation 121.395(1) of CASR; and

(b) prescribes requirements relating to take-off performance for a flight of an aeroplane mentioned in section 9.08B.

Note 1: Regulation 121.390 of CASR requires a calculation that relates to an aeroplane's performance to be made using performance data set out in the aircraft flight manual instructions for the aeroplane or approved by CASA. See the CASR Dictionary for the definition of ***aircraft flight manual instructions***.

Note 2: Regulation 91.055 of CASR makes it an offence if an aircraft is operated in a manner that creates a hazard to another aircraft, a person or property.

### 9.08B Application of this Division

This Division applies to an aeroplane that:

(a) is a propeller-driven aeroplane; and

(b) has a maximum take-off weight of not more than 5 700 kg.

### 9.08C Definitions for this Division

In this Division:

***approved take-off factor***, for an aeroplane, means the take-off factor for which the aeroplane operator holds an approval under regulation 121.010 of CASR.

***factored take-off run***: see section 9.08D.

***standard take-off factor*** means:

(a) for an aeroplane with a maximum take-off weight of not more than 2 000 kg—1.15; and

(b) for an aeroplane with an maximum take-off weight of more than 2 000 kg, but less than 3 500 kg—a factor derived by linear interpolation between 1.15 and 1.25, according to the aeroplane's maximum take-off weight; and

(c) for an aeroplane with a maximum take-off weight of 3 500 kg or more—1.25.

### 9.08D Meaning of *factored take-off run*

The ***factored take-off run***, for an aeroplane that is of the kind mentioned in column 1 of an item in table 9.08D, is the take-off run required, for the aeroplane, multiplied by the factor mentioned in column 2 of the item.

| Table 9.08D—Factored take-off run | | |
|---|---|---|
| **Item** | **Column 1**<br>**Aeroplane** | **Column 2**<br>**Factor** |
| 1 | An aeroplane for which:<br>(a) there is a flight manual; and<br>(b) there is no approved take-off factor | The standard take-off factor for the aeroplane |
| 2 | An aeroplane for which there is an approved take-off factor | The approved take-off factor for the aeroplane |

Note: The term ***take-off run required*** is defined in subsection 1.04(1).

## 9.08E Approval of take-off factor for aeroplanes

CASA may, under regulation 121.010 of CASR, approve a take-off factor for an aeroplane, for operations at a particular aerodrome, which is less than the standard take-off factor for the aeroplane, only if the proposed take-off factor has been risk-assessed by the aeroplane's operator for operations at the aerodrome.

## 9.08F Maximum permitted take-off weight

The operator, and pilot in command, must each ensure that, at take-off, the aeroplane's weight does not exceed each of the following:

(a) a weight that would enable the aeroplane to meet the requirements stated in sections 9.08G to 9.08K;

(b) a weight that, taking account of the expected consumption of fuel and oil for the flight, will ensure a landing weight that does not exceed the maximum landing weight;

(c) a weight that will ensure a landing weight that, taking account of the expected consumption of fuel and oil for the flight, complies with Division 2.

Note: The weight at take-off for an aeroplane is also limited by the ***maximum take-off weight*** for the aeroplane, which in the Dictionary, for a type certificated aeroplane, is defined to mean the maximum take-off weight for the aeroplane permitted by its flight manual. It is an offence under regulation 91.095, or 121.055, of CASR if an aeroplane is not operated in accordance with the aeroplane's aircraft flight manual instructions.

## 9.08G Take-off requirements

(1) The operator, and pilot in command, must each ensure:

(a) the factored take-off run, for a take-off of the aeroplane from a runway at an aerodrome, does not exceed the take-off run available for the runway; and

(b) the take-off distance required for a take-off of the aeroplane from the runway does not exceed the take-off distance available for the runway; and

(c) any clearway forming part of the take-off distance available for the runway does not exceed half the length of the take-off run available for the runway.

(2) For the purposes of subsection (1), the following matters must be taken into account:
   (a) the take-off configuration of the aeroplane;
   (b) the pressure altitude, and presumed temperature, at the aerodrome;
   (c) the type of runway surface, and runway surface condition;
   (d) the runway slope in the direction of take-off;
   (e) unless otherwise accounted for in the performance data set out in the aeroplane's aircraft flight manual instructions, not more than 50% of the headwind component, or not less than 150% of the tailwind component, for the runway.

(3) In this section:

***take-off distance required***, for the aeroplane, means the take-off distance to 50 ft AGL, for the aeroplane, calculated in accordance with the relevant requirements stated in the aeroplane's flight manual.

***take-off run available***, for a runway at an aerodrome, means the length of the runway available and suitable for the ground run of the aeroplane taking off at the aerodrome.

## 9.08H Initial climb performance and obstacle clearance

(1) The operator, and pilot in command, must each ensure that until the aeroplane reaches the minimum height (the ***relevant height***) for the flight in accordance with regulation 91.265, 91.267 or 91.305, of CASR, as applicable:
   (a) for all flights—the aeroplane has the performance to clear all obstacles by a safe margin, as determined by the operator's exposition; and
   (b) for flights not conducted in VMC by day—the aeroplane has the performance to reach, and maintain, the relevant height.

(2) For the purposes of subsection (1), the following matters must be taken into account:
   (a) the take-off configuration of the aeroplane;
   (b) the pressure altitude, and presumed temperature, at the aerodrome;
   (c) the obstacles, if any, in the vicinity of the take-off path and en route;
   (d) the forecast weather en route.

## 9.08J Take-off requirements—additional requirements for aeroplanes with maximum take-off weight more than 3 500 kg

(1) This section applies if an aeroplane has a maximum take-off weight of more than 3 500 kg.

(2) The operator, and the pilot in command, must each ensure that, at take-off, the weight of the aeroplane does not exceed a weight such that the gross gradient of climb with the critical engine inoperative is equal to, or greater than, the obstacle-free gradient specified in the authorised aeronautical information for the take-off distance available.

(3) Despite subsection (2), if the obstacle-free gradient specified in the authorised aeronautical information for the take-off distance available is less than 1.9%, the operator and the pilot in command must ensure the weight of the aeroplane does not exceed a weight that enables the aeroplane to achieve a gross gradient of climb of at least 1.9%.

(4) For the purposes of subsection (2):
  (a) the gradient must be established for a distance of 3 000 m from the end of the take-off distance available; and
  (b) the following matters must be taken into account:
    (i) the pressure altitude at the aerodrome;
    (ii) the presumed temperature at the aerodrome.

## 9.08K En route obstacle clearance for multi-engine aeroplane

(1) The operator and pilot in command of an aeroplane must each ensure that the aeroplane has the performance to conduct the flight in accordance with regulation 91.265, 91.267 or 91.305, of CASR, as applicable, if:
  (a) an engine of the aeroplane becomes inoperative, during a flight, before the aeroplane reaches the planned cruising altitude, or cruising level, for the flight; and
  (b) each remaining engine of the aeroplane is operating within the maximum continuous power limitations stated in the aeroplane's flight manual.

(2) Subsection (1) does not apply if the operator's exposition states procedures requiring the pilot in command to have a plan, in the circumstances mentioned in subsection (1), that enables the aeroplane to return to the departure aerodrome, or divert to a take-off alternate aerodrome, clear of all ground, water and obstacles.

(3) The procedures mentioned in subsection (2) may include drift-down procedures, provided that the procedures enable the aeroplane to descend, and land, at an aerodrome with at least 2 000 ft vertical separation from all ground, water and obstacles within 5 nautical miles on either side, or ahead, of the aeroplane's track until established within the aerodrome's circuit area.

## Division 2—Landing performance

### 9.09 Scope of Division 2, Chapter 9

This Division:

(a) is made for subregulation 121.420(1) of CASR; and

(b) prescribes requirements relating to landing performance for a flight of an aeroplane.

Note 1: Regulation 121.390 of CASR requires a calculation that relates to an aeroplane's performance to be made using performance data set out in the aircraft flight manual instructions for the aeroplane or approved by CASA. See the CASR Dictionary for the definition of ***aircraft flight manual instructions***.

Note 2: Regulation 91.055 of CASR makes it an offence if an aircraft is operated in a manner that creates a hazard to another aircraft, a person or property.

### 9.10 Pre-flight landing requirements—dry runway

(1) The operator and the pilot in command of an aeroplane for a flight must each ensure that, when the flight begins, if an authorised weather forecast indicates that the runway at:

(a) the planned destination aerodrome; and

(b) in the case that a destination alternate aerodrome is required for the flight—the destination alternate aerodrome;

at the aeroplane's estimated time of arrival will be dry, the distance required to bring the aeroplane to a stop on the runway will meet the requirements of subsection (2).

(2) For subsection (1), the requirements are that the distance required to bring the aeroplane to a stop on a runway at the planned destination aerodrome, and the destination alternate aerodrome (if any), for the flight, is not greater than:

(a) for a jet engine aeroplane—60% of the landing distance available for the runway; and

(b) for a turbo-propeller or piston-engine aeroplane—70% of the landing distance available for the runway.

(3) For the purposes of subsection (2), the operator and the pilot in command must take into account the following factors:

(a) that the runway will be dry;

(b) that the aeroplane crosses the runway threshold at a height of 50 ft;

(c) the runway expected to be used, taking into account the wind speed and direction, instrument approach procedure to be used (if any) and terrain;

(d) the anticipated landing configuration for the aeroplane;

(e) subject to paragraph (j)—the wind direction and speed;

(f) the expected consumption of fuel and oil in flight to the planned destination aerodrome;

(g) the expected consumption of fuel and oil in flight to the destination alternate aerodrome (if any):
  (i) assuming that the flight is routed via the planned destination aerodrome; and
  (ii) including the conduct of a missed approach at the planned destination aerodrome;
(h) the aerodrome elevation;
(i) the runway slope, if greater than +/- 1%;
(j) unless otherwise accounted for in the performance data stated in the aircraft flight manual instructions for the aeroplane, not more than 50% of headwind and not less than 150% of tailwind.

## 9.11 Pre-flight landing requirements—wet or contaminated runway

(1) Subject to subsection (2), the operator and the pilot in command of an aeroplane for a flight must each ensure that, when the flight begins, if an authorised weather forecast indicates that the runway at:
  (a) the planned destination aerodrome; and
  (b) in the case that a destination alternate aerodrome is required for the flight—the destination alternate aerodrome;
at the aeroplane's estimated time of arrival, may be wet, the landing distance available at the aerodrome is at least 115% of the landing distance required under subsection 9.10(1).

(2) A landing distance on a wet runway, that is shorter than that required under subsection (1) but not less than that required under subsection 9.10(1), may be used if the performance data used in accordance with regulation 121.390 of CASR provides landing distance information for wet runways and the landing distance is calculated in accordance with the information.

(3) If an authorised weather forecast indicates that the runway at the planned destination aerodrome or destination alternate aerodrome (if any) at the aeroplane's estimated time of arrival may be contaminated, the operator and the pilot in command must each ensure that, when the flight begins, the landing distance available at the aerodrome is at least the greater of the following:
  (a) the landing distance available, mentioned in subsection (1);
  (b) 115% of the required landing distance calculated in accordance with the performance data used in accordance with regulation 121.390 of CASR, where the data is specific to operations on contaminated runways.

## 9.12 Certain aerodromes—planned missed approach climb requirements

(1) The operator and the pilot in command of an aeroplane for a flight must each ensure that, when the flight begins, the aeroplane is able to comply with the requirement in subsection (2) at the aeroplane's estimated time of arrival at:
  (a) the planned destination aerodrome; and
  (b) if a destination alternate aerodrome is required for the flight—the destination alternate aerodrome.

(2) For subsection (1), the aeroplane must be able to comply with at least one of the following:
  (a) the aeroplane must be able to conduct a missed approach with a climb gradient that is the greater of:
    (i) the published missed approach climb gradient for the authorised missed approach procedure; and
    (ii) a missed approach climb gradient of at least 2.5%;
  (b) the aeroplane must be able to conduct a missed approach with a climb gradient of at least the gradient required to clear any obstacles in the missed approach flight path, in accordance with section 9.04 or 9.08J;
  (c) the aeroplane must be able to avoid obstacles by an acceptable margin using procedures specified in the operator's exposition for the specific runway, aerodrome and the aeroplane type.

(3) For the purposes of meeting the requirement in subsection (2), the operator and the pilot in command must take into account:
  (a) the aerodrome elevation and the temperature expected for the estimated time of arrival at the planned destination aerodrome, and the destination alternate aerodrome (if any); and
  (b) the expected consumption of fuel and oil in flight to the planned destination aerodrome; and
  (c) the expected consumption of fuel and oil in flight to the destination alternate aerodrome (if any):
    (i) assuming that the flight is routed via the planned destination aerodrome; and
    (ii) including the conduct of a missed approach at the destination aerodrome; and
  (d) the landing configuration of the aeroplane.

## 9.13 Landing distance—in-flight requirements

(1) In this instrument:

***actual landing distance*** means the landing distance required for the actual conditions at an aerodrome using the deceleration devices required to be used for the landing of an aeroplane.

Note: The ICAO *Aeroplane Performance Manual* (Doc 10064), Chapter 5 – Landing Performance, explains the requirements for aeroplane manufacturer provision of actual landing distance data.

*Actual landing distance data—if used*

(2) Subsection (3) applies if, during a flight of an aeroplane:
  (a) performance data used in accordance with regulation 121.390 of CASR contains actual landing distance data; and
  (b) that data is used when calculating the landing distance required at the aerodrome of intended landing.

(3) The pilot in command of the aeroplane must ensure, during the flight and before landing, that the landing distance available at the aerodrome is greater than, or equal to, 115% of the landing distance required to bring the aeroplane to a stop on the runway.

*Actual landing distance data not used—general*

(4) Subsection (5) applies if, during a flight of an aeroplane, actual landing distance data is not used when calculating the landing distance required at the aerodrome of intended landing.

(5) The pilot in command of the aeroplane must ensure, during the flight and before landing, that if a weather report or forecast, or a combination of weather reports and forecasts, indicate that the runway should, at the aeroplane's estimated time of arrival, be:

(a) dry—then the requirements in subsections (6) and (7) must be met; or

(b) wet—then the requirements in subsection (8) must be met; or

(c) contaminated—then the requirements in subsection (10) must be met.

*Actual landing distance data not used—dry runway*

(6) For paragraph (5)(a), the landing distance required to bring the aeroplane to a stop on the runway planned to be used at the aerodrome of intended landing must not be greater than:

(a) for a jet engine aeroplane—60% of the landing distance available for the runway; and

(b) for a turbo-propeller or piston-engine aeroplane—70% of the landing distance available for the runway.

(7) For the purposes of subsection (6), the following factors must be taken into account:

(a) the landing configuration for the aeroplane;

(b) the anticipated landing weight for the aeroplane at the aerodrome;

(c) the aerodrome elevation;

(d) the runway slope, if greater than +/- 1%;

(e) unless otherwise accounted for in the performance data stated in the aircraft flight manual instructions for the aeroplane, not more than 50% of headwind and not less than 150% of tailwind.

*Actual landing distance data not used—wet runway*

(8) Subject to subsection (9), the landing distance available at the aerodrome must be at least 115% of the landing distance required under subsection (6).

(9) The landing distance available may be shorter than that required under subsection (8), but must be no less than the landing distance required under subsection (6), if:

(a) the performance data used in accordance with regulation 121.390 of CASR provides landing distance information for wet runways; and

(b) the landing distance required is calculated in accordance with the information.

*Actual landing distance data not used—contaminated runway*

(10) For paragraph (5)(c), the landing distance available must be the greater of the following:

(a) the landing distance available, mentioned in subsection (8);

(b) 115% of the landing distance required, calculated in accordance with the performance data used in accordance with regulation 121.390 of CASR, if the data is specific to operations on contaminated runways.