Australian Government
Civil Aviation Safety Authority

ACCEPTABLE MEANS OF COMPLIANCE AND GUIDANCE MATERIAL

General operating and flight rules

Part 91 of CASR

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Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

Inside front cover artwork: James Baban.

An Acceptable Means of Compliance (AMC) explains how one or more requirements of the Civil Aviation Safety Regulations 1998 (CASR) for the issue of a certificate, licence, approval or other authorisation, can be met by an individual or organisation applying to the Civil Aviation Safety Authority (CASA) for the authorisation.

AMC are non-binding advisory documents issued by CASA which may be used by persons and organisations to achieve compliance with CASR.

Applicants are not required to utilise an AMC to comply with a legislative requirement but if they do, CASA will issue the authorisation to which the AMC relates.

AMC do not articulate the only way compliance can be achieved. Individuals and operators may, on their own initiative, propose other ways of meeting the requirements of CASR; however, any such proposal will be subject to separate assessment by CASA to determine whether the proposed methods are likely to produce the required legislative outcome.

Guidance material (GM) is non-binding material issued by CASA which helps to illustrate the meaning of a requirement or specification in CASR. It provides explanations of the CASR and sometimes an amplification of the policy intention underpinning the applicable provision of CASR, rather than a means of complying with it. GM should be read in conjunction with the applicable provision of CASR and AMC. GM is identified by grey shaded text.

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Audience

This acceptable means of compliance and guidance material (AMC and GM) applies to:

- current and future pilots, operational personnel and operators of Australian aircraft, whether in Australian territory, over the high seas or in a foreign country
- current and future pilots, operational personnel and operators of foreign registered aircraft and foreign state aircraft in Australian territory
- current and future aerodrome operators and designers of facilities where aircraft operations will be carried out.

Purpose

This AMC and GM provides advice in the form of Guidance Material (GM) and, where relevant, suggests Acceptable Means of Compliance (AMC) for Part 91 of the *Civil Aviation Safety Regulations 1998* (CASR). Part 91 of CASR outlines the general operating requirements and flight rules for aircraft operation. The intention is to translate the requirements of the regulations into language that is easily understood, and where necessary expand the information to ensure the intent of the legislation is clear.

It is recommended that this AMC and GM be read in conjunction with Part 91 of CASR to ensure a comprehensive understanding. Any AMC outlined will allow operators to satisfy the Civil Aviation Safety Authority (CASA) of the regulatory requirement if they choose to use and follow the AMC material, however operators may also propose alternative means of compliance to the AMC if they so desire. This alternative means will need to be assessed and found acceptable for the purpose by CASA.

For further information

For further information or to provide feedback on this AMC and GM, visit CASA's contact us page.

Status

This version of the AMC and GM is approved by the National Manager, Flight Standards Branch.

Note: Changes made in the current version are annotated with change bars.

Table 1: Status

Version	Date	Details
v2.5	June 2025	Notable changes include: • updated multiple definitions to match the precise wording used in the Civil Aviation Act 1988 and CASR Dictionary (as appropriate) • replace all references to the expired exemption CASA EX81/21 with references to the replacement exemption CASA EX67/24 • replace all references to the expired exemption CASA EX08/21 with references to the replacement exemption CASA EX07/24 • replace all references to the expired exemption CASA EX129/19 with references to the replacement exemption CASA EX92/22 • removed reference to CASA Direction 26/21 • updated section 1.4 (Forms) to match changes to form titles and the air display application now being through the myCASA portal

Version	Date	Details
		• new AMC 91.055 and AMC 91.400 added about an operative radio aircraft making radio calls on behalf of an inoperative or not fitted radio aircraft in relation to a non-controlled aerodrome mentioned in regulation 91.400 of CASR • GM 91.205 added guidance about the formation in IMC and formation at night approvals • GM 91.255 added guidance about altimeter setting at and below the transition altitude • GM 91.267 added information about the low flying approval power for pilots not authorised under Part 61 • GM 91.305 added information about the additional restrictions applicable to some IFR flights under a Part 61 of CASR licence due to regulation 61.942 of CASR • GM 91.307 revised Figure 4 aligned to the updated MOS. • minor updates to GM 91.410 relating to military aerodromes • GM 91.510 regarding Part 121, 133, 135 AOC holders and Part 138 aerial work certificate holders fuelling with high volatile fuels when persons are onboard • GM 91.545 added more information about MOS content • new AMC 91.555 relating to jump pilot trainer seating • added GM 91.555 content relating to cabin crew and jump pilot trainer seating • GM 91.695 to include pilots reporting braking action, not as good as expected, directly to the aerodrome operator, at certified non-controlled aerodromes • GM 91.745 updated to cover the missing piece for multi-engine aeroplanes with an MTOW of more than 8618kg and a certified passenger capacity of 9 or less • GM 91.805 updated to include further guidance on the criticality of remaining within weight and balance limits, with specific recommendations for parachuting operations • GM 91.940 updated to include information regarding expected actions relating to an approved MEL when the MMEL upon which it is based is changed. • GM to 91.810(1) for Section 26.04 of the Part 91 MOS regarding the serviceability of equipment, and information on CASA EX14/25 - Serviceability of Equipment (additional equipment with serviceability provisions) • Subpart 91.Z guidance relating to foreign aircraft in Australia, especially foreign aircraft operating under a foreign special certificate of airworthiness or foreign special permit, with additional information also relating to foreign state aircraft approvals • CASA new style template applied.
v2.4	October 2023	Notable changes include the content mentioned in the following bullet points, but there are numerous other changes as well. • Added reference to new exemptions regarding certain aerobatic activities, the use of certain experimental aircraft for glider towing and the changed requirement for experimental aircraft to only hold an approval for flight over the built-up area of a city or town (instead of a populous area and public gathering) which were included in latest version of EX81/21. • Added reference to new heliport design AC and removed reference to old helicopter CAAPs. • Added reference to new AC 91-11 on low visibility operations

Version	Date	Details
		and removed reference to CAAP 257-EX-01(0). • Added new content on the use of the international aerodrome alternate minima in section 8.09 of the Part 91 MOS to GM 91.235. • Added information about VFR flights not navigating using ground or water to GM 91.273. • Added significant a new AMC 91.287 (AMC 3) about navigation specifications. • Added new GM 91.307 content about RNP approaches. • Added new AMC 91.645 and GM 91.645 about the documentation required to be held by operators so it is available to the ATSB in relation to FDRs. • Added new content about aiding other aircraft in distress, sourced from ICAO Annex 12, to GM 91.675. • Added significant new guidance about denying aircraft boarding to persons believed to be affected by psychoactive substances to GM 91.790. • Added content about various kinds of equipment to GM 91.810.
v2.3	April 2022	Added information about forms. Added information regarding approvals mentioned in CASA exemptions and directions instruments and how these relate to the significant change approval rules. Added new information in GM 91.095 relating to aircraft without doors. Added a link to CASA website conflict zone information in GM 91.215. Added new GM 91.265 content on populous areas and public gatherings. Added new AMC 91.277 and AMC 91.305. Added a Note to AMC 91.795 regarding AIP-ERSA content on runway take-off survey areas.
v2.2	December 2021	Added references to additional exemptions incorporated into EX81/21 by EX146/21. Added reference to the transitional approvals arising from CASA EX161/21. Added reference to the existing exemption relating to the conduct of aerial application operations under Part 137 of CASR which is CASA EX129/19.
v2.1	November 2021	Added information on air displays and aerobatics, and landing on wet runways guidance from CAAP 235-5 (the CAAP is being withdrawn on 2 December 2021).
v2.0	October 2021	Addition of guidance material and editorial changes. Added references to exemptions and directions.
v1.0	December 2020	Initial AMC and GM.

1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AMC and GM are listed in the table below.

Table 2: Acronyms

Acronym	Description
AAI	authorised aeronautical information
ADIZ	Air Defence Identification Zone
AFM	aircraft flight manual
AGL	above ground level
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
AMC	acceptable means of compliance
AOD	alcohol and other drugs
APCH	Approach
APU	auxiliary power unit
APV	approach with vertical guidance
AR	approval required
ASAO	approved self-administering organisation
ATC	air traffic control
ATS	air traffic services
ATSB	Australian Transport Safety Bureau
AVGAS	aviation gasoline
AVTUR	aviation turbine fuel
AWB	Airworthiness Bulletin
CAS	calibrated airspeed
CASA	Civil Aviation Safety Authority
CASR	*Civil Aviation Safety Regulations 1998*
CAT	category
CofA	Certificate of Airworthiness
DAMP	drug and alcohol management plan
DME	distant measuring equipment
EC	electronic conspicuity

Acronym	Description
ERC	en-route chart
EVDS	electronic visual distress signals
FIS	Flight Information Service
GM	guidance material
GNSS	Global Navigation Satellite System
HLS	helicopter landing site
ICAO	International Civil Aviation Organization
ILS	instrument landing system
IFR	instrument flight rules
IRM	immediately reportable matter
IMC	instrument meteorological conditions
JRCC	Joint rescue coordination centre
LPV	localiser performance with vertical navigation
LNAV	lateral navigation
LOC	localiser
LSA	light sport aircraft
LSALT	lowest safe altitude
MEL	minimum equipment list
MMEL	master minimum equipment list
MOGAS	motor gasoline (road transport gasoline as distinct from aviation gasoline or AVGAS))
MOS	Manual of Standards
MTOW	maximum take-off weight
NM	nautical mile
NOTAM	notice to airmen
NOTOC	notification to the captain
NVIS	night vision imaging system
PAL	pilot activated lighting
PBN	performance-based navigation
PED	portable electronic device
PIC	pilot in command
PRM	precision runway monitor
RCR	runway condition report

Acronym	Description
RF	radius to fix **Note:** This term relates to terminal instrument flight procedures - see AMC 91.287.
RNP	required navigation performance
RRM	routinely reportable matter
RVSM	reduced vertical separation minimum
RWY	runway
RWYCC	runway condition code
SFP	special flight permit
SSAA	safety sensitive aviation activity
TODA	take-off distance available
TSO	Technical Standards Order
VFR	visual flight rules
VMC	visual meteorological conditions

1.2 Definitions

Terms that have specific meaning within this AMC and GM are defined in the table below. Where definitions from the civil aviation legislation have been reproduced for ease of reference, these are identified by 'grey shading'. Should there be a discrepancy between a definition given in this AMC and GM and the civil aviation legislation, the definition in the legislation prevails.

Table 3: Definitions

Term	Definition
Act	*Civil Aviation Act 1988*
aerial work operation	see regulation 138.010 of CASR.
air service	means a service of providing air transportation of people or goods, or both people and goods. **Note:** This definition is provided here solely to support the definitions of prescribed aircraft and prescribed air service, both of which are contained in the Commonwealth Aviation Transport Security legislation - see the later definitions of these related terms in this section.
air transport operation	1. An air transport operation is a passenger transport operation, a cargo transport operation or a medical transport operation, that: a. is conducted for hire or reward; or b. is prescribed by an instrument issued under regulation 201.025. 2. Despite subclause (1), an air transport operation does not include an aerial work operation or a balloon transport operation.
Australian aircraft	means: a. aircraft registered in Australia; and

Term	Definition
	b. aircraft in Australian territory, other than foreign registered aircraft and state aircraft. Note: Some references to Australian aircraft may be affected by the operation of section 4A *[sic - of the Civil Aviation Act 1988]*.
Australian territory	means: a. the territory of Australia and of every external Territory; b. the territorial sea of Australia and of every external Territory; and c. the air space over any such territory or sea.
authorised aeronautical information	for a flight of an aircraft, means the aeronautical maps, charts and other aeronautical information relevant to the route of the flight, and any probable diversionary route, that are published: a. if paragraph (b) does not apply: i in the AIP; or ii by a data service provider; or iii in NOTAMs; or b. for a flight in a foreign country: i in the document that in that country is equivalent to the AIP; or ii by an organisation approved to publish aeronautical information by the national aviation authority of that country.
authorised person	means a person who is appointed under regulation 201.001 to be an authorised person in relation to one or more of the following: a. CASR; b. a particular provision of CASR; c. CAR; d. a particular provision of CAR.
basic HLS	A place used for infrequent, opportune or short-term rotorcraft operations.
cargo	means things other than persons carried, or to be carried, on an aircraft.
cargo transport operation	a. means an operation of an aircraft that involves the carriage of cargo and crew only, but b. does not include the following: i an operation conducted for the carriage of the possessions of the operator or the pilot in command for the purpose of business or trade; ii a medical transport operation.
carry-on baggage	means baggage or personal effects taken into, or to be taken into, the cabin of an aircraft, for carriage on the aircraft, by: a. a person (including a crew member of the aircraft) travelling on the aircraft; or b. a member of the personnel of the operator of the aircraft on behalf of a person mentioned in paragraph (a).
flight training	For a flight crew licence, rating or endorsement, means the training mentioned in regulation 61.195 for the licence, rating or endorsement.
fuelling	includes refuelling and defuelling.
high seas	Refer to GM 91.015.

Term	Definition
highly volatile fuel	means: a. aviation gasoline; or b. a hydrocarbon mixture that spans the gasoline and kerosene boiling ranges; or c. a mixture of aviation gasoline and a hydrocarbon mixture mentioned in paragraph (b).
IFR pick-up	A pilot procedure whereby a flight operating to the IFR in Class G airspace changes to VFR upon entering Class E airspace whilst awaiting an airways clearance.
instrument approach procedure	means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix or, where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply.
misfuelling	Delivering the incorrect type of fuel into an aircraft.
Part 103 aircraft	see subregulation 103.005(4) of CASR.
Part 131 aircraft	A manned free balloon or a hot air airship. **Note:** This definition comes from subregulation 131.005(2) of CASR, to which the CASR Dictionary refers a reader of the legislation.
passenger transport operation	1. A passenger transport operation is an operation of an aircraft that involves the carriage of passengers, whether or not cargo is also carried on the aircraft. 2. Despite subclause (1), an operation is not a passenger transport operation if the operation is: a. an operation of an aircraft with a special certificate of airworthiness; or b. a cost-sharing flight; or c. a medical transport operation; or d. if the registered operator of an aircraft is an individual—an operation of the aircraft: i that involves the carriage of that individual; and ii does not also involve the carriage of other passengers; or e. if the registered operator of an aircraft is an individual—an operation of the aircraft: i that involves the carriage of that individual; and ii involves the carriage of other passengers; and iii for which no payment or reward is made or given in relation to the carriage of the other passengers or cargo. **Note:** Due to the CASR Dictionary definition of the term 'special certificate of airworthiness', this term only relates to certificates issued under Part 21 of CASR and does not include foreign issued special certificates of airworthiness. For operators of aircraft under foreign special certificates of airworthiness, please review the GM 91.965 and GM 91.970 entries in this AMC/GM document, and the GM 119.010 entry in the Part 119 AMC/GM document.
portable electronic device	Lightweight, electrically-powered equipment including a mobile phone, music player, e-reader, tablet computer, laptop computer, portable video game console, or camera.

Term	Definition
prescribed aircraft	means an aircraft that: a. is being used for a prescribed air service; or b. is regularly used for prescribed air services. **Note:** This definition is sourced from the Aviation Transport Security Act 2004.
prescribed air service	means an air service of any of the following kinds: a. a regular public transport operation; b. an air service in which a jet is used; c. an air service in which an aircraft with a certified MTOW greater than 5,700 kg is used. **Note:** This definition is sourced from the Aviation Transport Security Regulations 2005. The definition of regular public transport operation is also contained in the same regulations.
RF leg	means a radius to fix path terminator. **Note:** This term relates to terminal instrument flight procedures - see AMC 91.287.
secondary HLS	A place suitable for use as an aerodrome for helicopter operations by day or night that is not certified in accordance with Part 139.

1.3 References

Legislation

Legislation is available on the Federal Register of Legislation website https://www.legislation.gov.au/

Table 4: Legislation references

Document	Title
Aviation Transport Security Act 2004	Division 3 (Weapons)
Civil Aviation Act	Civil Aviation Act 1988
Civil Aviation Regulations	Civil Aviation Regulations 1988
Civil Aviation Safety Regulations	Civil Aviation Safety Regulations 1998
Crimes Act 1914	Sections 3ZC (use of force in making arrest) and 3ZD (persons to be informed of ground of arrest)
Disability Discrimination Act	Disability Discrimination Act 1992
Part 11 of CASR	Regulatory administrative procedures
Part 21 of CASR	Certification and airworthiness requirements for aircraft and parts
Part 23 of CASR	Airworthiness standards for aeroplanes in the normal, utility, acrobatic or commuter category
Part 25 of CASR	Airworthiness standards for aeroplanes in the transport category

Document	Title
Part 27 of CASR	Airworthiness standards for rotorcraft in the normal category
Part 29 of CASR	Airworthiness standards for rotorcraft in the transport category
Regulation 61.340 of CASR	Production of licencing documents, medical certificates and identification
Part 91 of CASR	General operating and flight rules
Part 92 of CASR	Consignment and carriage of dangerous goods by air
Part 101 of CASR	Unmanned aircraft and rockets
Part 103 of CASR	Sport and recreation aircraft
Part 131 of CASR	Balloons and hot air airship
Part 173 of CASR	Standards Applicable to Instrument Flight Procedure Design
Part 91 MOS	Part 91 (General Operating and Flight Rules) Manual of Standards 2020
Part 121 MOS	Part 121 (Australian Air Transport Operations - Larger Aeroplanes) Manual of Standards 2020
Part 133 MOS	Part 133 (Australian Air Transport Operations - Rotorcraft) Manual of Standards 2020
Part 135 MOS	Part 135 (Australian Air Transport Operations - Smaller Aeroplanes) Manual of Standards 2020
Part 138 MOS	Part 138 (Aerial Work Operations) Manual of Standards 2020
	Radiocommunications Act 1992
	Transport Safety Investigation Act 2003
	Transport Safety Investigation Regulations 2003
CAO 48.1	Civil Aviation Order 48.1 Instrument 2019 **Note:** This CAO contains the flight crew member fatigue requirements.
CAO 100.7	Civil Aviation Order 100.7 Instrument 2015 **Note:** This CAO contains the weighing and related requirements for aircraft.
CASA 152/12	Direction – Personal Electronic Devices used as Electronic Flight Bags or provided as In Flight Entertainment devices **Note:** This instrument specifies that certain personal electronic devices are not aircraft components for CAR 1988. This instrument is available on CASA's website.
CASA 73/17	Civil Aircraft in Australian Territory (Interception) Direction 2017
CASA EX07/24	Low-level Operations (Air Displays and Aerobatic Manoeuvres) Exemption 2024
CASA EX42/21	ASRA National Championships (Dropping of Things from Gyroplanes) Instrument 2021
CASA EX67/24	Part 91 of CASR - Supplementary Exemptions and Directions Instrument 2024
CASA EX68/24	Part 119 of CASR – Supplementary Exemptions and Directions Instrument 2024

Document	Title
CASA EX69/24	Part 121 and 91 Part of CASR – Supplementary Exemptions and Directions Instrument 2024
CASA EX70/24	Part 133 and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024
CASA EX71/24	Part 135, Subpart 121.Z and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024
CASA EX72/24	Part 138 and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2024
CASA EX92/22	Part 137 and Part 91 of CASR – Supplementary Exemptions and Directions Instrument 2022

International Civil Aviation Organization documents

International Civil Aviation Organization (ICAO) documents are available for purchase from http://store1.icao.int/

Table 5: ICAO references

Document	Title
ICAO Annex 2	Annex 2 to the Chicago Convention, Rules of the Air
ICAO Doc. 9683	Human Factors Training Manual
ICAO Doc. 9984	Manual on Access to Air Transport by Persons with Disabilities
ICAO Doc. 10084	Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones

Advisory material

CASA's advisory materials are available at https://www.casa.gov.au/publications-and-resources/guidance-materials

Table 6: Advisory material references

Document	Title
AC 1-01	Understanding the legislative framework
AC 1-02 Annex C	Exposition and operations manual fuel policy guidance **Note:** The general topic of AC 1-02 is 'Guide to the preparation of expositions and operations manuals'.
AC 1-03	Transitioning to the flight operations regulations
AC 11-03	Electronically formatted certifications, records and management systems
AC 11-04	Approvals under CASR Parts 91, 103, 119, 121, 129, 131, 132, 133, 135, 138 and 149 (including MOS)
AC 21-1	Aircraft Airworthiness and Certification Categories and Designations Explained
AC 21-6	Restricted Category Aircraft – Certification
AC 21-7	Primary Category Aircraft - Certification
AC 21-09	Special Flight Permits
AC 21-10	Experimental certificates
AC 21-41	Light Sport Aircraft Certificate of Airworthiness
AC 21-42	Light sport aircraft manufacturers' requirements
AC 21-45	Airworthiness approval of airborne automatic dependent surveillance broadcast equipment
AC 91-02	Guidelines for aeroplanes with MTOW not exceeding 5 700 kg - suitable places to take off and land
AC 91-03	Carriage of assistance animals
AC 91-05	Performance based navigation
AC 91-06	Performance based communications and surveillance
AC 91-07	Cabin electronic flight bags
AC 91-09	Ditching
AC 91-10	Operations in the vicinity of non-controlled aerodromes
AC 91-11	Aeroplane low visibility operations - conduct and approval
AC 91-12	Conduct of practice autoland operations
Multi-Part AC 91-13, AC 133-09 and AC 138-06	Night vision imaging - helicopters
AC 91-14	Pilots' responsibility for collision avoidance
AC 91-15	Guidelines for aircraft fuel requirements

Document	Title
AC 91-16	Wake turbulence
AC 91-17	Electronic flight bags
AC 91-18	Restraints of infants and children
Multi-Part AC 91-19, AC 121-04, AC 133-10, AC 135-12 and AC 138-10	Passenger safety information
AC 91-20	Reduced vertical separation minima **Note:** This AC has not yet been issued as at the publication of this AMC/GM.
AC 91-21	Air Displays
AC 91-22	Aircraft checklists
AC 91-23	ADS-B for enhancing situational awareness
AC 91-25	Fuel and oil safety
AC 91-27	Non-precision approaches and approaches with vertical guidance **Note:** This AC has not yet been issued as at the publication of this AMC/GM.
AC 91-28	Crew safety during turbulence
AC 91-29	Guidelines for helicopters - suitable places to take off and land (under development) **Note:** Heliport design related information is now available in AC 139.R-01.
Multi-Part AC 91-30, 121-12, 133-03 and 135-14	Emergency locator transmitters
Multi-Part AC 91-32 and AC 139-22	Global reporting format – Runway surface condition
AC 91-33	Flight in airspace with volcanic ash contamination
AC 92A-01	The consignment and carriage of dangerous goods on all aircraft in Australian territory and on Australian aircraft overseas: An overview of the legislative framework and procedures
AC 92-5	Use of Compressed Oxygen: Carriage and Consignment of Live Aquatic Animals for Transport by Air
Multi-Part AC 121-05, AC 133-04 and AC 135-08	Passenger, crew and baggage weights
AC 133-01	Performance class operations **Note:** Earlier versions of the Part 91 AMC/GM document mentioned a possible future AC 133-03 which would focus on performance class 3 (PC3) operations over populous areas. CASA decided not to create a separate AC for this topic and instead include PC3 over populous area guidance into AC 133-01.

Document	Title
AC 133-02	Performance Class 2 with exposure operations
AC 139.R-01	Guidelines for heliports - design and operation **Note:** Flight operations helicopter related information is contained in AC 91-29 and/or AC 133-01. **Note:** This AC replaces the HLS related information previously found in CAAP 92-2(2) and 92-4(0).
AWB 02-064	Preventing Carbon Monoxide Poisoning in Piston Engine Aircraft
CAAP 5.23-1	Multi-engine operations and training
CAAP 37-1	Minimum Equipment Lists (MEL)
CAAP 48-01	Fatigue management for flight crew members
CAAP 181A-1(2)	Reduced vertical separation minimum (RVSM) approvals **Note:** This CAAP will eventually be replaced by AC 91-20.
CAO 48.1 PEG	Fatigue management - Plain English guide
CASA Safety Video	Drum refuelling
Part 91 PEG	General operating and flight rules - Plain English guide
Part 121 AMC/GM	Acceptable means of compliance and guidance material – Australian air transport operations—larger aeroplanes
Part 133 AMC/GM	Acceptable means of compliance and guidance material – Australian air transport operations—rotorcraft
Part 135 AMC/GM	Acceptable means of compliance and guidance material – Australian air transport operations—smaller aeroplanes
Part 138 AMC/GM	Acceptable means of compliance and guidance material – Aerial work operations
VFRG	Visual flight rules guide

Other material

Table 7: Other material references

Document	Title
AIP	Australian Aeronautical Information Publication
AS 2092-2004	Pyrotechnic marine distress flares and signals for pleasure craft
ATSB AR-2010-055	Avoidable Accidents No. 3. Managing partial power loss after Take-off in single-engine aircraft
ATSB AR-2008-044(1)	A pilot's guide to staying safe in the vicinity of non-controlled aerodromes
EASA Easy Access Rules for Air Operations	Easy Access Rules for Air Operations (Regulation (EU) No 965/2012)
FAA AC 91.21-1D	Use of Portable Electronic Devices Aboard Aircraft
FAA-H-8082-3B	Airplane Flying Handbook

Document	Title
FAA-H-8083-15B	Instrument Flying Handbook
FAA-H-8083-16B	Instrument Procedures Handbook
IMO IE982E	International Maritime Organization (IMO) International Life-Saving Appliance (LSA) Code, 2017 edition
MATS	Joint Airservices Australia and Australian Department of Defence Manual of Air Traffic Services
OPS.04 protocol suite	Navigation authorisations
OPS.12 protocol suite	Aircraft low visibility operations
OPS.25 protocol suite	Air display approval
United Nations Convention on the Law of the Sea	Article 86 (definition of 'high seas')

1.4 Forms

CASA's forms are available at http://www.casa.gov.au/forms

Table 8: Forms

Form number	Title
	Aerial work operations
	Air Operator's Certificate / Associated approvals
	Air Operator's Certificate (balloon operations) / Associated Approvals
	Application – Minimum Equipment List (CASRs 91.935, 91.940 and 91.945)
	myCASA Air Display Application
	Part 91 Approvals - General **Note:** Use the air display approval application through myCASA for the approval required by regulation 91.180 and the low visibility and PBN operations form for the approvals required by regulations 91.315 and 91.660.
	Part 91 Approvals - Low Visibility and PBN Operations

2 Subpart 91.A—Preliminary

There is a Part 11 direction in force in relation to crew members carrying out audits, checks, examinations etc. Operators and pilots are advised to review section 9 of CASA EX67/24.

GM 91.005 Application of Part 91—Australian aircraft in Australian territory

Australian aircraft is defined by the *Civil Aviation Act 1988* (the Act) as:

- aircraft registered in Australia
- aircraft in Australian territory, other than foreign registered aircraft and state aircraft.

Aircraft in Australian territory, other than foreign registered aircraft, refers to aircraft that are operated in Australia but are not registered with CASA. This group of aircraft are generally Part 103 aircraft and are registered with an applicable Approved Self-Administering Organisation (ASAO). Part 149 prescribes the rules for ASAOs.

GM 91.010 Application of Part 91—Australian aircraft in foreign countries

For an Australian aircraft operated in a foreign country, both Part 91 and the aviation laws of the foreign country apply. Where there is an inconsistency, the pilot in command (PIC) must comply with the relevant law of the foreign country.

GM 91.015 Application of Part 91—Australian aircraft over the high seas

For an Australian aircraft operated over the high seas, both Part 91 and Annex 2 to the Chicago Convention apply and where both rules are capable of being complied with concurrently, the PIC must do so. However, where there is an inconsistency, the PIC must comply with the relevant Annex 2 standard.

See GM 91.140 for more detail of differences between Part 91 and Annex 2.

GM 91.020 Application of Part 91—foreign registered aircraft

There is a CASA direction in force which has specific relevance to the operation of the foreign registered aircraft mentioned in this regulation. It is recommended that relevant pilots and operators review CASA 73/17 Civil Aircraft in Australian Territory (Interception) Direction 2017.

GM 91.025 Application of Part 91—foreign state aircraft

Reserved.

GM 91.030 Application of Part 91—aircraft to which Part 101,103 or 131 applies

Reserved.

GM 91.035 Application of Part 91—certain provisions of this Part do not apply if provisions of Part 105, 121, 133, 135 or 138 apply

Reserved.

GM 91.040 Issue of Manual of Standards for Part 91

Refer to AC 1-01 - Understanding the legislative framework for guidance on the Australian legislative framework including explanation of the purpose of a Manual of Standards (MOS).

GM 91.045 Approvals by CASA for Part 91

General guidance on approvals under the flight operations regulations, which includes Part 138, is available in AC 11-04 Approvals under Parts 91, 103, 119, 121, 129, 131, 132, 133, 135, 138 and 149 of CASR (including MOS).

This regulation authorises CASA to issue approvals under Part 91 where a provision of Part 91, or the Part 91 MOS, makes reference to a CASA approval. All approvals granted by CASA under Part 91 are subject to the procedural requirements of Part 11. This requires CASA to have regard to the safety of air navigation.

It should be noted that the approvals required for certain flights of experimental certificate aircraft under regulations within Division 91.T.4, may be subject to the safety standard mentioned in subregulation 11.055 (1C) if the approval requires the issuance or re-issuance of an experimental certificate.

Forms and templates for approvals are available on the forms and templates page of the CASA website. For the purposes of paragraphs 11.030(1)(a) and (aa), all applications for regulation 91.045 approvals (except for those approval requirements mentioned in Subpart 91.Y relating to minimum equipment lists) are to be made using one of the following forms:

- 'Air Operator's Certificate / Associated Approvals' form when the application is made as part of an application for a Part 119 Australian air transport AOC.
- 'Aerial Work Operations' form when the application is made as part of an application for a Part 138 Aerial work certificate.
- 'Air Operator's Certificate (balloon operations) / Associated Approvals' form when the application is made as part of an application for an AOC for a Part 131 aircraft operation.
- If the application is made in circumstances other than those mentioned above use the:
  - 'Part 91 Approvals - General' form (except for approvals associated with regulations 91.180 or 91.315).
  - myCASA portal to apply for approval to conduct an Air Display for applications related to the approval required by regulation 91.180.
  - 'Part 91 Approvals - Low Visibility and PBN Operations' form for applications related to the approvals required by regulation 91.315 (low visibility operations) or 91.660 (performance-based navigation).

For the minimum equipment list approvals mentioned in regulations 91.935 and 91.940, the request for an approval, where that request is being made to CASA (note that certain other persons mentioned in the relevant regulations can grant approvals), is to be made via email to regservices@casa.gov.au.

For the minimum equipment list approval mentioned in regulation 91.945, the request for an approval is to be made using the relevant application form (see section 1.4 of this AC). See GM 91.945 for more information.

Approval applicants are advised that, under regulation 11.040, CASA may request additional information or documents as part of assessing an application. Additionally, when evaluating approval applications, CASA will appropriately consider the matters mentioned in regulations 11.050 and 11.055.

91.050 Approvals by authorised persons for Subpart 91.T

It should be noted that the approvals required for certain flights of experimental certificate aircraft under regulations within Division 91.T.4, may be subject to the safety standard mentioned in subregulation 11.055(1C) of CASR if the approval requires the issuance or re-issuance of an experimental certificate.

3 Subpart 91.C—General

3.1 Division 91.C.1—General flight limitations

AMC 91.055 Aircraft not to be operated in a manner that creates a hazard

AMC 1 - Flight of an aircraft without operative radio in company with another aircraft under subregulation 91.400(3)

In order to avoid operating an aircraft in a manner that creates a hazard to another aircraft, a person or property, it is an acceptable means of compliance with the requirement for the PIC of the operative radio aircraft to make required radio broadcasts on behalf of both aircraft, provided that the operative radio aircraft, in order to accurately report the position of the inoperative or not fitted radio aircraft, is manoeuvred to keep the non-radio aircraft at a safe distance and in sight at all times. In such a situation, subregulations 91.400 (3) or (4) impose some additional requirements.

AMC 2 - Use of radio (broadcasts and reports) under regulation 91.630 and chapter 26 of the Part 91 MOS

In order to avoid operating an aircraft in a manner that creates a hazard to another aircraft, a person or property, it is an acceptable means of compliance when making radio broadcasts and reports if those broadcasts and reports are:

- made using the standard words and phrases that are used for radio communications and specified in the Australian AIP, or, for foreign jurisdictions, in accordance with the relevant radiotelephony guidance for that jurisdiction

  or

- if using the standard phraseology is not possible, made using words and phrases that directly communicate the relevant information, accompanied by some form of confirmation that the message was received by the intended recipient.

GM 91.055 Aircraft not to be operated in a manner that creates a hazard

This regulation is a very broad outcome-based requirement that is intended to encompass hazards created by the operation of an aircraft to another aircraft, person or property, where the specific element of the operation that led to the hazard is not specifically mentioned elsewhere in the ruleset.

However, an aircraft is not considered to be creating a hazard simply by flying over populous areas in the normal course of navigation, provided the aircraft adheres to the prescribed distances and altitudes outlined in regulation 91.265, as the potential for normal operational hazard is dealt with elsewhere in the ruleset by this provision. As another example, an aircraft conducting a flight test that is part of the activities authorised under an experimental certificate, would not be taken to be operating in a manner that creates a hazard provided the operation is conducted in accordance with the experimental certificate and the underpinning documentation or procedures.

This rule is also intended to create flexibility in enforcement actions, noting that section 20A of the *Civil Aviation Act 1988* also states a person must not operate an aircraft being reckless regarding whether the manner of operation could endanger other persons or property, but criminal enforcement of a contravention of that provision is only through a prosecution, whereas CASA can issue an aviation infringement notice for a contravention of regulation 91.055, or a prosecution.

Readers are advised that CASA has moved operational information relating to volcanic ash into a new AC - see AC 91-33 Flight in airspace with volcanic ash contamination.

GM 91.060 Unauthorised travel or placing of cargo on aircraft

Reserved.

GM 91.085 NVIS flights

There are directions in force in relation to Part 133 and Part 138 operators and the approval required before conducting an NVIS operation for the first time in a Part 133 operation or an aerial work operation. It is recommended that Part 133 operators review section 6A of CASA EX68/24 and Part 138 operators review section 23 of CASA EX72/24. The approval mentioned in these directions is taken to be a significant change due to it activating paragraphs 119.020(c) or 138.012(d). Operators are to apply for this approval by applying for a significant change via the Air Operator's Certificate / Associated Approvals form available on CASA's website.

This regulation does not apply if regulation 133.265 or 138.350 applies to an operation.

The legal interrelationship between Parts 91, 133 and 138 results in a significant amount of duplicated NVIS content across the Part 91, 133 and 138 MOS's. This duplication requires a solid understanding of when the rules contained in a particular MOS apply to a particular kind of flight where NVIS is used. Multi-Part AC 91-13, 133-09 and 138-06 contains guidance regarding the use of NVIS and section 2.3 of the AC is a detailed description of the application of the rules within the 3 MOS's.

The operational NVIS requirements are contained in Chapter 3 of the Part 91 MOS. Unique VMC for NVIS are contained in section 2.07 of the Part 91 MOS. NVIS equipment requirements are contained in Division 26.17 of the Part 91 MOS.

GM 91.090 All flights—airspeed limits

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24.

Airspeed limits for the conduct of instrument flight procedures are described in Chapter 4 of the Part 91 MOS and may also be stated in the Aeronautical Information Publication (AIP).

3.2 Division 91.C.2—Operational documents

This Division does not apply if regulation 133.030 or 138.210 applies to an operation.

GM 91.095 Compliance with flight manual etc.

There is a Part 11 direction in force in relation to this regulation. Pilots are advised to review section 5 of CASA EX67/24.

There is an exemption in force in relation to this regulation, which limits the requirement to comply with aircraft flight manual instructions to any requirements or limitations set out in the aircraft flight manual instructions that relate to the aircraft. It is recommended that pilots review section 21 of CASA EX67/24.

There is an exemption in force (CASA EX92/22) for the conduct of aerial application operations under Part 137 that relates to this regulation. The effect of regulation 137.020 means that regulation 137.190 overrides this regulation in limited ways. After this override occurs, relevant operators and persons can then utilise instrument CASA EX92/22 if they elect to do so.

Transitional regulation 202.416A, item 20 of the table (which can be found here - Civil Aviation Legislation Amendment (Flight Operations—Consequential Amendments and Transitional Provisions)

Regulations 2021), contains a provision that deems an existing CAR 232 flight check approval to be an exemption, where necessary, from the requirements of this regulation. CASA recommends operators read this regulation to determine its applicability to their operation.

The wording of subregulation 91.095(1) refers to times when an aircraft's doors are opened or closed. To avoid doubt, if an aircraft does not have any doors at all, for example a helicopter that has had its doors removed, then subparagraphs 91.095(1)(a)(i) and (1)(b)(i), which contain the references to aircraft doors, have no effect. In these cases, subregulation 91.095(1) would function as if these subparagraphs did not exist.

This regulation also relies on the definition of *flight* which is contained in the *Civil Aviation Act 1988*. This definition is dependent on whether the aircraft is heavier-than-air or lighter-than-air. The definition states:

> ***flight*** means:
>
> (a) in the case of a heavier-than-air aircraft, the operation of the aircraft from the moment at which the aircraft first moves under its own power for the purpose of taking-off until the moment at which it comes to rest after being airborne; and
>
> (b) in the case of a lighter-than-air aircraft, the operation of the aircraft from the moment when it becomes detached from the surface of the earth or from a fixed object on the surface of the earth until the moment when it becomes again attached to the surface of the earth or a fixed object on the surface of the earth.

The PIC is required to ensure that the aircraft is operated in accordance with the aircraft flight manual instructions (defined term - see below) for the aircraft. This regulation does not provide CASA the ability to give any concession to a limitation or procedure that is set out in the flight manual.

The definition of *aircraft flight manual instructions* is:

> ***aircraft flight manual instructions***, for an aircraft, means the following documents and information provided by the aircraft's manufacturer or issued in accordance with a Part 21 approval:
>
> (a) the aircraft's flight manual;
>
> (b) checklists of normal, abnormal and emergency procedures for the aircraft;
>
> (c) any operating limitation, instructions, markings and placards relating to the aircraft.

The CASR Dictionary also defines the meaning of an aircraft flight manual (AFM). Under this definition, a reference to a flight manual in the CASR includes the manual produced for the aircraft type certification or another document that contains the aircraft's operating limitations and other information, including all amendments and supplements to the AFM or other documents, as applicable, required for safe operation of the aircraft.

For older aircraft, the AFM may be referred to as the pilot's operating handbook (POH), owner's handbook or owner's manual.

Part 21 requires each aircraft to be provided with an aircraft flight manual (AFM), placards or other documents stating approved limitations within which the aircraft is considered airworthy (as defined by the appropriate airworthiness requirements), and additional instructions and information necessary for the safe operation of the aircraft.

Aircraft flight manuals are required, under aircraft type certification rules (e.g., FAR Parts 23, 25, 27 and 29 and equivalent EASA rules), to contain a differing mixture of mandatory requirements and non-mandatory (advisory) elements. The balance in a flight manual between the mandatory and advisory material is dependent on which type certification rule applies to the aircraft.

Section 2.3 of AC 21-34 Aircraft flight manuals describes these different kinds of flight manual requirements as either “approved”, as in required to be approved by the national aviation authority (NAA) that provides the initial certification of a new aircraft type, or “unapproved”, as in advisory content from the manufacturer that is not required to be approved by the NAA.

The effect of this regulation, as modified by the forthcoming exemption mentioned earlier in this GM entry, is that compliance is only required in relation to the mandatory flight manual elements.

AC 91-22 Aircraft checklists contains information on aircraft checklists in the context of this regulation and similar regulations in Parts 121, 133, 135 and 138.

Readers are advised that CASA has moved operational information relating to volcanic ash into a new AC - see AC 91-33 Flight in airspace with volcanic ash contamination.

3.3 Division 91.C.3—Flight related documents

There are exemptions in force in relation to this Division for Part 121, 133 and 135 operators. Operators are advised to review section 15 of CASA EX69/24 (for Part 121 operators), section 10 of CASA EX70/24 (for Part 133 operators) and section 10 of CASA EX71/24 (for Part 135 operators).

This Division does not apply to Part 131 operations.

GM 91.100 Electronic documents

General guidance on electronic certifications, record keeping and management systems is available in AC 11-03 Electronically formatted certifications, records and management systems. Specific guidance on the use of electronic flight bags is available AC 91-17 Electronic flight bags and AC 91-07 Cabin electronic flight bags.

GM 91.105 Carriage of documents

There is a Part 11 direction in force in relation to this regulation and recreational aviation medical practitioner’s certificates (RAMPC). Pilots are advised to review section 6 of CASA EX67/24.

There is a Part 11 direction in force in relation to this regulation and photographic identity documents. Pilots are advised to review section 7 of CASA EX67/24.

There is an exemption in force in relation to this regulation for pilots of aerial work certificate holders. Operators and pilots are advised to review section 10 of CASA EX72/24.

This regulation does not apply to Part 103 operations.

GM 91.110 Carriage of documents for certain flights

The aeronautical information carried should contain data appropriate to the applicable air traffic regulations, rules of the air, flight altitudes, area/route and nature of the operation. Due consideration should be given to carriage of textual and graphic representations of aeronautical data including appropriate information on the following:

- airspace structure
- significant points, navigation aids (navaids) and air traffic services (ATS) routes
- navigation and communication frequencies
- prohibited, restricted and danger areas
- sites of other relevant activities that may present a hazard to the flight
- topographical data, including terrain and obstacle data.

The authorised aeronautical information should be current and in accordance with the Aeronautical Information Regulation and Control (AIRAC) cycle. AIRAC effective dates are shown in the AIP.

This regulation does not apply to Part 103 operations.

GM 91.115 Carriage of documents—flights that begin or end outside Australian territory

For flights outside Australia where electronic documents are used to satisfy the Australian carriage of document requirements, it should be noted that electronic copies of the required documents might not satisfy the laws of the relevant foreign country.

This regulation does not apply to Part 103 operations.

GM 91.120 Journey logs—flights that begin or end outside Australian territory

The journey log requirements are contained in Chapter 5 of the Part 91 MOS.

3.4 Division 91.C.4—Reporting and recording defects and incidents etc.

Reserved.

3.5 Division 91.C.5—Search and rescue services and emergency and survival equipment

Reserved.

3.6 Division 91.C.6—Miscellaneous requirements for aircraft

GM 91.140 Operating an Australian aircraft outside Australia

An Australian aircraft flown over the high seas must comply with both Part 91 and Annex 2 to the Chicago Convention, Rules of the Air. Where there is inconsistency, the PIC must comply with the requirements of Annex 2.

Article 86 of the United Nations Convention on the Law of the Sea (Montego Bay, 10 December 1982) defines the term ‘high seas’ as all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State. Territorial waters generally extend 12 nautical miles (NM) from the low water line except for some islands in the Torres Strait. Around those islands, territorial waters extend for 3 NM.

Where the entrance to coastal bays exceeds 24 NM in width, a low water line is created between two points in the bay. Internal waters are those inside this low water line.

Refer to the Geoscience Australia website for more information.

Differences between Part 91 and ICAO Annex 2

The Part 91 rules are compliant with most ICAO Annex 2 standards, with the differences being reported by Australia to ICAO via the Electronic Filing of Differences (EFOD) process and also identified in a document that is part of the Australian AIP suite. The AIP suite can be accessed on the Airservices Australia website. The Australian ICAO differences can be accessed via a link labelled "Differences from ICAO Standards, Recommended Practices and Procedures".

For a flight conducted over the high seas, the following list outlines when following a Part 91 rule would be incompatible with an Annex 2 standard (the list reflects the order of the provisions in Annex 2):

- Formation flights. Annex 2 standard 3.1.8 specifies a maximum separation between the flight lead and all other formation aircraft of 0.5 NM laterally/longitudinally and 100 ft vertically during formation flights. Part 91 has no such limits. See GM 91.205 for information about the kinds of formations and their spacing used in Australia.
- Submitting a flight plan during flight. Annex 2 standard 3.3.2 specifies that flight plan submission related to flight in controlled airspace must be done early enough to reach the relevant ATS unit 10 minutes before the aircraft's entry into controlled airspace. Part 91 (as devolved to the AIP by the Part 91 MOS) has no mandated limit (AIP just advises of potential delays with submissions inside a 30 minute timeframe).
- Arrival reports. Annex 2 standard 3.3.5.5 requires arrival reports to include the departure aerodrome and originally planned destination aerodrome if the arrival aerodrome is different to the planned destination due to a diversion. The Part 91 (as devolved to the AIP report content by the Part 91 MOS) rules assume that the ATS agency is aware of departure and diversion details and therefore the SARWATCH phrases only require mentioning the arrival aerodrome.
- Changeover point. Some foreign States promulgate navigation aid changeover points on their enroute charts. Annex 2 standard 3.6.2.1.2 requires that where VOR changeover points are promulgated, the pilot must changeover their primary navigation guidance ahead of, or as operationally close as possible to, the changeover point. Part 91 has no rules in relation to changeover points since Australia does not promulgate them.
- Communication failure. Annex 2 standard 3.6.5.2.2 requires IFR flights that are in controlled airspace to maintain heading and altitude for 20 minutes (non-radar airspace) or level and altitude for 7 minutes (radar airspace). Part 91 has lower time requirements (see paragraph 11.10(2)(b) of the Part 91 MOS).
- Cancelling IFR to proceed VFR. Annex 2 standard 5.1.3.2 requires an aircraft to not cancel its IFR status unless it is anticipated, and intended, that the flight will be continued for a reasonable period of time in uninterrupted VMC. Part 91 does not contain any such restriction, leaving it up to the PIC to determine whether it is safe to proceed VFR.
- Urgency signals. Annex 2 Appendix 1 section 1.2 provides additional methods of indicating different levels of urgency compared to Australian rules. ICAO provides for the use of landing or navigation lights and the radiotelegraphy "XXX" group in addition to PAN calls and messages, whereas Australia only uses the PAN call / message.

GM 91.145 Requirements to be met before Australian aircraft may fly

This regulation does not apply to Part 103 operations.

A registered aircraft is an aircraft registered under Part 47.

A special flight permit may be issued under regulation 21.200. It may be issued for one or more of the following purposes for an aircraft that may not, at the time, meet the applicable airworthiness requirements:

- flying the aircraft to a base where repairs, alterations, or maintenance are to be performed, or to a point of storage
- delivering or exporting the aircraft
- production flight testing of new production aircraft
- evacuating the aircraft from areas of impending danger
- conducting customer demonstration flights in new production aircraft that have satisfactorily completed production flight tests
- assisting in searching for, bringing aid to or rescuing persons in danger on a particular occasion
- assisting in dealing with a state of emergency
- operation of an aircraft at a weight in excess of its maximum certificated take-off weight for flight beyond the normal range over water, or over land areas where adequate landing facilities or appropriate fuel is not available. The excess weight that may be authorised under this paragraph is limited to the additional fuel, fuel-carrying facilities, and navigation equipment necessary for the flight.

GM 91.150 Operating aircraft with inoperative equipment—placarding

Reserved.

GM 91.155 Manipulating flight controls

Regulation 91.155 makes it an offence for a person to manipulate, or the PIC to permit, a person to manipulate the flight controls of an Australian aircraft, a foreign registered aircraft, a Part 103 aircraft or a Part 131 aircraft, if the person is not authorised to pilot the aircraft by the relevant legislation for piloting the aircraft.

With respect to Australian aircraft, regulation 91.155 has direct relevance to the requirements outlined in subsection 20AB (1) of the Act, and also to requirements under Part 61 of CASR regarding who can ‘pilot’ an aircraft.

> **20AB Flying aircraft without licence etc.**
>
> (1) A person must not perform any duty that is essential to the operation of an Australian aircraft during flight time unless:
>
> (a) the person holds a civil aviation authorisation that is in force and authorises the person to perform that duty; or
>
> (b) the person is authorised by or under the regulations to perform that duty without the civil aviation authorisation concerned.

There are multiple specifically referenced circumstances in Part 61 where paragraph 20AB(1)(b) of the Act applies rather than paragraph 20AB(1)(a). These are outlined in Subdivision 61.A.3.2 *Other circumstance in which flight crew duties may be performed without a licence, rating or endorsement*.

Although the primary purpose of this subdivision is to allow for training, testing and checks of persons in an Australian aircraft before they hold the requisite Part 61 licence, rating or endorsement for the

aircraft or the activity to be undertaken in the aircraft, there is an additional purpose contained in regulation 61.130.

Regulation 61.130 *Operation of a helicopter using the auto flight control system without a licence* permits a person, such as an air crew member, to pilot a helicopter using an auto flight control system, in the circumstances where the person is approved to do so by the operator and the PIC Auto flight control system (AFCS) is defined in Part 1 of the CASR Dictionary.

The circumstances where the requirements of regulation 61.130 would be required to avoid the offence under regulation 91.155 are:

- a situation where an air crew member controls the helicopter using the auto-hover trim control during auto-hover winching operations

  or

- where an air crew member enters data or changes modes of the AFCS under the supervision of the PIC whilst occupying a flight crew station as part of the minimum crew of the helicopter.

Note: Such operations can only be carried out by appropriately trained and competent air crew members with the approval of the operator and the PIC. Additionally, for the purposes of Parts 133 and 138, they would need to be conducted in accordance with the procedures for these operations outlined in the operator's exposition or operations manual.

3.7 Division 91.C.7—Firearms on aircraft

GM 91.160 Possessing firearm on aircraft

The *Aviation Transport Security Act 2004* prescribes that firearms can only be carried by certain people on *prescribed aircraft*.

A *prescribed aircraft* is:

- a regular public transport operation
- an air service in which a jet is used
- an air service in which an aircraft with a certified maximum take-off weight (MTOW) greater than 5 700 kg is used.

Note: While the phrase 'regular public transport' is not part of CASR, it is used in the Aviation Transport Security Regulations to refer to a certain type of operation. Refer to the *Aviation Transport Security Regulations 2005* for detail on the phrase.

The *Aviation Transport Security Act 2004* and associated regulations prescribe requirements for carriage of firearms on prescribed aircraft, including people that are permitted to do so.

Part 91 prescribes requirements for carriage of firearms on an aircraft that is not a prescribed aircraft. CASA approval is not required to carry or possess a firearm on an aircraft that is not a prescribed aircraft. However, before doing so, a person must have the permission of the operator or the PIC.

A non-prescribed aircraft is one used in Part 91 operations, or propeller-powered aeroplanes, or rotorcraft, with an MTOW less than or equal to 5 700 kg used in non-scheduled air transport operations.

When providing permission for passengers to carry or possess firearms on board an aircraft, the PIC should consider the following:

- the person's appropriate current Federal, State or Territory licence to possess the firearm
- the person should not perform any duty as a flight crew member while having a firearm in their possession
- the firearm should be unloaded at all times, unless discharge of the firearm is permitted by Part 138
- only the following types of firearms should be taken on the aircraft:
  - shotguns
  - semi-automatic shotguns
  - net guns
  - anaesthetising guns
  - rifles
  - semi-automatic rifles
  - handguns
  - other types of guns in secured cases.
- the PIC of the aircraft should not handle the firearm at any time during the flight
- applicable state and territory laws.

Note: Regulation 138.432 prescribes requirements for possessing and discharging firearms for aerial work operations.

Ammunition is classified as dangerous goods. The carriage of ammunition on board an aircraft conducting a Part 91 operation must therefore be in accordance with the requirements of regulation 92.175. The carriage of ammunition on board an aircraft conducting commercial operations (including Part 138 operations) must be in accordance with Subparts 92.B and 92.C.

GM 91.165 Discharging firearm on aircraft

The discharge of firearms on an aircraft is not permitted during Part 91 operations.

It may be permitted under certain circumstances during aerial work operations. Refer to regulation 138.432.

3.8 Division 91.C.8—Portable electronic devices

PIC and operators are advised that there is a non-legislative instrument (Instrument Number CASA 152/12) in force that determines certain personal electronic devices to not be aircraft components for CAR.

GM 91.170 Operation of portable electronic devices

There is a Part 11 direction in force in relation to the use of Electronic Flight Bags (EFB) by Australian air transport operators. It is recommended that operators review section 5 of CASA EX68/24. The approval mentioned in the direction is taken to be a significant change due to it activating paragraph 119.020(c). Operators are to apply for this approval by applying for a significant change via the Air Operator's Certificate / Associated Approvals form available on CASA's website.

Air transport operators should refer to regulations 121.350, 133.280 or 135.315, as applicable, for requirements relating to portable electronic devices in air transport operations.

Holders of AOCs authorising Part 137 aerial application operations should note that they must comply with the EFB requirements in section 11 and Appendix 9 of CAO 82.0.

A portable electronic device (PED) is any lightweight, electrically powered equipment. These devices are typically consumer electronic devices capable of communication, data processing and/or utility. Examples range from tablets, e-readers, and smart phones to electronic games. A portable electronic device might be transmitting or non-transmitting.

Many PEDs are not completely disconnected from the internal power source when switched off. The switching function may leave some remaining functionality, e.g., data storage, timer, clock, etc. These devices can be considered switched off when in the deactivated state. The same applies for devices having no transmitting capability and without further deactivation capability, e.g., wrist watches.

The PIC, when giving permission for the operation of a PED, should consider any limitation that may apply in the aircraft flight manual, supplementary aircraft manufacturer data or operational experience with the type of PED in question.

Considerations should include hazards associated with:

- PED in different aircraft zones
- PEDs used during various phases of flight
- PEDs used during turbulence
- improperly stowed PED
- impeded or slowed evacuations
- passenger non-compliance e.g., not deactivating transmitting functions, not switching off PEDs, or not stowing PEDs properly
- disruptive passengers
- battery fire.

The following ACs contain additional information:

- PED and EFB usage by balloon and hot air airship pilots and operators: see section 9 of AC 131-02
- EFB usage by all other pilots and operators: see AC 91-17
- cabin EFB usage: see AC 91-07.

GM 91.175 Operation of portable electronic devices by crew members

There is a Part 11 direction in force in relation to the use of Electronic Flight Bags (EFB) by Australian air transport operators. It is recommended that operators review section 5 of CASA EX67/24. The approval mentioned in the direction is taken to be a significant change due to it activating paragraph 119.020(c). Operators are to apply for this approval by applying for a significant change via the Air Operator's Certificate / Associated Approvals form available on CASA's website.

See GM 91.170 for guidance on PEDs.

3.9 Division 91.C.9—Special flight operations

GM 91.180 Air displays in Australian territory

There is an exemption in force in relation to multiple regulations within Part 91 and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24.

There is an exemption in force in relation to this regulation and air displays (see CASA EX07/24). The purpose of this instrument is to enable pilots of aircraft who do not hold a low-level rating, an aerial application rating or an aerobatics (unlimited) flight activity endorsement to conduct low-level operations at an approved air display, or during a practice flight solely for an actual, or anticipated, air display.

Air display is a defined term in the CASR Dictionary. A key phrase in this definition is the term *public gathering* which is also legally defined. These definitions state:

> ***air display*** means organised flying performed before a public gathering, including the following:
> (a) a contest;
> (b) an exhibition of aerobatic manoeuvres;
> (c) flying in formation;
> (d) other aircraft operations associated with the air display.

> ***public gathering*** means an assembly of people at a place on the basis of a general public invitation to attend at that place, whether or not a charge is made for attendance.

The intent of this regulation is to ensure that air displays are only conducted with the approval of CASA. The air display event organiser, i.e. the person "conducting" the air display, is the person required to obtain and hold the approval.

This regulation requires an air display event organiser to hold an approval. Individual participants in the air display do not need to hold an approval under 91.180 (but if they are conducting aerobatics at the air display then an approval is required by regulation 91.185).

However, operators and pilots in command of aircraft participating in the air display are required to ensure that a CASA approval has been given for the air display event as a whole.

For further guidance refer to:

- AC 91-21 - Air Displays
- Air display approval (OPS.25) protocol suite.

Apply for approval to conduct an air display through the myCASA portal.

GM 91.185 Conducting aerobatic manoeuvres

This regulation is dependent on the legal definition of *aerobatic manoeuvres* in the CASR Dictionary. That definition states:

> ***aerobatic manoeuvres***, for an aircraft, means manoeuvres of the aircraft that involve:
> (a) bank angles that are greater than 60°; or
> (b) pitch angles that are greater than 45°, or are otherwise abnormal to the aircraft type; or
> (c) abrupt changes of speed, direction, angle of bank or angle of pitch.

This regulation is also dependent on the legal definitions of *air display* and *public gathering* which are also in the CASR Dictionary. See GM 91.180 for a copy of these definitions.

This regulation does not necessarily require aerobatic training events to obtain an approval. To require an approval, the aerobatic training would need to be taking place over a populous area, or at night, or as part of an air display. As the definition of air display is dependent on the definition of public gathering, some aerobatic training flights, if they were occurring at a trade day of an airshow before the public days, may require approval since the trade day would still be a public gathering.

GM 91.190 Dropping things from aircraft

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24. There is an exemption in force in relation to this regulation and certain sports aviation flights (see CASA EX42/21).

This regulation does not apply if regulation 105.090, 105.095 or 138.425 applies to an operation.

This regulation does not apply to Part 103 or Part 131 operations.

GM 91.195 Picking up or setting down people or things during flight

There is an exemption in force in relation to this regulation for a Part 133 operation that is a medical transport operation. Operators are advised to review section 18 of CASA EX70/24.

A person or a thing must not be picked up or set down during a flight unless the PIC holds an approval or is permitted to do so by the requirements for external load operations as prescribed by the following CASR Parts:

- Part 133 (Australian air transport operations—rotorcraft)
- Part 138 (Aerial work operations).

Regulation 133.295, and its subordinate requirements within Division 1 of Chapter 5 of the Part 133 Manual of Standards (MOS), constitute *another provision of these Regulations* for the purposes of paragraph 91.195 (2) (b), which effectively means that a PIC of an aircraft for a flight that is a Part 133 medical transport operation does not need to hold the approval under regulation 91.045 mentioned in paragraph 91.195 (2) (a) to pick up or set down a person or a thing during the medical transport operation. Also see GM 133.295 in the Part 133 AMC and GM document.

GM 91.200 Persons not to be carried in certain parts of aircraft

There is an exemption in force in relation to this regulation for a Part 133 operation that is a medical transport operation. Operators are advised to review section 19 of CASA EX70/24.

Regulation 138.410 provides that the Part 138 Manual of Standards (MOS) may prescribe additional requirements relating to flights of aircraft involving external load operations.

GM 91.205 Flying in formation

An exception to this regulation for gliders is contained in Chapter 6 of the Part 91 MOS.

Australian licensing requirements

For the requirements of a formation flying activity endorsement, see regulation 61.380.

What is flying in formation?

An aircraft is flown in formation any time two or more aircraft are flown in close proximity to each other, and they operate as a single aircraft with regard to navigation, position reporting and control.

In addition, an aircraft is considered to be in formation during the period they are manoeuvring to achieve separation from each other in order to effect individual control and during join up or break away.

For determining close proximity to each other, attention should be paid to the type of aircraft in the formation and the speed of those aircraft.

Air traffic service formation categories

ATS categorises the different types of formation as follows:

- Close formation. When aircraft are in close formation, they are considered to be one aircraft.
- Standard formation. When aircraft are in standard formation, they may be manoeuvred up to 1 NM either side of co-altitude with an up to 1 NM behind, the lead aircraft.
- Block formation. When aircraft are in block formation they may operate anywhere within a prearranged airspace block.
- In-trail formation. When aircraft are in an in-trail formation, individual aircraft use aircraft radar and/or air-to-air TACAN to maintain contact and spacing with the aircraft ahead.

To enable the proper provision of air traffic services, formation leaders should specify the formation type on first contact with departure control or approach control, or, when inbound, with the first air traffic control element associated with a specific aerodrome if this is not approach control.

Further information on how Airservices Australia manages formation flights is available in the Australian Manual of Air Traffic Services (MATS).

Formation in IMC or at night

This regulation allows a pilot to gain approval, under regulation 91.045, to conduct formation in instrument meteorological conditions (IMC) or at night.

Like other regulation 91.045 approvals, the requirements of regulation 11.055 must be met. CASA may grant the authorisation only if it will preserve a level of aviation safety that is at least acceptable. AC 11-04 explains what level of safety CASA considers to be acceptable in different circumstances and generically outlines the necessity for an applicant to provide a safety case/risk assessment or similar.

Specific for the approval activities under this regulation, CASA advises applicants to provide the following information with their approval application:

- details, if any, of previous approvals from CASA to conduct the activity
- evidence, if any, of training or assessment undertaken in an ICAO Contracting State or in the military
- well-defined processes and procedures that will be followed when conducting the activity
- a risk assessment detailing how the risks associated with the activity will be mitigated, including any human factors considerations surrounding a formation flight in IMC or at night.

GM 91.210 Towing of things by aircraft

This regulation permits a thing to be towed provided that the PIC holds an approval under regulation 91.045 or another provision of the regulations permits the thing to be towed

The towing of a Part 103 aircraft by a Part 103 aircraft is a Part 103 activity. Refer to Part 103 for requirements relating to the conduct of Part 103 activities. Refer to regulation 103.130 for requirements related to towing of a Part 103 aircraft by an aircraft that is not a Part 103 aircraft.

The Part 138 MOS provides that a towing operation conducted in accordance with a 91.045 approval is not an aerial work external load operation for the purposes of Part 138.

It should be noted that such Part 91 approvals will only be issued for the conduct of an isolated and infrequent event, as the general policy intent is that a person intending to conduct enduring towing operations will need to comply with Part 138.

Refer to Part 138 for requirements relating to the conduct of an external load operation. An external load operation means carrying or towing a load outside an aircraft in flight and includes training for such an operation. An example of an external load operation is a banner towing operation by an aeroplane.

4 Subpart 91.D—Operational procedures

4.1 Division 91.D.1—Operational control

GM 91.215 Authority and responsibilities of pilot in command

Although not required by the regulation, the PIC will normally have to assume responsibilities before the flight begins and until after the flight ends to ensure the safety of the flight. This would normally be from the time that the PIC assumes responsibility for the aircraft and the passengers prior to a flight and is until the passengers are deplaned and escorted out of the operational area of the aerodrome or operating site and the PIC relinquishes responsibility for the aircraft at the end of a flight or series of flights.

Readers are advised that CASA has moved operational information relating to volcanic ash into a new AC - see AC 91-33 Flight in airspace with volcanic ash contamination.

Conflict zone risk management

When conducting a flight in geographical areas experiencing armed conflict, pilots will need to access resources and information relating to flights in these areas in order to fulfil their responsibilities to ensure the safe operation of the aircraft and the safety of persons and cargo onboard the aircraft.

CASA has published information relating to flights in conflict zones on our website that provides further links to internationally available information. ICAO Doc 10084 contains guidance for pilots and operators on conflict zone risk management.

GM 91.220 Actions and directions by operator or pilot in command

Reserved.

GM 91.225 Crew members—power of arrest

From subsection 3(1) of the Crimes Act 1914, constable means a member or special member of the Australian Federal Police, or a member of the police force or police service of a State or Territory.

From section 3ZC of the *Crimes Act 1914,* a person must not, in the course of arresting another person for an offence, use more force, or subject the other person to greater indignity, than is necessary and is reasonable to make the arrest or to prevent the escape of the other person after the arrest.

From section 3ZD of the *Crimes Act 1914,* a person who arrests another person for an offence must inform the person, at the time of the arrest, of the offence for which they are being arrested. It is sufficient if the person is informed of the substance of the offence, and it is not necessary that this be done in language of a precise or technical nature.

However, the informing of the offence is not necessary if the other person should, in the circumstances, know the substance of the offence for which they are being arrested; or the person's actions make it impracticable for the person making the arrest to inform the person of the offence for which they are being arrested.

4.2 Division 91.D.2—Flight preparation

This Division does not apply to Part 131 operations.

GM 91.230 Flight preparation (weather assessments) requirements

The flight preparation (weather assessments) requirements are contained in Chapter 7 of the Part 91 MOS.

Educational information for each type of authorised weather forecast and authorised weather report is available from the knowledge centre on the Bureau of Meteorology website. Other information available from the knowledge centre include publications on hazardous phenomena, regional hazards and airport hazards.

Authorised weather forecasts and authorised weather reports for Australia are available from the NAIPS Internet Service available through the Airservices Australia website.

Readers are advised that Australia has implemented the ICAO Global Reporting Format in relation to runway surface condition reporting. Refer to Multi-Part AC 91-32 and AC 139-22 Global reporting format – Runway surface condition for more information.

GM 91.235 Flight preparation (alternate aerodromes) requirements

There is an exemption in force in relation to this regulation for Part 121 operators. Operators are advised to review section 16 of CASA EX69/24.

The flight preparation (alternate aerodromes) requirements are contained in Chapter 8 of the Part 91 MOS. Alternate minima are used for flight planning purposes (both pre-flight and in-flight).

Operational requirements for visibility and minimum distances from cloud are prescribed as visual meteorological conditions (VMC) Criteria. Refer to regulation 91.280 for the requirement for the pilot of a visual flight rules (VFR) flight to comply with VMC Criteria.

The components of flight preparation (alternate aerodromes) requirements are:

- relevant weather conditions and relevant instrument approach procedure(s)
- weather requirements
- navigation requirements
- aerodrome lighting requirements
- restrictions
- alternate minima.

Whether a pilot is able to conduct an instrument approach procedure will depend on the following:

- Part 61 authorisations
- aircraft equipment fitment
- availability of published instrument approach procedures
- any restrictions or conditions mentioned in NOTAMs applicable to the flight.

When an alternate aerodrome is nominated for any reason, and navigation to an aerodrome will be achieved using only a Technical Standards Officer (TSO)-129 global navigation satellite system (GNSS), other navigation systems must be available.

An aerodrome must not be nominated as an alternate if it would require nomination of an alternate aerodrome.

International aerodrome alternate minima (section 8.09 of the Part 91 MOS)

Paragraphs 8.09(1)(c), (d) and (e) of the Part 91 MOS use the term *relevant IAP*. This term is defined in section 8.03 of the Part 91 MOS. Of particular importance to this definition is the concept of instrument approach procedures requiring the use of the same radio navigation aid. Radio navigation aid is defined in the CASR Dictionary as follows:

> ***radio navigation aid*** means a standard radio navigation aid of a kind mentioned in section 2.1.1 of Chapter 2 of Volume 1 of Annex 10 to the Chicago Convention.

There is a note following paragraph 8.03(2)(a) of the Part 91 MOS that contains examples of different instrument approach procedures that use the same *radio navigation aid.* This note says:

> **Note:** *Radio navigation aid* is a defined term in the CASR Dictionary. An example of this mandatory constraint is an aerodrome that has the following IAPs to a specific runway (from lowest to highest minimum altitude): an ILS with CAT I and CAT II minima that both require the use of a non-associated DME; a VOR that uses the same DME as the ILS; a GNSS with LNAV minima; and an NDB. The CAT II minima cannot be used and, therefore, cannot be the lowest minimum altitude and VOR could not be considered to have the second lowest minimum altitude as it shares a required radio navigation aid with the ILS (namely, the same DME).

A further example not contained in the note would be as follows:

An RNP-AR approach and a 'normal' RNP approach (the latter being historically labelled in the Australian DAP instrument charts as RNAV (GNSS) approaches) published for Australian aerodromes both rely on the same radio navigation aid, i.e. the United States Global Positioning System (GPS). Therefore, these 2 instrument approach procedures would not be 'independent' from each other. From a publishing perspective they are independent but not from a technical perspective.

Paragraph 8.09(1)(c) of the Part 91 MOS uses the word 'increment'. The word 'increment' is not in any way intended to mean the operationally desirable accuracy of a weather forecast, or what might be colloquially described as a weather forecasting tolerance. The increment to be added to landing minima in section 8.09 of the Part 91 MOS is not the same as a weather forecast tolerance. Instead, it is referring to, only if published and mandated by the State (i.e. a country), a specific increment that is added to landing minima to establish alternate minima (whether alternate minima to be applied at the destination aerodrome to determine that a destination alternate aerodrome must be planned, or alternate minima applied at the destination alternate aerodrome to qualify it for use as a destination alternate aerodrome).

Example

Using Australia's general alternate rules (which do not apply to Part 121 operations) as an example, the 'increment' would be adding 500 ft to the circling altitude and 2000m to the circling visibility.

Relevant weather conditions

The term *relevant weather conditions* is fundamental to the interpretation of the alternate aerodrome rules in Chapter 8 of the Part 91 MOS. Table 1 below summarises the meaning of this term.

Table 9: Relevant weather conditions

	Planning not based on TAF3 or ETA not within first three hours of validity of the TAF3	Planning based on TAF3 and ETA within first three hours of validity of the TAF3 and not after the end time (if any) specified for the TAF3 service
Cloud	more than SCT below the alternate minimum	more than SCT below the alternate minimum
Visibility	either: • less than the alternate minimum; or • equal to or more than the alternate minimum but with a forecast of at least a 30% probability of fog, mist, dust or any other phenomenon restricting visibility below the alternate minimum	less than the alternate minimum (probabilities do not have to be considered)
Wind	a headwind, crosswind or downwind component more than the maximum for the aircraft	a headwind, crosswind or downwind component more than the maximum for the aircraft
Other	a thunderstorm or its associated severe turbulence, or at least a 30% probability of a thunderstorm or its associated severe turbulence	a thunderstorm or its associated severe turbulence (probabilities do not have to be considered)

Alternate aerodromes — weather requirements are summarised in Figure 1: Navigation requirements are summarised in Figure 2: Aerodrome lighting requirements are summarised in Figure 3.

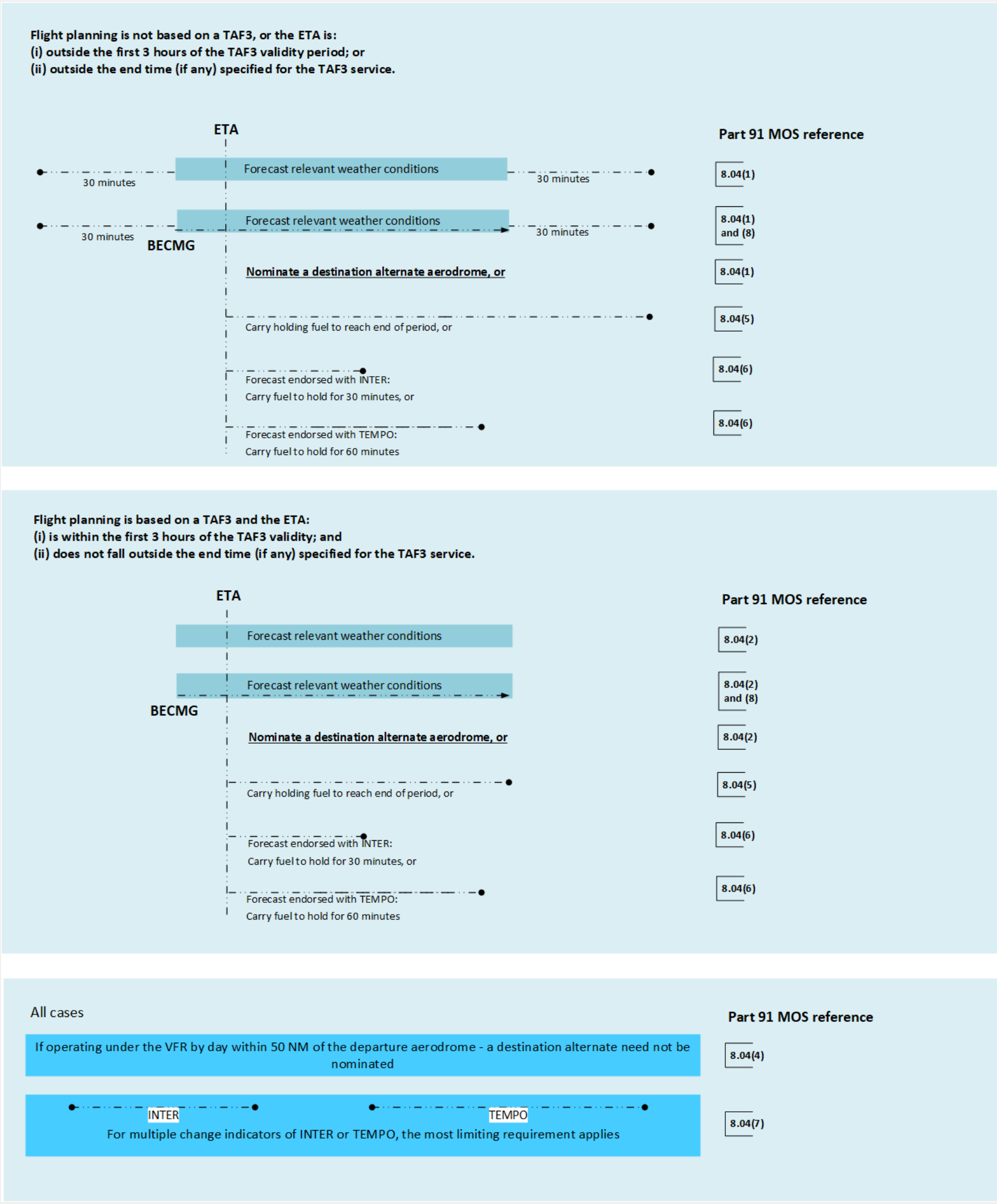


Figure 1: Destination alternate aerodromes — weather

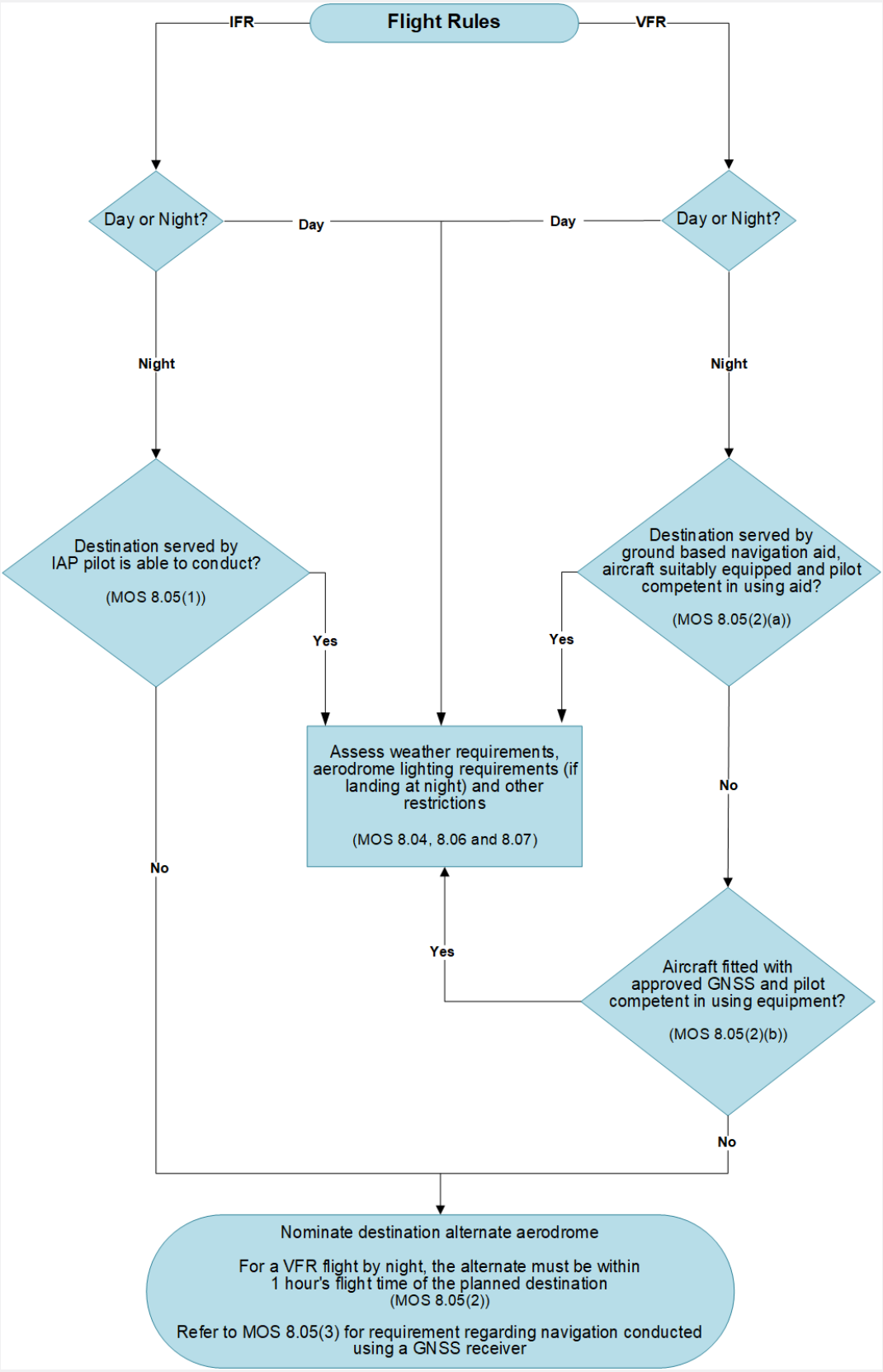
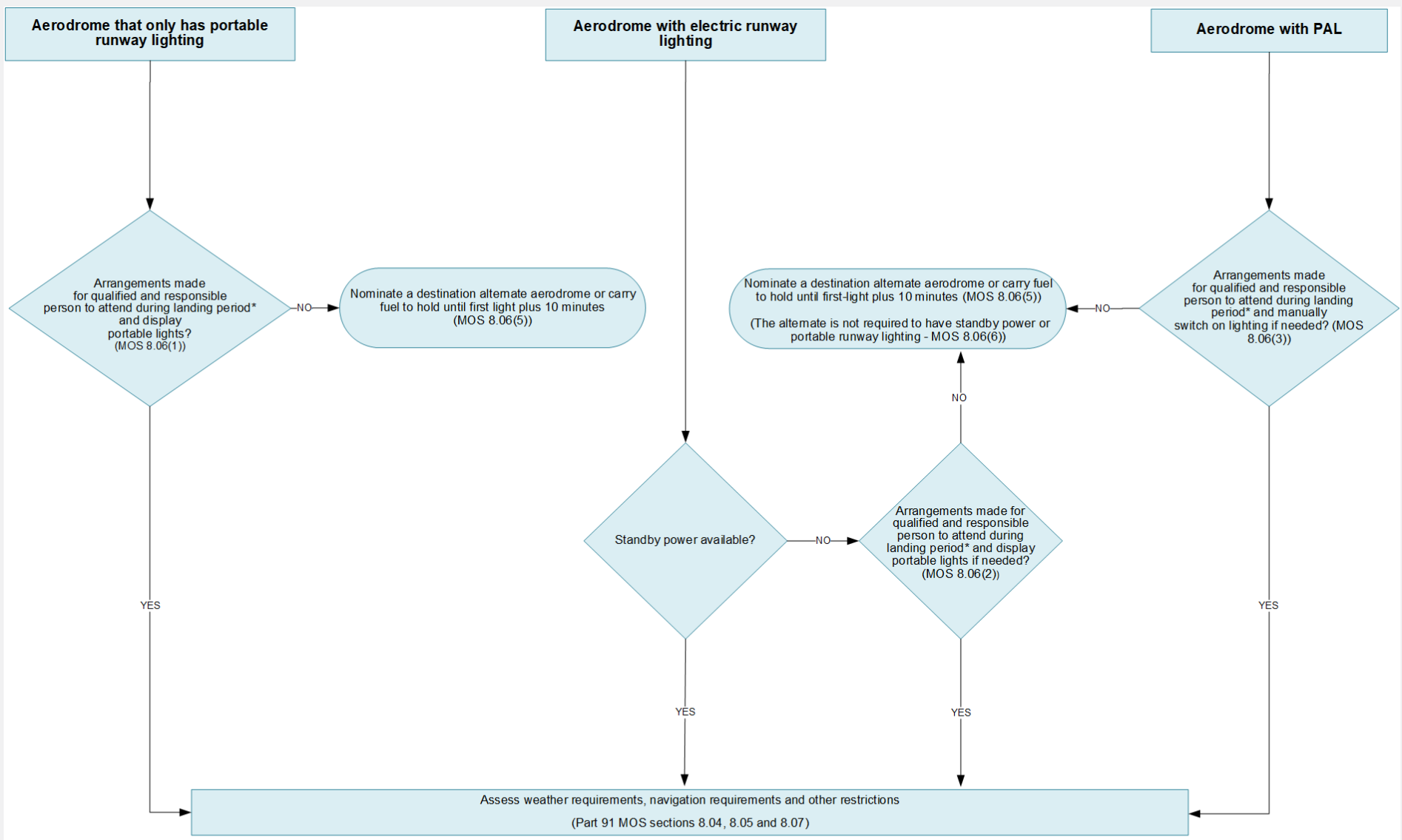


Figure 2: Destination alternate aerodromes — navigation



Note 1*: 'Landing period' means the period from at least 30 minutes before ETA until completion of landing and taxiing.

Note 2: For an aerodrome to be nominated as a destination alternate aerodrome it must:

- be suitable as a planned destination aerodrome
- not require an alternate itself
- not be a helideck.

(MOS 8.07)

Figure 3: Destination alternate aerodromes — aerodrome lighting

4.3 Division 91.D.3—Flight notifications and pre-flight checks

This Division does not apply to Part 131 operations.

GM 91.240 Flight notifications

The flight notification requirements are contained in Chapter 9 of the Part 91 MOS.

Three types of flight notifications are used in Australia: International Civil Aviation Organization (ICAO) format flight plan, SARTIME notification, and flight note. Refer to the AIP for detailed guidance on procedures for submitting a flight notification.

GM 91.245 Matters to be checked before take-off

Chapter 10 of the Part 91 MOS sets out the matters to be checked before commencing a flight but does not distinguish between simple aircraft, complex aircraft, or types of operation. The PIC and operator should identify the requirements that are to be addressed and that are applicable to their operations.

Checks on the safety of routes (MOS paragraph 10.02(a))

The PIC and operator should consider the impact of foreseeable hazards when deciding on the route for a flight. For example, an aircraft depressurization over high terrain that requires an immediate descent, or flight in the vicinity of a conflict zone.

Information on conflict zones is available from CASA's Flying over or in conflict zones webpage which contains links to external agency critical information about current conflict zones.

Information on volcanic ash is available in AC 91-33 Flight in airspace with volcanic ash contamination.

Checks of aircraft equipment (MOS paragraph 10.02(d))

When conducting checks of aircraft equipment, they should be completed in accordance with any criteria or limitations contained in the AFM or, where the AFM has no instruction for other equipment, in the manufacturer's requirements or guidance for that equipment.

Solo flights in aircraft with dual controls (MOS paragraph 10.02(h))

Before a solo flight in an aircraft fitted with dual controls, the PIC should ensure that any additional safety harness and any other articles or equipment which may foul the controls are safely secured. If the second control column is readily detachable and the AFM permits, consideration should be given to its removal.

Incorporation of requirements into checklists - recommendation

Although the regulation does not require the use of a checklist, CASA recommends that the operator develop a flight checklist system that not only captures the relevant requirements of the MOS before take-off, but also the checks that are identified in the AFM for other phases of flight and that include, at least, the approach and landing.

Refer to AC 91-22 – Aircraft checklists for detailed guidance on aircraft checklist systems.

4.4 Division 91.D.4—Flight rules

4.4.1 Subdivision 91.D.4.1—General

GM 91.255 Air traffic services—prescribed requirements

This regulation does not apply to Part 131 operations.

There is a direction in force relating to flight in certain over water danger areas. It is recommended that pilots and operators review CASA 26/21 Direction – Australian Aircraft and Foreign Registered Aircraft in Australian-administered Airspace Instrument 2021.

The detailed requirements relating to this regulation are contained in Chapter 11 of the Part 91 MOS. The MOS covers the following broad topics:

- Transition altitude, transition layer and transition levels
- Availability of GNSS FDE in oceanic airspace
- Loss of GNSS integrity
- Use and supply of distance information
- ACAS resolution advisory
- RVSM airspace
- Flight in the NAT-HLA
- Performance-based communication and surveillance requirements
- Australian domestic airspace — inoperative radio requirements
- Mandatory broadcast area requirements
- Use of controlled aerodromes, control areas and control zones, including inoperative radio requirements for certain oceanic control areas
- Prohibited, restricted and danger areas.

Setting of QNH below transition altitude

Subsection 11.02(5) of the Part 91 MOS requires an aircraft's altimeter setting at and below the transition altitude to be one of the following:

- the current local QNH (either an accurate QNH as defined in section 10.06 or a forecast QNH) of a station along the route within 100 NM of the aircraft

  or

- the current forecast area QNH.

It is recommended that in certain circumstances the current local QNH be set instead of the current forecast area QNH to aid in traffic deconfliction. These circumstances include:

- when departing from an aerodrome
- arriving at an aerodrome
- overflying an aerodrome at relatively low altitudes where radio calls could result in traffic at that aerodrome using your reported altitude for deconfliction purposes.

Ultimately which option to use in each operational circumstance is a matter for PIC noting they are directly responsible for, and the final authority for, the operation of their aircraft.

Readback of air traffic control (ATC) clearances and instructions

The PIC of an aircraft is directly responsible for and is the final authority for the operation of that aircraft. Therefore, the pilot should obtain clarification of any clearance or instruction that is not understood.

Where possible, standard words and phrases should be used in all communication. Where this is not possible, plain English should be used and the correct receipt of the intended message confirmed.

A manoeuvring area is the part of the aerodrome to be used for take-off, landing and taxiing of aircraft, excluding aprons. Manoeuvring area maps for some controlled aerodromes are available from the CASA website.

Pilots are expected to maintain route centre lines during all operations unless instructed or cleared by ATS or under emergency conditions.

VFR climb/descend and VFR on top

VFR climb/descend and VFR on top are instrument flight rules (IFR) procedures.

They provide IFR pilots with a way of departing an aerodrome into *Class E airspace* when an IFR clearance might be unavailable because of traffic or other ATC demands.

IFR pick-up

IFR pick-up provides the same option for the pilot of an IFR flight departing an aerodrome in *non-controlled airspace*. The flight will begin as a VFR flight and will change flight rules to become an IFR flight when an airways clearance is available.

Table 10 provides a comparison of the operations.

Table 10: VFR Climb/Descend/on top and IFR pick-up comparison

	VFR Climb/Descend VFR on top	IFR Pick-up
Flight rules	IFR	VFR
VMC requirements	Must meet	Must meet
Cruising level	VFR levels	VFR levels
Traffic separation and obstacle clearance	Pilot responsibility	Pilot responsibility
Reporting requirements	IFR reporting requirements	VFR reporting requirements
Clearance required to change flight rules from VFR to IFR	Not applicable	Yes
Clearance required to change levels in Class E airspace?	No	No

Reduced vertical separation minimum (RVSM)

The global separation standards require 2 000 ft vertical separation between aircraft. In RVSM airspace, the vertical separation requirements are reduced to 1 000 ft.

ICAO provides that RVSM can be applied, under specified conditions, within designated portions of airspace based on regional air navigation agreements.

In Australian airspace (at and north of 80° south), between FL290 and FL410 (inclusive) is designated as RVSM airspace. RVSM is not applied in Australian airspace south of 80° south.

GM 91.257 Air traffic control clearances and instructions

Reserved.

GM 91.260 Unauthorised entry into prohibited or restricted areas

Conditions relating to the declaration of a restricted area are shown in the AIP or notice to airmen (NOTAM) for an area. Refer to Section 13 of the Designated Airspace Handbook or NOTAMs. Conditions are also stated on aeronautical charts.

Prohibited and restricted areas, if declared for three (3) months or longer, are published in the AIP. For shorter periods, they are published in a NOTAM.

GM 91.263 Air defence identification zone flights

An Air Defence Identification Zone (ADIZ) is airspace of defined dimensions within which identification of all aircraft is required. Special requirements may be published relative to a particular ADIZ.

GM 91.265 Minimum height rules—populous areas and public gatherings

There is an exemption in force in relation to this regulation and the conduct of Part 173 validation flights by a CASA pilot. See section 24 of CASA EX67/24.

This regulation does not apply to Part 131 operations.

The take-off and landing circumstances for paragraph 91.265(4)(a) are include in section 12.01 of the Part 91 MOS.

This regulation relies on the definitions of the terms ‘populous area’ and ‘public gathering’. The CASR Dictionary defines these terms as follows:

> ***populous area*** includes a city and a town.

> ***public gathering*** means an assembly of people at a place on the basis of a general public invitation to attend at that place, whether or not a charge is made for attendance.

The term ‘populous area’ includes cities and towns, but also means areas other than cities or towns that are taken to be populous.

The Macquarie Dictionary defines “city’, ‘town’, ‘populous’ and ‘area’ as follows:

> *city*
>
> *1.*
>
> *a. a large or important town; a town so nominated.*
>
> *b. an area within a large and extended city which has been nominated as a city even though it is essentially suburban as the City of Parramatta within Greater Sydney or the City of Nunawading within Greater Melbourne.*
>
> *2. an urban area the extent of which is subject at all times to redefinition but which*

a. (in the cases of Adelaide, Melbourne, Sydney and Perth between 1839 and 1842) was originally so nominated by royal charter.

b. in NSW, SA, Tasmania (by special Act), and WA, was originally so nominated by a Colonial or subsequently a State Government on the basis of its population, its annual revenue, the presence of a cathedral, etc.

town

*1. a small group of houses and other buildings thought of as a place, and given a name: *the word `town' is employed with generosity in Australia –WA WINTER-IRVING, 1977.*

2. a distinct densely populated area of considerable size, having some degree of self-government.

populous

adjective full of people or inhabitants, as a region; well populated.

area

noun 1. any particular extent of surface; region; tract: *the settled area*.

A populous area is anywhere people are living or gathered for a purpose. If your aircraft were to malfunction, or an operational error was made that led to a forced landing or crash, and it could pose a risk to the life, safety or property of a person in the area, it is likely the area would be a populous area. Examples of this include a beach with persons on it, a busy road, a sporting event, a gold course, a concert or a wedding.

GM 91.267 Minimum height rules—other areas

This regulation does not apply to Part 103 or Part 131 operations. This regulation depends on the definitions of the terms *populous area* and *public gathering*. See GM 91.265 for more information on these defined terms.

To fly an aircraft over an area other than a populous area or public gathering, below 500 ft above obstacles within a 300 m radius immediately below the aircraft, the flight must fit into **at least one** of the circumstances mentioned in subregulation 91.267(3).

There are 2 exemptions in force in relation to this regulation:

- Section 24 of CASA EX67/24 regarding the conduct of Part 173 validation flights by a CASA pilot.
- EX07/24 which, in relation to this regulation, permits pilots with an unlimited aerobatics flight activity endorsement to conduct practice aerobatic manoeuvres below 500 ft.

The following key points are relevant to this regulation:

- The take-off and landing circumstances for paragraph 91.267(3)(a) are included in section 12.01 of the Part 91 MOS.
- Paragraph 91.267(3)(k) facilitates the ability to fly below 500 ft for practising and actually conducting an aerodrome reconnaissance before landing. For more information on this procedure, refer to Chapter 11 (Precautionary search and inspection procedure) of AC 91-02.

Approval under paragraph 91.267(3)(h)(i)

This approval is directly related to activities permitted under exemption CASA EX07/24. That exemption allows pilots who do not hold a low-level rating, aerial application rating or unlimited aerobatic flight activity endorsement, to fly below 500 ft AGL (i.e. conduct what Part 61 defines as a *low-level operation*) during an air display or when practising for an air display.

If a pilot is conducting an air display, then the combination of the exemption EX07/24 and paragraph 91.267(3)(g) allows the pilot to fly below 500 ft above obstacles within a radius of 300 m immediately below the aircraft. The pilot's lack of a formal Part 61 competency to fly below 500 ft is risk controlled by the air display procedures and plans.

However, when using this exemption to practice for a known or anticipated air display, a pilot would contravene regulation 91.267 if they flew below 500 ft above obstacles within a 300 m radius immediately below the aircraft without holding the approval mentioned in subparagraph 91.267(3)(h)(i). In relation to this approval:

- a pilot must apply for this approval using the Part 91 general approvals application form
- if the approval is granted, the risks associated with such a pilot flying below 500 ft will be controlled through the conditions placed on the approval
- pilots are advised that under almost all circumstances:
  - where a pilot lacks formal training and competency recognition in low flying skills, any regulation 91.045 approval for subparagraph 91.267(3)(h)(i) is likely to be limited to absolutely no lower than 200 ft AGL and also have angle of bank limits imposed, with other possible conditions, in order to ensure the aviation safety risk remains at an acceptable level
  - if lower altitudes are desired, any application would need to justify the need for a person lacking formal low-level operations training to conduct such activities and provide a robust training program for such operations.

Pilots should refer to AC 11-04 Approvals under Parts 91, 103, 119, 121, 129, 131, 132, 133, 135, 138 and 149 of CASR (including MOS) for general information about flight operations approvals.

GM 91.270 Aircraft to be flown under VFR or IFR

Part 103 aircraft must be flown under the VFR by day.

Part 131 aircraft must be flown under the VFR.

Other aircraft must be flown under either the VFR or the IFR.

4.4.2 Subdivision 91.D.4.2—Visual flight rules

This subdivision does not apply to Part 131 operations.

This subdivision sets the rules for operating under the VFR and consists of regulations 91.273, 91.275, 91.277, 91.80, 91.283 and 91.285.

AMC 91.273 VFR flights

Subsection 13.02(4) of the Part 91 MOS specifies certain requirements for an aircraft to be ‘approved under a particular navigation specification’.

As an acceptable means of compliance, AMC 1 and AMC 2 within AMC 91.287 also apply to the acceptable interpretations of the requirement mentioned above.

GM 91.273 VFR flights

The MOS content for this regulation is contained in Chapter 13 of the Part 91 MOS.

This regulation sets the underlying navigation rules when operating under the VFR.

As outlined in regulation 91.280, a flight conducted under the VFR must normally comply with the VMC criteria except in certain circumstances listed in regulation 91.280. The VMC criteria are listed in section 2.07 of the Part 91 MOS).

PICs are reminded that the VMC criteria require operating in sight of the ground or water below certain altitudes (refer to section 2.07 of the Part 91 MOS).

If pilots elect to not navigate by reference to ground or water, they can navigate using any IFR method provided they comply with the requirements of Chapter 14 of the Part 91 MOS (the IFR requirements), the aircraft is fitted with any equipment required to comply with those requirements, and they are adequately trained and competent in the use of that equipment and the necessary operating techniques.

Refer to AMC 91.287 regarding CASA's acceptable means of compliance for older aircraft that do not specifically identify specific navigation specifications in the AFM, i.e., the AFM does not specifically state the RNAV or RNP certification of the aircraft.

GM 91.275 Specified VFR cruising levels

Specified VFR cruising levels are defined in Division 2.5 of the Part 91 MOS.

AMC 91.277 Minimum heights—VFR flights at night

The acceptable means of compliance included in AMC 91.305 in relation to the definition of lowest safe altitude is also acceptable means of compliance for regulation 91.277 in the same context.

GM 91.277 Minimum heights—VFR flights at night

Refer to GM 91.305 for guidance on lowest safe altitudes.

The MOS content mentioned in paragraph 91.277(2)(e) is not currently being used. A placeholder for any future content is contained in section 12.03 of the Part 91 MOS. Adding any new content would be subject to the consultation rules contained in Subpart 11.J.

GM 91.280 VFR flights—compliance with VMC criteria

VMC criteria are defined in Division 2.4 of the Part 91 MOS.

VMC criteria are defined for Class A airspace however approval is required to operate an aircraft under the VFR in Class A. Refer to regulation 91.285.

When it becomes evident that flight in VMC will not be practicable, the pilot of a VFR flight operating in controlled airspace should do the following:

- request an amended clearance enabling the flight to continue in VMC or to leave the controlled airspace
- if operating within a control zone by day, request clearance to operate as a special VFR flight

  or
- request clearance to operate in accordance with the instrument flight rules.

Clearance to operate under the special VFR is only available for operation in a control zone. Pilots wishing to operate under the special VFR should request clearance when in the control zone, or in a control area next to a control zone prior to entry into the zone. The ATC unit responsible for the control zone can issue a clearance to operate under the special VFR if an IFR flight will not be unduly delayed.

Pilots of VFR aircraft should be aware that clearance to operate under the special VFR will not always be available. They should consider alternate plans if weather conditions for departure from, or arrival at, a control zone are marginal.

GM 91.283 VFR flights—aircraft not to exceed certain speeds

Reserved.

GM 91.285 VFR flights—flights in class A airspace

Under the ICAO airspace classification, class A airspace is designed for the traffic management of IFR aircraft only. However, there are occasions when a VFR aircraft may need or wish to operate in class A airspace; therefore, the regulation allows for an approval in limited or certain circumstances.

Pilots and operators should be aware that it is unlikely for an approval to be granted for VFR flight in RVSM airspace (generally promulgated above FL290) due to the lower vertical separation standards that apply in that airspace. This is in accordance with ICAO Annex 2 standards.

4.4.3 Subdivision 91.D.4.3—Instrument flight rules

This subdivision does not apply to Part 131 operations.

AMC 91.287 IFR flights

Introduction

Subsection 14.01(2) of the Part 91 MOS specifies certain requirements for an aircraft to be 'approved under a particular navigation specification'. *Navigation specification* is a defined term in the Part 91 MOS. That definition states:

> *navigation specification* means a set of aircraft and aircrew requirements needed to support PBN operations within a defined airspace, being either:
>
> – RNAV specification which is a navigation specification based on area navigation that does not include the requirement for on-board performance monitoring and alerting, and is designated by the prefix RNAV, for example, RNAV 5, RNAV 1;
>
> or
>
> – RNP specification which is a navigation specification based on area navigation that includes the requirement for on-board performance monitoring and alerting, and is designated by the prefix RNP, for example, RNP 2, RNP APCH.

The AFMs of older aircraft may not specifically state the navigation capabilities of the aircraft using RNAV or RNP terminology. For example, the AFM may not state that the aircraft is certified to 'RNP 2'.

AMC 1

As an acceptable means of compliance, for the purpose of subsection 14.01(2) (and subsection 13.02(4)) of the Part 91 MOS, a particular older terminology mentioned in a row of column 1 of Table 3 below is taken to be a reference to the navigation specification mentioned in column 2 of the same row of Table 3. For example, a mention of GPS RNAV TERMINAL is taken to be a mention of RNP 1 – whether mentioned in an AFM, or a document approved under Part 21 based on an airworthiness assessment before 2 December 2021, or a document approved in writing by a foreign NAA before 2 December 2021.

Note: Column 3 of Table 11 provides advisory information regarding the kinds of instrument approach minima available for use with the different specifications.

Table 11: PBN navigation specifications

GPS capability (column 1)	Navigation specification (column 2)	Minima available for use (column 3)
GPS RNAV EN ROUTE	RNP 2	-
GPS RNAV TERMINAL	RNP 1	-
GPS RNAV NON-PRECISION APPROACH	RNP APCH	LNAV
Baro-VNAV	RNP APCH	LNAV/VNAV
GPS RNAV LP	RNP APCH	LP
GPS RNAV LPV	RNP APCH	LPV

AMC 2

As an acceptable means of compliance, for the purpose of subsection 14.01(2) (and subsection 13.02(4)) of the Part 91 MOS, the references listed below, which may be found in the AFM or other acceptable documents (see listing below in GM 91.287), are taken to be equivalent to the relevant specific navigation specification below where the correct navigation specification terminology (i.e., RNAV or RNP) is not used.

RNAV 1/RNAV 2

If a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNAV 1/RNAV 2 operations:

- RNAV 1
- PRNAV
- US RNAV type A
- FAA AC 20-138 for the appropriate navigation specification
- FAA AC 90-100A
- JAA TEMPORARY GUIDANCE MATERIAL, LEAFLET NO. 10 Rev1 (TGL 10)
- FAA AC 90-100.

However, if position determination is exclusively computed based on VOR-DME, the aircraft is not eligible for RNAV 1/RNAV 2 operations.

RNAV 5

If a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNAV 5 operations:

- B-RNAV
- RNAV 1
- RNP APCH

- RNP 4
- A-RNP
- AMC 20-4
- JAA TEMPORARY GUIDANCE MATERIAL, LEAFLET NO. 2 (TGL 2)
- JAA AMJ 20X2
- FAA AC 20-130A for en-route operations
- FAA AC 20-138 for en-route operations
- FAA AC 90-96.

RNP 1/RNP 2 continental

If a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNP 1/RNP 2 continental operations:

- A-RNP
- FAA AC 20-138 for the appropriate navigation specification
- FAA AC 90-105.

Alternatively, if a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above and position determination is primarily based on GNSS, the aircraft is eligible for RNP 1/RNP 2 continental operations. However, in these cases, loss of GNSS implies loss of RNP 1/RNP 2 capability:

- JAA TEMPORARY GUIDANCE MATERIAL, LEAFLET NO. 10 (TGL 10) (any revision)
- FAA AC 90-100.

RNP APCH — LNAV minima

If a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNP APCH — LNAV operations:

- A-RNP
- AMC 20-27
- AMC 20-28
- FAA AC 20-138 for the appropriate navigation specification
- FAA AC 90-105 for the appropriate navigation specification.

Alternatively, if a statement of compliance with RNP 0.3 GNSS approaches in accordance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNP APCH — LNAV operations. Any limitation such as ‘within the US National Airspace’ may be ignored since RNP APCH procedures are assumed to meet the same ICAO criteria around the world:

- JAA TEMPORARY GUIDANCE MATERIAL, LEAFLET NO. 3 (TGL 3)
- AMC 20-4
- FAA AC 20-130A
- FAA AC 20-138.

RNP APCH — LNAV/VNAV minima

If a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNP APCH — LNAV/VNAV operation:

- A-RNP
- AMC 20-27 with Baro VNAV
- AMC 20-28
- FAA AC 20-138
- FAA AC 90-105 for the appropriate navigation specification.

Alternatively, if a statement of compliance with FAA AC 20-129 is found in the acceptable documentation as listed above, and the aircraft complies with the requirements and limitations of EASA SIB 2014-041, the aircraft is eligible for RNP APCH — LNAV/VNAV operations. Any limitation such as 'within the US National Airspace' may be ignored since RNP APCH procedures are assumed to meet the same ICAO criteria around the world.

RNP APCH — LPV minima

If a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNP APCH — LPV operations:

- AMC 20-28
- FAA AC 20-138 for the appropriate navigation specification
- FAA AC 90-107.

For aircraft that have a TAWS Class A installed and do not provide Mode-5 protection on an LPV approach, the DH is limited to 250 ft.

RNAV 10

If a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNAV 10 operations:

- RNP 10
- FAA AC 20-138 for the appropriate navigation specification
- AMC 20-12
- FAA Order 8400.12 (or later revision)
- FAA AC 90-105.

RNP 4

If a statement of compliance with any of the following specifications or standards is found in the acceptable documentation as listed above, the aircraft is eligible for RNP 4 operations:

- FAA AC 20-138B or later, for the appropriate navigation specification
- FAA Order 8400.33
- FAA AC 90-105 for the appropriate navigation specification.

RNP 2 oceanic

If a statement of compliance with FAA AC 90-105 for the appropriate navigation specification is found in the acceptable documentation as listed above, the aircraft is eligible for RNP 2 oceanic operations.

If the aircraft has been assessed eligible for RNP 4, the aircraft is eligible for RNP 2 oceanic.

RF in terminal operations (used in RNP 1 and in the initial segment of the RNP APCH)

The RF path terminator (commonly referred to as a RF Leg) provides the functionality for aircraft to fly a curved path with a defined radius when used in association with RNP 1, RNP 0.3, RNP APCH, and A-RNP

specifications. RF Legs are an optional capability for use with RNP 1, RNP 0.3 and RNP APCH but are a minimum requirement for A-RNP.

If a statement of demonstrated capability to perform an RF leg, certified in accordance with any of the following specifications or standards, is found in the acceptable documentation as listed above, the aircraft is eligible for RF in terminal operations (noting that these acceptable documentation alternatives are only needed if the AFM does not specifically state the aircraft is capable of conducting RF legs):

- EASA AMC 20-26
- FAA AC 20-138B or later.

If there is a reference to RF and a reference to compliance with FAA AC 90-105, then the aircraft is eligible for such operations.

Other considerations

In all cases, the limitations in the AFM need to be checked; in particular, the use of AP or FD which can be required to reduce the FTE primarily for RNP APCH, RNAV 1, and RNP 1.

Any limitation such as ‘within the US National Airspace’ may be ignored since RNP APCH procedures are assumed to meet the same ICAO criteria around the world.

AMC 3

As an acceptable means of compliance, for the purpose of subsection 14.01(2) (and subsection 13.02(4)) of the Part 91 MOS, the table below outlines which (E)TSO equipment standards can be used to satisfy different RNAV/RNP navigation specifications.

TSO	RNAV 10 (RNP 10) Oceanic and remote navigation	RNAV 5 En-route and terminal1 navigation	RNAV 2 En-route and terminal1 navigation	RNAV 1 En-route and terminal1 navigation	RNP 4 Oceanic and remote navigation	RNP 2 Oceanic and remote, en-route and terminal1 navigation	RNP 1 En-route and terminal1 navigation	RNP APCH Non-precision approach
TSO-C129	Acceptable[3]	Acceptable[3]	Class A1 or Class B[2] or C[2]	Class A1 or Class B[2] or C[2]	Acceptable[3]	Class A1 or Class B[2] or C[2]	Class A1 or Class B[2] or C[2]	Class A1, B1[2], B3[2], C1[2] and C3[2]
(E)TSO-C129a	Acceptable[3]	Acceptable[3]	Class A1 or Class B[2] or C[2]	Class A1 or Class B[2] or C[2]	Acceptable[3]	Class A1 or Class B[2] or C[2]	Class A1 or Class B[2] or C[2]	Class A1, B1, B3, C1 and C3
(E)TSO-C145	Acceptable[3]	Acceptable[3]	Acceptable[2]	Acceptable[2]	Acceptable[3]	Class 1[2], 2[2] or 3[2]	Class 1[2], 2[2] or 3[2]	LNAV - Classes 1, 2, 3 LNAV/VNAV - Classes 2, 3 LP/LPV - Class 3
(E)TSO-C146	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Class Gamma and Operational Class 1, 2 or 3	Class Gamma and Operational Class 1, 2 or 3	Class Gamma: LNAV - Classes 1, 2, 3 LNAV/VNAV - Classes 2, 3 LP/LPV - Class 3

TSO	RNAV 10 (RNP 10) Oceanic and remote navigation	RNAV 5 En-route and terminal1 navigation	RNAV 2 En-route and terminal1 navigation	RNAV 1 En-route and terminal1 navigation	RNP 4 Oceanic and remote navigation	RNP 2 Oceanic and remote, en-route and terminal1 navigation	RNP 1 En-route and terminal1 navigation	RNP APCH Non-precision approach
(E)TSO-C196	Acceptable[3]	Acceptable[3]	Acceptable[2]	Acceptable[2]	Acceptable[3]	Acceptable[2]	Acceptable[2]	LNAV

Notes:

1. ‘Terminal’ navigation terminology is included to enable operators with equipment classified in that manner to identify its capability.
2. Also requires a (E)TSO-C115b FMS installed IAW with FAA AC 20-138D.
3. Also requires a navigation system meeting the requirements of FAA AC 20-130A or AC-138B (or later version).

GM 91.287 IFR flights

The MOS content for this regulation is contained in Chapter 14 of the Part 91 MOS.

Aircraft eligibility for PBN specifications not requiring specific approval

The navigation performance of the aircraft is usually stated in the AFM. Where such a reference cannot be found in the AFM, other information provided by the aircraft manufacturer as the type certificate (TC) holder, the supplemental type certificate (STC) holder or the design organisation having a privilege to approve minor changes may be considered. The following documents are considered acceptable sources of information:

- AFM, supplements thereto, and documents directly referenced in the AFM
- FCOM or similar document
- Service Bulletin or Service Letter issued by the TC holder or STC holder
- approved design data or data issued in support of a design change approval
- any other formal document issued by the TC or STC holders stating compliance with PBN specifications, AMC, Advisory Circulars (AC) or similar documents issued by the State of Design
- written evidence obtained from the State of Design.

Equipment qualification data alone is not sufficient to assess the PBN capabilities of the aircraft, since the latter depend on installation and integration.

As some PBN equipment and installations may have been certified prior to the publication of the ICAO PBN Manual and the adoption of its terminology for navigation specifications, it is not always possible to find a clear statement of aircraft PBN capability in the AFM. However, aircraft eligibility for certain PBN specifications can rely on the aircraft performance certified for PBN procedures and routes prior to the publication of the PBN Manual.

Precision runway monitor instrument approach operations

For section 14.08 of the Part 91 MOS, training for precision runway monitor (PRM) instrument approach operations should be included in an air transport operator's training and checking system or, for an aerial work operator with a formal training and checking system, in that system.

Training for PRM operations for pilots other than those conducting air transport operations should be conducted by a Part 141 or Part 142 training provider.

Training for PRM operations should include an assessment of the pilot's knowledge to ensure that the pilot understands and can apply PRM approach procedures (including the breakout procedures and phraseology) completely and correctly. An overview of PRM operations and a pilot training presentation is available from the Airservices Australia website.

GNSS substitution and DME/GNSS arrivals and GNSS arrivals - interpretation of sections 14.04 and 14.05 of the Part 91 MOS

A GNSS cannot be used to substitute for the VOR or NDB azimuth signals that are used to laterally navigate an aircraft during a DME/GNSS arrival or GNSS arrival. During these 2 kinds of instrument approaches, a GNSS can only be used to substitute for a DME.

Navigation database - section 14.07 of the Part 91 MOS

A navigation database that is not current at the start of a flight, or ceases to be current during a flight, may only be used for navigation if:

- the data used for navigation of the flight is verified before use by reference to *authorised aeronautical information* (i.e. the AIP in Australia)
- the database is not used for updating of a navigation system
- for an aircraft operated without an MEL: the aircraft must not operate under PBN for more than 72 hours after the navigation database has ceased to be current
- for an aircraft operated with an MEL: the aircraft must operate in accordance with the instructions in the MEL.

In relation to the period that might be specified in an MEL, the pre-2 December 2021 CAO 20.91 limited the MEL rectification period to no more than '3 flight days'. This limitation has been removed in the Part 91 MOS however it is critical for operators to ensure that any rectification period which allows operations without a current database must have appropriate safeguards in place. These instructions are the (O) items, or operational conditions, under which operations can occur during this rectification period.

To ensure this occurs safely, it is recommended that the instructions in the MEL should require:

- the data used for navigation of a flight is verified by the PIC before use by reference to *authorised aeronautical information*
- that the database not be used for updating a navigation system.

It is also recommended that operators examine whether a process needs to be specified in their exposition or operations manual for this verification (for example, that requires the verification to occur via up-to-date maps and charts etc).

GM 91.290 Specified IFR cruising levels

Specified IFR cruising levels are defined in Division 2.5 of the Part 91 MOS.

GM 91.295 IFR flights at non-specified cruising levels—notifying Air Traffic Services

Reserved.

GM 91.300 IFR flights at non-specified cruising levels—avoiding collisions with aircraft conducting VFR flights

Reserved.

AMC 91.305 Minimum heights—IFR flights

Operator methods of calculating lowest safe altitude

The CASR Dictionary defines *lowest safe altitude* as follows:

> ***lowest safe altitude***, for a route or route segment of a flight of an aircraft, means the lowest altitude that will provide safe terrain clearance for the aircraft for the route or route segment calculated in accordance with a method specified in the Part 173 Manual of Standards, the operator's exposition or the operator's operations manual.
>
> Note: The methods specified in the Part 173 Manual of Standards are also published in the AIP.

In relation to the words of this definition which state lowest safe altitude can be in accordance with a method specified in the operator's exposition or operations manual, the methods listed below for calculating lowest

safe altitude along a route of consistent track (allowing for magnetic variation changes) between 2 points are an acceptable means of compliance (Part 173 MOS methods are not included in this list since they are separately referred to in the legal definition above):

- The altitude of the LSALT must be at least:
  - where the elevation of the highest terrain or obstacle in the obstacle assessment area is not above 500 feet AMSL, not be less than 1 500 feet AMSL
  - in other cases:
    - » where the highest obstacle is more than 360 feet above the elevation determined for the terrain – 1 000 feet above the highest obstacle

      or
    - » where the highest obstacle is less than 360 feet above the terrain elevation, or there is no charted obstacle, 1 360 feet above the elevation determined for the terrain.
- The obstacle assessment area must be at least:
  - For a flight navigated by RNP 2, an area of 5 NM surrounding and including the departure point, the destination and each side of the nominal track.
  - For a flight navigated by RNP 4, an area of 5 NM surrounding and including an area defined by lines drawn from the departure point not less than 15° each side of the nominal track to a maximum of 8 NM and then paralleling track to abeam the destination and converging by a semicircle of the same radius centered on the destination.

GM 91.305 Minimum heights—IFR flights

There is an exemption in force in relation to this regulation relating to taking off from an aerodrome in IMC for which there are no authorised instrument departure procedures and no ATC. Pilots and operators are recommended to review section 19 of CASA EX67/24.

IFR flights must be flown at or above certain minimum heights unless certain circumstances apply (see this regulation and, for holders of certain private instrument endorsements, regulation 61.942, for these circumstances).

The relevant minimum heights under this regulation (see below for further explanation of the impact of regulation 61.942) can be any of the following:

- the published, in the AIP (which includes the ERCs), lowest safe altitude for a particular route
- the published, in the AIP (which includes the ERCs), minimum sector altitude (MSA) associated with a particular aerodrome
- the published, in the AIP (which includes the ERCs), lowest safe altitude for a particular geographic area (commonly referred to as grid LSALT)
- a lowest safe altitude calculated by the pilot in accordance with certain specified methods.

The routine criteria applicable for a pilot calculated lowest safe altitude is contained in the Part 173 Manual of Standards (MOS) through the effect of the legal definition of *lowest safe altitude*. It is also currently published in the AIP for easy reference. Additionally, "*operators holding an AOC, aerial work certificate or Part 141 certificate*" that have an exposition or operations manual can include in their exposition or operations manual alternative methods of calculating lowest safe altitude. The intent of this rule was to provide for limited circumstances which are sometimes encountered during flights outside Australia. This does not preclude the use of this provision over Australia, but operators could expect that CASA would carefully review any alternative methods of calculating lowest safe altitude and, if appropriate, use powers under the relevant CASR parts to direct operators to change their exposition or operations manual where the method in the operator's manual did not result in an equivalent level of aviation safety compared to the routine criteria.

Published lowest safe altitudes for specific routes are published on AIP en-route charts. As per the CAUTION on these charts, these published lowest safe altitudes are only valid if the aircraft can navigate in accordance with the RNP 2 navigation specification. See Chapter 14 of the Part 91 MOS for the requirements to be met in relation to navigation specifications. When a flight is conducted off a published route, or the flight is conducted in an aircraft that is not compliant with the RNP 2 navigation specification, another kind of minimum height must be used.

While this regulation permits a flight to be below a minimum height when operating by day in VMC, it is recommended that pilots fly at or above a minimum height during the conduct of all IFR operations. Many aviation incidents and accidents can be attributed to pilots operating in unfamiliar circumstances, and the familiarity required to avoid such events is strongly enhanced by operating in a consistent manner.

An in-depth understanding of instrument flight procedure design can be gained by referring to Part 173. Additionally, the US FAA publish the Instrument Flying Handbook and Instrument Procedures Handbook, both of which contain valuable information.

Restrictions for certain private instrument endorsement holders (regulation 61.942)

Regulation 61.942 prohibits the holder of a single-engine aeroplane, multi-engine aeroplane or gyroplane private instrument endorsement from operating under the IFR below a published lowest safe altitude unless that element of the flight is conducted clear of cloud and with a minimum of 5000 m visibility. Some example scenarios are provided below to illustrate these restrictions.

Scenario 1

The aircraft is navigating to an RNP 2 accuracy and is tracking along a route that has a RNP 2 based AIP chart route LSALT.

In this scenario, the aircraft cannot descent below the RNP 2 AIP chart LSALT unless the conditions in regulation 61.942 are met.

Scenario 2

The aircraft is navigating between 2 uncharted airfields. The aircraft might or might not be navigating to an RNP 2 standard.

In this scenario, the aircraft cannot descent below the published Grid LSALT unless the conditions in regulation 61.942 are met as that LSALT is the published LSALT for the route being flown.

Scenario 3

The aircraft is not navigating to an RNP 2 accuracy due a degradation in the onboard GNSS. It is tracking, using the degraded navigation solution, along a route that has a RNP 2 based AIP chart route LSALT.

In this scenario, the aircraft cannot descent below the Grid LSALT unless the conditions in regulation 61.942 are met because the aircraft cannot use the RNP 2 route LSALT.

Scenario 4

This is any of the above scenarios by day but there are distinctly separate layers of cloud below the published LSALT.

The aircraft can descend below the published LSALT provided the aircraft remains clear of cloud (i.e. it is ok to manoeuvre both laterally and vertically below the LSALT to remain clear of cloud) with a minimum of 5000 m visibility (noting that additional requirements might apply if in uncontrolled airspace at certain altitudes noting paragraph 91.305(3)(c)).

Scenario 5

This is any of the above scenarios by night but there are distinctly separate layers of cloud below the published LSALT. There is **not** sufficient moonlight/starlight/ground cultural lighting to visually the cloud.

The aircraft cannot descend below the published LSALT since the aircraft cannot remain clear of cloud and cannot determine visibility (and also as a result cannot meet the night visual approach requirements in the AIP empowered by regulation 91.305 either).

Scenario 6

This is any of the above scenarios by night but there are distinctly separate layers of cloud below the published LSALT. There **is** sufficient moonlight/starlight/ground cultural lighting to visually identify ALL clouds.

The aircraft can descend below the published LSALT since the aircraft can remain clear of cloud and can determine visibility, with the aircraft also being required to meet the night visual approach requirements in the AIP (empowered by regulation 91.305).

GM 91.307 IFR take-off and landing minima

The MOS content for this regulation is contained in Chapter 15 of the Part 91 MOS.

Take-off

When outlining the necessary criteria that permits a qualifying multi-engine aeroplane or qualifying multi-engine rotorcraft to take-off in visibilities below 800 m down to a minimum of 550 m, sections 15.05 and 15.07 of the Part 91 MOS includes a requirement that the required runway lights must be "supported by a secondary power supply with a switchover capability of 1 second or less". Operators and the PIC will need to ensure that this technical capability is both available and serviceable in order to conduct a take-off in these visibilities. In particular, if the secondary power supply is provided by a generator and the 1 second or less time period can only occur when the backup generator is already running, the operator and PIC will need to confirm that this is actually the case prior to taking off in visibilities below 800 m.

Landing

Whether a pilot is able to conduct an instrument approach procedure will depend on the following:

- Part 61 authorisations
- aircraft equipment fitment
- availability of published instrument approach procedures
- any restrictions or conditions mentioned in NOTAMs applicable to the flight.

Instrument approach procedures are defined as the following:

> ***instrument approach procedure*** means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix or, where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply.

To avoid any misinterpretation or doubt, GNSS arrivals and GNSS/DME arrivals are instrument approach procedures whereas Standard Arrival Routes (STARs) are not instrument approach

procedures. The minimum height and missed approach requirements in regulation 91.307 (IFR take-off and landing minima) apply to the conduct of GNSS and GNSS/DME arrivals.

Instrument approach procedures are based on either ground-based navigation aids (VOR, NDB, ILS, DME) or on Performance Based Navigation (PBN).

Two types of PBN based approaches exist: RNP APCH and RNP AR APCH.

- RNP AR APCH procedures may be conducted only by operators or pilots who hold CASA approval and are not discussed in this section.
- RNP APCH procedures do not require operators or pilots to hold CASA approval.

Four types of minima might appear on the approach chart for an RNP APCH procedure. Pilots must select minima based on aircraft certification and the type of approach operation they are authorised to conduct (2D or 3D instrument approach operations). Aircraft certification is documented in the AFM or AFM supplement. Table 12 shows the relationship between types of instrument approach procedures, their classification, the technology needed and available minima.

The format for instrument approach chart titles is currently subject to a global amendment and standardisation activity. In Australia, RNP APCH charts are historically titled RNAV(GNSS) RWY XX. Titles are progressively being amended to the format RNP APCH RWY XX. Additionally, the minima 'S-I GNSS' is progressively being replaced with 'LNAV'.

Types of vertical guidance in RNP approaches

For instrument approach operations an aircraft navigation system may provide two different types of vertical navigation—vertical guidance or advisory vertical guidance.

- *Vertical navigation (VNAV) guidance* is provided by a navigation system for an Instrument Approach Procedure (IAP) that is designed to utilise navigation infrastructure to provide both lateral navigation (LNAV) and VNAV guidance. The lateral and vertical path information for the IAP is authorised by CASA and is coded into the navigation system database and ensures an aircraft, flown within the specified tolerances, will comply with obstacle clearance requirements considered in the design of the IAP. The VNAV guidance permits the minimum altitude to be prescribed as a Decision Altitude/Height (DA/H). The approach may be conducted as a 3D instrument approach operation, as vertical guidance is used to manage the vertical path of the aircraft. For an IAP based on GNSS, the availability of vertical guidance is typically enunciated by aircraft systems as 'LNAV/VNAV' or 'LPV'. Vertical guidance is also provided by a glideslope for an IAP based on ILS navigation infrastructure.
- *Advisory Vertical Navigation (VNAV) guidance* is provided by some navigation systems for an IAP that is designed to utilise navigation infrastructure to provide only lateral navigation (LNAV) guidance. Consequently, the minimum altitude for such an IAP will be prescribed as a Minimum Descent Altitude/ Height (MDA/H). Advisory VNAV guidance is typically provided by GNSS for a vertical path encoded in the navigation system database but is derived from data that has not been verified by CASA and may not ensure the flight path of the aircraft will comply with any descent limitations specified on the IAP. While advisory VNAV guidance may be used to conduct an IAP as a 3D instrument approach operation, as the advisory VNAV guidance is used to manage the vertical path of the aircraft, descent below each Segment Minimum Safe Altitude and the MDA/H is not permitted and the pilot must ensure, by means of both cognitive and guidance cues, the flight path of the aircraft complies with the prescribed descent limits. The availability of advisory vertical guidance is typically enunciated by aircraft systems as 'LNAV+V' or 'LP+V'.

Advisory vertical guidance cannot be used for descent below a minima prescribed as a MDA/H in IMC, but it may be used to conduct an approach as a 3D instrument approach operation and satisfy the 3D instrument approach recent experience requirement.

Pilots are responsible for ensuring compliance with any descent limitations specified on the IAP when advisory VNAV guidance is used to determine or manage the vertical path of the aircraft. RNP APCH operations to LNAV/VNAV or LPV minima are only available to aircraft fitted with navigation systems approved for such procedures.

LNAV/VNAV (Baro-VNAV) minima are only available to aircraft equipped with a navigation system that derives the VNAV guidance from a barometric source. LPV minima is only available to an aircraft fitted with an SBAS-capable navigation system utilising WAAS, EGNOS or other SBAS and the SBAS is available.

SBAS is **not yet available** in Australia.

Flying an RNP approach with approved (not advisory) vertical guidance

Some RNP instrument approach charts in Australia combine the depiction of both the LNAV non-precision approach and the LNAV/VNAV approach with vertical guidance (APV), similar to how a LOC non-precision approach is depicted on the same instrument approach chart as the ILS precision approach.

If pilots are not familiar with this combined chart presentation for RNP approaches, it might cause confusion for pilots flying the LNAV/VNAV approach as while the minimum segment altitudes depicted on the chart always apply to the LNAV approach, only some of the minimum segment altitudes apply to the LNAV/VNAV approach.

The only minimum segment altitudes that apply to the LNAV/VNAV approach (i.e. the APV) are those before the vertical path angle (VPA) intercept point. However, where a minimum segment altitude is below the promulgated VPA intercept altitude, it is **strongly recommended** that the pilot maintain the published VPA intercept altitude to the VPA intercept point to ensure the safe conduct of a stabilised approach. *Missed approach navigational tolerances*

Requirements and guidance published before Part 91 commenced on 2 December 2021 lacked consistency and clarity regarding the lateral deviation of an aircraft during an instrument approach before a missed approach needed to be executed.

Paragraph 15.11(1)(a) of the Part 91 MOS requires that the PIC must execute a missed approach if, during the final segment of an IAP, the aircraft is flown outside the *navigational tolerance*. Navigational tolerance is defined in the dictionary at the front of the MOS as follows:

> ***navigational tolerance*** means 1 of the following:
>
> (a) for PBN operations — the RNP value for the segment of the IAP being conducted;
>
> (b) for VOR or LOC-based operations — full-scale deflection of the course deviation indicator;
>
> (c) for NDB-based operations — + or - 5° from the specified bearing;
>
> (d) for DME-based operations — + or - 2 NM from the required arc;
>
> (e) for operations based on visual navigation — 1 NM from the cleared track.

These tolerances are not always the same as the licensing tolerances contained in the Part 61 MOS. This is because the licensing tolerances can be thought of as a **target level of safety performance** whereas the missed approach requirements represent the **minimum acceptable level of safety performance**. The definition of *navigational tolerance* has been developed in consideration of the design obstacle clearance tolerances for instrument approaches of different kinds.

Table 12: Approach procedure types and classifications interrelationships

Operation Type	Operation Method	Procedure Classification	Approach Procedure Technology	Procedure Minima Type10		
Type A2	2D		Conventional Ground Based[4]	VOR (MDA/H)	NDB (MDA/H)	LOC (MDA/H)

		Non-precision approach (NPA)	PBN: (RNP APCH)	LNAV (MDA/H)	LP (MDA/H)[7]	
	3D	Approach procedure with vertical guidance (APV)		LNAV/VNAV (DA/H)[5]	LPV (DH at or above 250ft) (DA/H)[7]	
			PBN: (RNP AR APCH)	RNP (0.x) (DA/H)[6]		
Type B[3&9]		Precision approach (PA) procedure	PBN: (RNP APCH)	LPV (DH below 250ft) (DA/H)[7&8]		
			Conventional Ground Based	ILS (DA/H)[9]		
			GNSS Based	GLS (DA/H)[9]		

Notes:

1. This table should be read from left to right and shows IAP terminology interrelationships.
2. Type A: a minimum descent height or decision height at or above 250 ft.
3. Type B: a decision height below 250 ft.
4. DME or GNSS arrivals are technically classified as NPA but will only have circling minima published.
5. Barometric input is needed to compute the VNAV component in LNAV/VNAV procedures, hence they are sometimes referred to as BARO VNAV procedures.
6. For a RNP AR APCH procedure the minima are represented as RNP 0.x where 0.x refers to the RNP value specific to the final approach segment (for example: 0.3). RNP AR APCH procedures are for use by CASA approved operators only.
7. IAPs with LP and LPV minima are not currently available in Australia as they rely on the availability of an SBAS (satellite based augmentation system). An SBAS is expected to be available for Australian IAPs in late 2028 via the Australia / New Zealand Southern Positioning Augmentation Network (SouthPAN).
8. SBAS is required for all IAP's with LPV minima and can potentially provide minima similar to ILS CAT I minima. Hence an IAP with LPV minima below 250 ft are sometimes referred to as SBAS Cat I procedures.
9. Obstructions and/or lack of infrastructure (for example related to non-precision approach runways as defined in the Part 139 MOS) may limit ILS or GLS PA to a decision height of 250 ft or above. In these situations, the procedure classification is still a PA but the operation type is Type A.

10. Multiple minima types may be included on the same chart when the procedure technology for the IAP allows. This can occur for ILS with LOC, ILS with multiple CAT I, II or III minima, LNAV with LNAV/VNAV, RNP AR APCH with multiple RNP values and any RWY approach with circling minima.

GM 91.310 Approach ban for IFR flights

The MOS content for this regulation is contained in Chapter 16 of the Part 91 MOS.

The intent of an approach ban for IFR flights is to manage the risks associated with the conduct of a missed approach from a low altitude.

A consequence of an approach ban for IFR flights is more efficient traffic flow. Because of the lower landing minima associated with low-visibility operations, aircraft conducting those operations will not be unduly delayed by those that are not.

GM 91.315 Taking off and landing in low visibility

Low-visibility operations consist of 2 types:

- a low-visibility take-off (this is defined in the CASR Dictionary) which are take-offs with a runway visual range of less than 550 m
- a low-visibility approach (this is defined in the CASR Dictionary) which are instrument approach operations using landing minima that are less than the category (CAT) I minima (examples include operations using CAT II, CAT III, and special authorisation CAT I (SA CAT I) landing minima).

If an operator is required by the Regulations to have an exposition or operations manual, i.e., under Parts 119, 131, 138, 141 or 142, then the operator must have approval to conduct low-visibility operations.

If an operator is not required to have an operations manual or exposition, the PIC must have approval to conduct low-visibility operations. This is particularly relevant to Part 91 operations.

For further guidance refer to:

- AC 91-11 - Aeroplane low visibility operations - conduct and approvals
- Navigation authorisations (OPS.04) protocol suite
- Aircraft low visibility Operations (OPS.12) protocol suite.

GM 91.320 Specified aircraft performance categories

A specified aircraft performance category is determined in accordance with the definition shown in Division 2.2 of the Part 91 MOS.

The specified aircraft performance category is obtained by considering aircraft type, V_{AT} and instrument approach handling speeds. Section 2.02 of the MOS is only intended to provide requirements for determining the category – operational matters such as maximum speeds are not shown.

The specified aircraft performance category is used to determine the following operational matters:

- instrument approach aircraft handling speeds
- instrument approach minima.

Requirements for both are stated in the AIP.

When operating in a specified aircraft performance category, the PIC must comply with obstacle clearance, instrument approach speed limits, circling area limits and landing minima for the category.

A reference to 'lower performance category' is determined by the hierarchy of specified aircraft performance categories whereby CAT E is the highest and CAT A is the lowest.

'Performance category A' should not be confused with a 'Category A rotorcraft'. *Performance category A* refers to a performance category for an aircraft that is determined using the aircraft handling speeds in accordance with Division 2.2 of the Part 91 MOS. A *category A rotorcraft* is a rotorcraft that meets certain certification standards. Refer to AC 133-01 - Performance class operations for information on category A rotorcraft.

4.4.4 Subdivision 91.D.4.4—Avoiding collisions in the air

GM 91.325 Basic rule

This regulation emphasises the responsibility of a flight crew member to maintain vigilance so far as weather conditions permit to see and avoid other aircraft.

Refer to AC 91-14 - Pilots' responsibility for collision avoidance for guidance on the pilots' responsibility for collision avoidance.

GM 91.330 Right of way rules

Reserved.

GM 91.335 Additional right of way rules

This regulation does not apply to Part 131 operations.

GM 91.340 Right of way rules for take-off and landing

Reserved.

4.4.5 Subdivision 91.D.4.5—Avoiding collisions on water

GM 91.345 Compliance with International Regulations

International Regulations means the International Regulations for Preventing Collisions at Sea, 1972. The regulations are part of the Convention on the International Regulations for Preventing Collisions at Sea.

Note: The Convention is in Australian Treaty Series 1980 No. 5 ([1980] ATS 5) and can be viewed in the Australian Treaties Library on the AustLII website.

GM 91.350 Giving way to vessels

Reserved.

GM 91.355 Giving way on water

This regulation does not apply to Part 131 operations.

4.4.6 Subdivision 91.D.4.6—Avoiding collisions at or in the vicinity of aerodromes

GM 91.360 Meaning of *in the vicinity of a non-controlled aerodrome*

Refer to AC 91-10 - Operations in the vicinity of non-controlled aerodromes for guidance on operations in the vicinity of non-controlled aerodromes.

Useful information is also found in the Australian Transport Safety Bureau (ATSB) publication 'A pilot's guide to staying safe in the vicinity of non-controlled aerodromes'.

GM 91.365 Taxiing or towing on movement area of aerodrome

This regulation does not apply to Part 131 operations.

The movement area is any part of an aerodrome used for take-off, landing and taxiing of aircraft including manoeuvring areas and aprons.

AMC 91.370 Take-off or landing at non-controlled aerodrome—all aircraft

An acceptable means of complying with this regulation is for the PIC to ensure that if another aircraft is taking off ahead from the same runway:

- the other aircraft has crossed the upwind end of the runway

  or

- the other aircraft has commenced a turn.

GM 91.370 Take-off or landing at non-controlled aerodrome—all aircraft

This regulation does not apply to Part 131 operations.

At an aerodrome where gliders or glider tugs are operating to a common circuit pattern from either a runway or parallel strip they are to be taken as one. Therefore, an aircraft must not take-off or land when another aircraft on the parallel strip or runway is taking off or landing. However, an aircraft may take-off or land if there is another aircraft taxiing or stationary on either the runway or parallel strip, provided it does not affect the ability to take-off or land safely.

GM 91.375 Operating on manoeuvring area, or in the vicinity, of non-controlled aerodrome—general requirements

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24. There is an exemption in force in relation to this regulation and the conduct of certain aerobatic activities under the auspices of the Australian Aerobatic Club. (See section 20B of CASA EX67/24).

This regulation does not apply to Part 131 operations.

The manoeuvring area of an aerodrome is that part used for take-off, landing and taxiing of aircraft, excluding aprons.

Refer to AC 91-10 - Operations in the vicinity of non-controlled aerodromes for guidance on operations in the vicinity of non-controlled aerodromes.

GM 91.380 Operating on manoeuvring area, or in the vicinity, of non-controlled aerodrome—landing and taking off into the wind

This regulation does not apply to Part 131 operations.

Refer to AC 91-10 - Operations in the vicinity of non-controlled aerodromes for guidance on operations in the vicinity of non-controlled aerodromes.

GM 91.385 Operating on manoeuvring area, or in the vicinity, of non-controlled aerodrome—requirements that apply after joining the circuit pattern

This regulation does not apply to Part 131 operations.

Refer to AC 91-10 - Operations in the vicinity of non-controlled aerodromes for guidance on operations in the vicinity of non-controlled aerodromes.

GM 91.390 Operating on manoeuvring area, or in the vicinity, of non-controlled aerodrome—requirements related to maintaining the same track after take-off

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/241.

This regulation does not apply to Part 131 operations.

Refer to AC 91-10 - Operations in the vicinity of non-controlled aerodromes for guidance on operations in the vicinity of non-controlled aerodromes.

GM 91.395 Straight-in approaches at non-controlled aerodromes

This regulation does not apply to Part 131 operations.

Refer to AC 91-10 - Operations in the vicinity of non-controlled aerodromes for guidance on operations in the vicinity of non-controlled aerodromes.

AMC 91.400 Communicating at certified, registered, military or designated non controlled aerodromes

Note: See the AMC 1 entry in AMC 91.055 relating to the provision in subregulation 91.400(3) regarding an aircraft not carrying an operative radio being in company with another aircraft.

GM 91.400 Communicating at certified, registered, military or designated non controlled aerodromes

This regulation does not apply to Part 131 operations.

The MOS content mentioned in subparagraph 91.400(1)(a)(iv) does not presently exist. A placeholder for any future content is contained in Chapter 17 of the Part 91 MOS. Adding any new content would be subject to the consultation rules contained in Subpart 11.J.

Aircraft operating in the vicinity of a non-controlled aerodrome that is certified, military, or an aerodrome specifically mentioned in the Part 91 MOS, must be fitted with at least one VHF radio communication system (refer to regulation 91.810).

Despite the requirements, it is recognised that there are occasions when this is not possible. Therefore, an alleviation is provided with restrictions:

- all of the following must happen:
  - flight in VMC by day
  - flight in company with another aircraft where:
    - » the other aircraft is carrying an operative radio
    - » the pilot of the other aircraft is authorised to operate the radio

    or
- the radio fails in flight, or the flight is for the purpose of radio repairs:
  - the aircraft landing lights, anti-collision lights and transponder are all switched on
  - upon arrival, the aircraft joins either crosswind or down-wind leg of the circuit.

GM 91.405 Aircraft in aerodrome traffic at controlled aerodromes

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24.

There is an exemption in force in relation to the mistaken regulatory requirement to maintain a continuous watch for visual instructions from ATC. Operators and pilots are advised to review section 12 of CASA EX67/24.

This regulation does not apply to Part 131 operations.

4.5 Division 91.D.5—Taking off, landing and ground operations

There is a direction in force in relation to the use of military aerodromes. Pilots and operators are recommended to review section 11 of CASA EX67/24.

AMC 91.410 Use of aerodromes

Notes:

1. This regulation is disapplied for Part 121 operations (see item 6 of the table in subregulation 91.035(1)) and therefore this AMC does not apply during the conduct of Part 121 operations. For the equivalent AMC for those operations, refer to AMC 121.205.
2. For the lighting requirements during NVIS operations – refer to Multi-Part AC 91-13, 133-09 and 138-06[1].

[1] At the time of publication of this document, this AC is under development. Once published, it will be available from the CASA website.

Aerodrome lighting

This AMC applies to:

- subparagraph 91.410(2)(a)(iv), i.e. that the place an aircraft takes off from, or lands at, must be suitable for the landing and taking off of aircraft
- paragraph 91.410(2)(b), i.e. that the aircraft can land at, or take-off from, a place safely having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions).

Minimum lighting

When conducting operations at night, or by day when the visibility is not sufficient to safely taxi, take-off or land without runway, taxiway or obstacle lighting, it is an acceptable means of compliance with the regulatory provisions above if the PIC or operator ensures that the following minimum kinds of lighting are available:

- runway edge lighting
- threshold lighting
- illuminated wind direction indicator (not required if wind velocity information can be obtained from an authorised weather report)
- obstacle lighting (when specified in local procedures).

Lighting availability time periods

When conducting operations at night, or by day when the visibility is not sufficient to safely taxi, take-off or land without runway, taxiway or obstacle lighting, and PAL is not being used, it is an acceptable means of compliance with the regulatory provisions above if the PIC or operator ensures that arrangements have been made for the lighting to be operating during the following periods:

- departure: from at least 10 minutes before departure to at least 30 minutes after take-off
- arrival: from at least 30 minutes before ETA to the time landing and taxiing has been completed.

A pilot or operator that has an arrangement with an external party for aerodrome lighting (whether ATC or the aerodrome operator) must notify any change in requirements. Confirmation must be obtained that requests for lighting will be satisfied.

Notes:

1. Aerodrome lighting at an aerodrome where a control tower is operating will be activated by ATC as necessary. Pilots requiring aerodrome lighting outside the ATC published hours should use PAL, if available, or make appropriate arrangements with ATC.
2. Aerodrome lighting at non-controlled aerodromes (including aerodromes where ATC has already ceased duty) should be arranged with the aerodrome operator, or by using PAL facilities, if available.
3. The AIP-ERSA identifies locations where selected runway lighting is routinely left switched on during hours of darkness.

Aerodrome pavement strength

This acceptable means of compliance applies to:

- subparagraph 91.410(2)(a)(iv), i.e., that the place an aircraft takes off from, or lands at, must be suitable for the landing and taking off of aircraft
- paragraph 91.410(2)(b), i.e., that the aircraft can land at, or take-off from, a place safely having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions).

In relation to the pavement strength of an aerodrome runway that has a man-made surface (i.e. concrete, bitumen etc), it is an acceptable means of compliance with the regulatory provisions above if the PIC or operator ensures that where the runway has a pavement classification number (PCN) – that the aircraft classification number (ACN) is not greater than the PCN unless the aerodrome operator has provided permission for the aircraft to use the runway.

In relation to the pavement strength of any aerodrome man-made surface (i.e., runway, taxiway, apron etc), it is an acceptable means of compliance with the regulatory provisions above if the PIC or operator ensures that where the surface has a maximum permissible tyre pressure – that the aircraft tyre pressure does not exceed the maximum permissible tyre pressure unless the aerodrome operator has provided permission for the aircraft to use the surface.

In relation to the pavement strength of any aerodrome man-made surface (i.e. runway, taxiway, apron etc), it is an acceptable means of compliance with the regulatory provisions above if the PIC or operator ensures that where the surface has a maximum permissible aircraft weight – that the aircraft gross weight does not exceed the maximum permissible aircraft weight unless the aerodrome operator has provided permission for the aircraft to use the surface.

Notes:

1. See AIP-ERSA for further information on the information published in the authorised aeronautical information for Australia about CAN/PCN, maximum tyre pressures and maximum weights for different aerodrome surfaces.
2. Some aerodrome operators may provide permanent concessions for certain aircraft. Sometimes these concessions are contained in the AIP-ERSA entry for that aerodrome, or the aerodrome operator may need to be contacted directly.

GM 91.410 Use of aerodromes

There is a direction in force in relation to the use of military aerodromes. This information is included in this GM section because, even though the direction does not specifically relate to this regulation, it relates to the general topic of aerodrome usage. Pilots and operators are recommended to review section 11 of CASA EX67/24.

This regulation does not apply if regulation 121.205 applies to an operation.

There are no longer any registered aerodromes in Australia following changes to Part 139 of CASR; therefore subparagraph 91.410(2)(a)(ii) has no effect. CASA plans to delete this subparagraph at a future regulation amendment opportunity.

Section 3 of the Act defines the word ‘aerodrome’ as follows:

> ‘An aerodrome is an area of land or water (including any buildings, installations and equipment) the use of which as an aerodrome is authorised under the regulations, being such an area intended for use wholly or partly for the arrival, departure or movement of aircraft’.

This includes helicopter landings sites (HLS)[2].

[2] HELICOPTER LANDING SITE (HLS):

(a) an area of land or water, or an area on a structure on land, intended for use wholly or partly for the arrival or departure of helicopters

or

(b) a helideck

or

(c) a heliport.

Subregulation 91.410(1) requires aircraft to be operated into and out of places that are one of the following:

- a certified aerodrome
- a defence aerodrome for which an arrangement under section 20 of the Act, for civilian use, is in force

> **Note:** At the time of publishing version 2.5 of this AC, no arrangements under section 20 of the Act are in force.

- a place that is suitable for the landing and taking-off of aircraft.

The places may only be used provided the aircraft can land at, or take-off from, the place safely having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions).

For the purposes of section 3 of the Act, subregulation 91.410(3) authorises a place that is suitable for the landing and taking-off of aircraft as an aerodrome, as this allows the flexibility of operations needed for Australian civil aviation operations, into places which are not a certified aerodrome, or a defence aerodrome for which an arrangement under section 20 of the Act is in force.

> **Note:** At the time of publishing version 2.5 of this AC, no arrangements under section 20 of the Act are in force. Therefore, except for the joint user aerodromes of Darwin and Townsville, all other Defence operated aerodromes are categorised in regulation 91.410 as a place described in subparagraph 91.410(2)(a)(iv).

Unlike the places in the first two dot points, this means that an aeroplane landing area (ALA) or an HLS which may or may not be designed and constructed to a particular standard is authorised as an aerodrome for the purposes of the regulations, and may be used for take-off and landing by respective categories of aircraft, provided the operation can be conducted safely following an assessment of all circumstances of the operation.

When considering '…all the circumstances'[3] of the proposed landing or take-off, this will include all of the normal flight operational safety requirements for the aircraft operation and should include the risk to safety of persons and property on the ground that may be impacted by the operation into the place.

Particularly when an aircraft is operated at an ALA or an HLS which has not been designed and built to a recognised standard, the PIC must ensure the site is suitable for the operation.

Further guidance relating to aerodromes is available from the following sources:

- Refer to the GM 133.315 entry in the Part 133 AMC/GM document for further guidance on medical transport operating sites.
- The broad definition of aerodrome is extensively covered in AC 91-29 - Guidelines for helicopters – suitable places to take off and land, and AC 91-02 - Guidelines for aeroplanes with MTOW not exceeding 5 700 kg – suitable places to take off and land.
- Multi-Part AC 91-32 and AC 139-22 - Global reporting format – Runway surface condition provides guidance on the braking action associated with each RWYCC e.g. a 'WET' runway has a braking action of 'GOOD' and a 'SLIPPERY WET' runway has a braking action of 'MEDIUM'.
- Refer to AC 139.R-01 for information on heliport design and operation.

[3] See paragraph 91.410(2)(b).

GM 91.415 Taxiing aircraft

Reserved.

GM 91.420 Parked aircraft not to create hazard

In addition to considering the hazard posed to other aircraft, consideration should be given to parking an aircraft so that it does not create a hazard to other people or property both inside and outside an aerodrome perimeter.

AMC 91.425 Safety when aeroplane operating on ground

Some aircraft must be hand-started by manipulating the propeller. The method will depend on the availability of adequate assistance. When determining the suitability of a person to manipulate a propeller, consideration should be given to the risks associated with such an activity.

When adequate assistance is not available and the PIC will manipulate the propeller, the aircraft must be suitably chocked, and no one may be on board the aircraft. The PIC should ensure the aircraft throttle and mixture controls are set in a manner that will ensure aircraft will not jump the chocks. Consideration should also be given to the risks associated with people or aircraft operating nearby and the aircraft positioned in a way that will mitigate risk of injury. Once the PIC is in the pilot seat, passengers may be permitted to board.

When adequate assistance is available. The PIC will either be in a pilot seat (and the propeller being manipulated by another person) or will be manipulating the propeller (and a person who is competent to apply the brakes and control the engine in a pilot seat).

Determining that the person is competent is the responsibility of the PIC. They should provide instruction(s) or demonstration necessary to ensure the aircraft will remain stationary and/or the engine will be shut down. Ideally, an operator will provide a training course on the activities associated with hand-starting aircraft.

GM 91.425 Safety when aeroplane operating on ground

This regulation does not apply to Part 103 operations.

The MOS content for this regulation is contained in Chapter 18 of the Part 91 MOS.

GM 91.430 Safety when rotorcraft operating on ground

There is an exemption in force in relation to this regulation. Pilots are advised to review section 13 of CASA EX67/24.

This regulation does not apply to Part 103 operations.

4.6 Division 91.D.6—Fuel requirements

GM 91.455 Fuel requirements

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24.

There are exemptions in force in relation to this regulation for Part 121, 133 and 135 operators. Operators are advised to review section 17 of CASA EX69/24 (for Part 121 operators), section 11 of CASA EX70/24 (for Part 133 operators) and section 11 of CASA EX71/24 (for Part 135 operators).

This regulation does not apply if Division 121.D.6, 133.D.6 or 135.D.6 of CASR applies to an operation.

This regulation does not apply to Part 131 operations.

This regulation requires the PIC to comply with the fuel requirements in Chapter 19 of the Part 91 MOS.

Further guidance on operational fuel requirements can be found in AC 91-15 Guidelines for aircraft fuel requirements. Further guidance for advanced or complex air operators on operator fuel policies and the use of operational variations can be found in AC 1-02 Annex C.

Operators holding an AOC authorising aerial application operations or Part 142 activities, or operators holding an aerial work certificate or Part 141 certificate, that were using an operational variation prior to the commencement of Part 91 on 2 December 2021 under the auspices of section 8 of *CASA 29/18 — Civil Aviation (Fuel Requirements) Instrument 2018*, and that intend to continue using the same operational variation after 2 December 2021, do not need to submit any additional documentation to CASA. The operator is taken to have already submitted the required documentation to CASA required under subsection 19.07(5) of the Part 91 MOS.

GM 91.460 Oil requirements

Reserved.

AMC 91.465 Contaminated, degraded or inappropriate fuels

Inspection and testing of fuel system after hot fuelling

When hot fuelling an aircraft, it is an acceptable means of compliance with subregulation 91.465(1) if one of the following is complied with:

- the PIC inspects and tests the aircraft's fuel system on completion of each hot fuelling sequence for the presence of water and other contaminants, degraded or inappropriate fuel

  or

- the aircraft has, for a continuous period of not more than 5 hours' time in service, been engaged in operations during which hot fuelling has taken place and either of the following apply:
  - the fuel used by the aircraft is supplied by a person:
    - » who has a fuel quality audit program; and
    - » whose regular audit reports are checked by the operator

      or
  - in a case where the fuel used by the aircraft is supplied by a person who does not have a fuel quality audit program, the operator has a system for monitoring the quality of the fuel used by the aircraft.

Note: For specific rules related to hot fuelling during a Part 91 operation – see regulations 91.495, 91.500 and 91.505. For Part 138 operations, see regulation 138.300.

GM 91.465 Contaminated, degraded or inappropriate fuels

Where various types of fuel are available, there is a risk of fuelling with an incorrect type. If an incorrect fuel type was added to an aircraft fuel tank, such as AVTUR instead of AVGAS, the fuel system may contain enough of the correct fuel type to allow start up, taxi and take-off, only to have an

engine fail catastrophically soon after. The risk of the wrong type of fuel being added can be mitigated by awareness of fuel properties and signage requirements, in addition to thorough fuel checking or sampling using physical protective measures shown in Table 13.

Table 13: Fuel characteristics and protective measures

Characteristic	AVGAS	AVTUR (Jet A1)
Awareness of physical characteristics.	Familiar petrol scent and texture and is coloured red, blue or green depending on grade.	Distinctive odour similar to diesel, is oily to the touch and is clear or straw coloured.
Wing decals. Placed on wing adjacent to filler port stating type of fuel required.	Red.	Black.
Bowser and filler nozzle signage.	Red signs on bowser. Red filler handle.	Black signs on bowser. Black filler handle.
Selective fuelling port.	Fitted to AVGAS aircraft tanks to allow only the smaller nozzles of AVGAS fuelling systems to fit.	Larger jet A1 nozzles unable to be inserted through selective fuelling port.

Like misfuelling, contaminated or degraded fuel has the potential to result in engine failure, or even a partial power loss, soon after take-off. During flying training, pilots are continuously exposed to simulated engine failures and the actions required become second nature. Students are very rarely, if ever, exposed to situations where partial power loss is experienced. To highlight the importance of managing partial power losses, the ATSB has published an advisory document discussing the subject. Titled 'Avoidable Accidents No. 3 - Managing partial power loss after takeoff in single-engine aircraft', the booklet is available from the ATSB website.

Refer to:

- AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety
- CASA safety video on drum refuelling.

GM 91.470 Fire hazards

All reasonable precautions against fire hazards should be taken. All equipment should be of sound design and be maintained in safe working condition.

Good airmanship requires a pilot to constantly monitor the fuelling taking place and positively manage any hazards that exist, including those created by another person.

Refer to AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety.

GM 91.475 Fuelling aircraft—fire fighting equipment

Refer to AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety.

GM 91.480 Fuelling aircraft—electrical bonding

This regulation does not apply to Part 131 operations.

For clarity, bonded means that aircraft and the fuelling equipment have the same electrical potential. By ensuring the same electrical potential between the aircraft and the fuelling equipment, bonding prevents static discharges in aircraft fuel tanks and hoses.

Refer to AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety.

GM 91.485 Equipment or electronic devices operating near aircraft

The term 'fuelling' refers to both refuelling and defueling.

A critical fuelling point means any of the following:

- a fuel tank filling point on the aircraft
- a fuel tank vent outlet on the aircraft
- the ground fuelling equipment that is used to fuel the aircraft.

When an aircraft is being fuelled, a person must not operate equipment or an electronic device within 15 m of a critical fuelling point for the aircraft. A person must not fuel an aircraft if equipment or an electronic device is being operated within the same area. This includes the operation of equipment such as an internal combustion engine or any electrical switch, battery, generator, motor or other electrical apparatus. Subregulation 91.485 (3) provides exceptions to this requirement, including for equipment that is part of the aircraft's fuelling equipment or that is designed for use during fuelling operations, e.g., mobile fuel tankers, in-ground refuel ports, fuel bowsers, hand pumps, drums and funnels.

The auxiliary power unit (APU) of the aircraft may be operated during fuelling if it is permitted by the AFM and is started before fuelling begins.

An 'electronic device that is hazardous to the process of fuelling only because it is designed to produce radio emissions (within the meaning of the *Radiocommunications Act 1992*)' typically refers to mobile telephones, radios and radar equipment. The responsibility lies with the PIC to determine whether a device is hazardous in these circumstances. The PIC and the operator should take reasonable steps to ensure that a person does not operate or perform maintenance work on the aircraft radar equipment during fuelling operations except where the fuel is kerosene, when operation or maintenance may be carried out provided the radar transmitter is de-activated.

Refer to AC 91-25 - Fuel and oil safety for more detailed guidance on the precautions to be taken during fuelling operations.

GM 91.490 Fuelling turbine-engine aircraft—low-risk electronic devices

Low-risk electronic device means:

- a digital mobile telephone
- a hand-held personal digital assistant
- an electronic device designed to transmit on a Wi-Fi network.

A person may only operate a low-risk electronic device inside the cabin of a turbine-engine aircraft being fuelled when they have been given permission by the PIC, and each cabin door within 3 m of a critical fuelling point is closed.

A person may operate a low-risk electronic device outside the cabin of a turbine-engine aircraft while it is being fuelled only if the device is operated more than 3 m from each critical fuelling point. A person may also operate a low-risk electronic device outside the cabin of a turbine-engine aircraft while it is being fuelled and the device is operated less than 3 m from any critical fuelling point if they are employed or engaged by the operator and have successfully completed appropriate training.

Refer to AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety.

GM 91.495 Only turbine-engine aircraft to be hot fuelled

This regulation does not apply if regulation 138.300 applies to an operation, which is only applicable to aerial work certificate holders. Aerial work certificate holders are recommended to review GM 138.300 entry in the Part 138 AMC/GM document.

For this regulation, an APU is not considered to be an engine. Therefore, fuelling an aircraft with only the APU running is not considered hot fuelling.

Refer to AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety.

GM 91.500 Hot fuelling aircraft—general

This regulation does not apply if regulation 138.300 applies to an operation, which is only applicable to aerial work certificate holders. Aerial work certificate holders are recommended to review GM 138.300 in the Part 138 AMC/GM document.

Before authorising the hot fuelling of an aircraft, the operator or owner should be satisfied that the fuelling can be carried out safely, and should have regard to the:

- configuration of the aircraft and its engine or engines
- location of the components of the aircraft's fuel system
- refuelling system(s) to be used and associated components
- aircraft's flight manual or equivalent data
- location of the aircraft
- requirements of the aerodrome operator
- requirements of regulation 91.505.

Refer to AC 91-25 - Fuel and oil safety for more detailed guidance on the precautions to be taken during hot fuelling operations, and AMC 91.465 for an acceptable means of compliance for the inspection and testing of a fuel system after hot fuelling.

GM 91.505 Hot fuelling aircraft—procedures etc.

There is an exemption in force in relation to this regulation and the operation of turbine-powered aeroplanes for parachuting operations conducted under the auspices of a Part 105 ASAO. Pilots and operators are recommended to review section 22 of CASA EX67/24.

This regulation does not apply if regulation 138.300 applies to an operation, which is only applicable to aerial work certificate holders. Aerial work certificate holders are recommended to review GM 138.300 in the Part 138 AMC/GM document.

During hot fuelling, and where possible, communication between the pilot and the person on the ground in charge of the fuelling system should be considered by means of:

- an electronic intercommunication system

  or

- visual contact and an agreed system of signals.

While hot fuelling is taking place, radio transmissions from the aeroplane should be restricted to the greatest extent practicable.

Refer to AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety.

GM 91.510 Fuelling aircraft—persons on aircraft, boarding or disembarking

There are exemptions in force in relation to this regulation for Part 121, 133, 135 operators and aerial work certificate holders. Operators are advised to review section 18 of CASA EX69/24 (for Part 121 operators), section 12 of CASA EX70/24 (for Part 133 operators), section 12 of CASA EX71/24 (for Part 135 operators) and section 11 of CASA EX72/24 (for aerial work certificate holders).

This regulation does not apply if regulation 121.240, 133.195, 135.220 or 138.302 applies to an operation. These regulations are only relevant to operators holding an Australian air transport AOC under Part 119 of CASR or an aerial work certificate holder. These operators are recommended to review the respective GM entries for regulations 121.240, 133.195, 135.220 and 138.302 in the respective AMC/GM documents.

This regulation does not apply to Part 131 operations.

A highly volatile fuel easily evaporates when brought into contact with the air. In aviation, this generally refers to AVGAS or MOGAS fuel. Fuel that is ‘other than highly volatile’ generally refers to AVTUR or kerosene (refer to section 1.2 for the definition of ‘highly volatile fuel’).

An aircraft operated under Part 91 must not be fuelled with a highly volatile fuel if anyone other than a crew member is on board, boarding or disembarking the aircraft.

Although regulations 121.240, 133.195, 135.220 and 138.302 technically enable fuelling with AVGAS or MOGAS with persons on board, there are significant safety risks that must be mitigated by the operators and documented in their exposition or operations manual. Operators are advised that they should expect CASA closely review any such procedures. Refer to AC 91-25 - Fuel and oil safety for more information.

An aircraft may be fuelled with fuel other than a highly volatile fuel with a person other than a crew member on board, boarding or disembarking only if the PIC or the operator is approved for such an operation.

Because air transport operators and aerial work operators must have fuelling procedures in their exposition or operations manual, the regulation does not apply to Part 121, 133 or 135 operations.

Refer to AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety.

GM 91.515 Fuelling aircraft if fuel vapour detected

This regulation does not apply to Part 131 operations.

Operators and pilots in command are recommended to especially consider the practical implications of this rule if they are conducting fuelling operations via an open to the air aircraft fuelling port. This kind of fuelling operation is sometimes known as 'over the wing' fuelling, as opposed to 'single-point' fuelling which involves a fuelling nozzle locked to the fuelling port and not directly exposed to the atmosphere.

If an operator or PIC is permitted to conduct this kind of fuelling with passengers embarking, disembarking or onboard the aircraft, the increased likelihood of fuel vapours entering the aircraft cabin, thereby triggering the requirements of this regulation, should be considered.

Operators and PIC are advised to consider the prevailing wind direction (including the effects of obstacles in the vicinity of the aircraft on the wind direction) compared to the location of open aircraft doors when designing their fuelling procedures.

Refer to AC 91-25 - Fuel and oil safety for detailed guidance on fuel and oil safety.

4.7 Division 91.D.7—Safety of persons on aircraft and cargo requirements

There is a Part 11 direction in force in relation to crew members carrying out audits, checks, examinations etc. Operators and pilots are advised to review section 9 of CASA EX67/24.

GM 91.520 Crew members to be fit for duty

Most preventable accidents have human error as a common factor. External factors such as aircraft design, meteorological conditions and airworthiness issues are often involved. However, the ability to manage such factors and make effective decisions greatly improves when pilots are in good health, well rested and free of other health concerns or impairments.

Performance impairment arises from a number of sources. Family and work worries are common and can be a major source of stress and distraction and are often difficult to discuss or resolve in a busy and pressured work environment. Lifestyle factors such as rest, exercise, a balanced diet and responsible alcohol consumption all play an important role in supporting 'fitness'. Medical problems and the respective treatment are often a concern for pilots and controllers, and they may be associated with incapacitation risks, irrespective of whether the individual feels well or not.

Fatigue is the factor most commonly associated with fitness for duty which can be induced by a wide variety of factors. Indirect factors include stress, which can be induced by pressures from significant life events or pending flight reviews. Direct factors affecting fatigue include aircraft ergonomics, noise and vibration. Regardless of its cause, because fatigue has such a major effect on crew fitness CASA has a collection of material dedicated to the subject on the fatigue management page on its website.

Impairment may be due to the influence of psychoactive substances including recreational drugs, alcohol, and medication. It has been shown that alcohol can produce a measurable impairment up to 48 hours after drinking. Medication, both over the counter and prescribed, has the potential to affect performance and side effects should be checked before performing aviation-related activities.

Consideration must be given to the effects of deep-water diving and blood donation, and the necessity to allow for a recovery period between these activities and returning to flying. A suitable minimum length of time to allow recovery from diving activities is 24 hours.

Guidance on the use of medication, recommended minimum stand-down times for several medical procedures (such as blood donation) and related matters are available on the CASA website.

In addition to in-flight incidents that result from impairment, some errors may occur during pre-flight activities and they may contribute to incidents in the same way that errors during flight may. Misreading of weather forecasts, errors in fuel planning and misfuelling are among the plethora of mistakes that can go unnoticed and have grave consequences.

Accident statistics suggest that pilots should be conducting pre-flight checklists on themselves as well as their aircraft. The commonly used 'I'M SAFE' mnemonic addresses the most common factors that can cause pilot impairment, and is detailed in Table 14.

Table 14: I'M SAFE mnemonic for pilot impairment self-assessment

Letter	Word	Question
I	Illness	Do I have any symptoms?
M	Medication	Have I been taking any prescription or over-the-counter medication?
S	Stress	Am I under psychological pressure? Do I have money, health, or family problems?

A	Alcohol	Have I been drinking within eight (8) hours? Within 24 hours?
F	Fatigue	Am I adequately rested?
E	Eating	Have I eaten enough proper food to sustain me for the flight? Do I have extra packed?

Ultimately, being fit for duty is a responsibility that rests with an individual. Sound and honest judgement is required to be satisfied that performance will not be impaired in a way that affects the ability to conduct safe operations. Illness, prescriptive medication, stress, fatigue, alcohol consumption, fatigue, eating and hydration may affect the ability to be fit for duty and to do your job safely.

Part 99 requires certain aviation organisations to implement a drug and alcohol management plan (DAMP). The DAMP provides a framework for organisations to assess and manage the risks of alcohol and other drug (AOD) use in the workplace and applies to all employees who are performing, or are available to perform, a safety-sensitive aviation activity (SSAA). The term SSAA includes a broad range of aviation-related activities, such as piloting and maintaining aircraft, providing air traffic control services and acting as a baggage handler. Part 99 also provides for CASA to undertake random AOD testing of all individuals involved in SSAA. In addition to SSAA employees of DAMP organisations, this covers SSAA individuals employed by aviation organisations that are not required to have a DAMP, as well as SSAA individuals operating in a private capacity.

In addition to Part 99, subparagraph 91.520(2)(b)(i) requires that a crew member must not consume any alcohol in the eight hours before flight. Part 99 also requires the permitted level of alcohol to be less than 0.02 grams of alcohol in 210 litres of breath.

Specific regulatory requirements relating to flight crew fatigue limits are contained in CAO 48.1 and the CAO 48.1 Plain English guide.

GM 91.525 Offensive or disorderly behaviour on aircraft

The intent of the regulation is to prevent incidents involving unruly passengers onboard the aircraft that endangers the safety of the aircraft or any person on board.

Behaviour considered offensive or disorderly would include:

- physical assault or threat to commit assault against a crew member
- verbal intimidation or threat against a crew member that interferes with the performance of their duties
- refusal to follow a lawful instruction given on behalf of the PIC
- assault, intimidation or threat, whether physical or verbal, against another person
- intentionally causing damage to, or destruction of, property
- consuming alcoholic beverages or drugs resulting in intoxication
- smoking on board
- tampering with a smoke detector or any other safety-related device on board the aircraft
- operating a portable electronic device when prohibited.

Operator procedures should address the following:

- the types of incidents personnel may be exposed to and possible consequences
- providing operational personnel with the means and knowledge necessary to respond appropriately

- techniques for diffusing a situation and preventing it from escalating to where a passenger is assessed as offensive or disorderly
- preventative measures to avoid passengers becoming offensive or disorderly e.g., restricting alcohol consumption due to its greater effect on people at high altitudes
- identifying passengers exhibiting signs of a potential problem before boarding e.g., aggressive, loud, unruly behaviour during check-in or in the departure area
- clarity on when and under what conditions a passenger may be refused boarding or deplaned for actions displayed on board the aircraft
- providing notification to all relevant personnel regarding a decision to refuse boarding or deplaning a passenger due to offensive or disorderly behaviour
- distribution of procedures to all relevant operational personnel to ensure awareness and consistency in managing incidents.

GM 91.530 When smoking not permitted

This regulation does not apply to Part 131 operations.

Section 37 of the *Air Navigation Regulation 2016* prohibits smoking on board an aircraft when carrying passengers in Australian territory as part of an air transport service. Also, on an Australian international flight (other than cargo only flight), smoking is prohibited at all times.

In other operations, smoking is prohibited during take-off, during landing, and at other times at the discretion of the PIC. A person smoking onboard an aircraft during a critical stage of flight could be distracting and affect the safety of the aircraft. Sound judgement should be exercised when directing passengers not to smoke.

To advise passengers of smoking restrictions that apply, the PIC may make use of both verbal and non-verbal communication. Visible communication may be in the form of permanent or temporary signs such as illuminated 'no smoking' signs.

GM 91.535 Crew safety during turbulence

This regulation does not apply to Part 131 operations.

This regulation requires procedures for crew members (other than flight crew) to be in place before the flight begins that protect the crew members during times of turbulence during the flight. AOC or certificate holders would detail such procedures in their exposition or operations manual.

For a Part 91 operation that is conducted without an exposition or operations manual and where a crew member is carried, the PIC, to satisfy the requirement, would be expected to brief the crew member before the flight begins.

GM 91.540 Means of passenger communication

This regulation does not apply to Part 131 operations.

GM 91.545 Seating for persons on aircraft

This regulation does not apply to Part 103 or Part 131 operations.

The regulation requires a seat or berth, to which a person is assigned, to have a seatbelt or shoulder harness. The regulation permits the Part 91 MOS to specify variations to these methods of restraint. These restraint variations are contained in Division 20.1 of the Part 91 MOS.

The variations cover the following kinds of persons and operations:

- crew members that are not flight crew members during medical transport operations, rescue operations or police special operation group (however described by the police service) operations

- medical patients during medical transport operations
- persons rescued during a rescue operation
- special operations group member during special operations group operations
- parachutists during certain parachuting operations.

GM 91.550 Seating for flight crew members

This regulation does not apply to Part 103 or Part 131 operations.

AMC 91.555 Seating for crew members other than flight crew members

Jump pilot trainer seating

This acceptable means of compliance applies to the interpretation of what constitutes a crew station for a person who is a Jump Pilot Trainer (a person who is a crew member conducting Jump Pilot Authorisation training).

It is acceptable means of compliance with the definition of *crew station* for a Jump Pilot Trainer to be seated and restrained using normal parachuting personnel methods (for example a single-point restraint and seating on a bench seat) provided that:

- the parachuting operator has assessed that the Jump Pilot Trainer can fulfil their training duties when seated and restrained during the flight using these methods
- any Part 105 of CASR requirements relating to restraint are complied with.

GM 91.555 Seating for crew members other than flight crew members

There is an exemption in force in relation to this regulation for a Part 135 operation or a Subpart 121.Z operation that is a medical transport operation. Operators are advised to review section 17 of CASA EX71/24.

This regulation does not apply to Part 131 operations.

Aerial work operations

This regulation does not apply if regulation 138.375 applies to an operation. Regulation 138.375 addresses the wearing of seatbelts and other restraining devices in aerial work operations.

Medical transport operations under Parts 133 or 135 of CASR

Refer to the Part 133 Manual of Standards and Part 135 Manual of Standards for more information on wearing a safety harness or restraint strap during medical transport operations.

General guidance

This regulation uses the CASR Dictionary defined term *crew station*. See the later subheadings in this GM entry regarding the interpretation of crew station in relation to cabin crew members and parachuting jump pilot instructors.

A crew member (other than a flight crew member) must, during take-off, landing or any other time the PIC directs, occupy their crew station and wear any provided seatbelt or shoulder harness and ensure that it is securely fastened.

If the PIC gives a direction during turbulence, then a crew member may instead occupy a seat other than a crew member's seat (this could be a passenger seat) provided they wear a securely fastened seatbelt or shoulder harness at that seat.

Cabin crew seating

The term *cabin crew seats* means a seat specifically designed by the aircraft manufacturer for the purpose of being a cabin crew seat. In the Australian civil aviation legislation, these design requirements are in Part 90 of CASR and the Part 90 MOS.

Operators are reminded that the crew stations assigned for the use of cabin crew members under routine circumstances must meet the standards prescribed by regulation 90.125.

However, during non-normal and emergency circumstances, or during periods where the normal crew station is unserviceable and encompassed by the operation of a minimum equipment list (MEL), the use by cabin crew members of other seating might be acceptable.

Refer to the guidance in the GM 121.380 entry in the Part 121 AMC/GM document for further information.

Parachute pilot training

On occasion, parachuting aeroplanes are modified to remove one of the normally installed pilot seats. Depending on the aeroplane and its specific modification, the seat sometimes cannot be re-installed and maintain the aircraft in the parachuting configuration.

When this occurs, if a parachute jump pilot trainer is carried on the flight to provide training to a pilot undergoing Jump Pilot Authorisation training, the jump pilot trainer is a crew member and therefore, according to this regulation, the trainer must occupy their defined crew station at particular times.

Refer to AMC 91.555 for an acceptable means of compliance.

GM 91.560 Restraint of infants and children

This regulation does not apply to Part 103 or Part 131 operations.

The MOS content for this regulation is contained in Division 20.2 of the Part 91 MOS.

Refer to AC 91-18 - Restraint of infants and children for guidance on the restraint of infants and children.

GM 91.565 Passengers—safety briefings and instructions

There are exemptions in force in relation to this regulation for Part 121, 133, 135 operators and aerial work certificate holders. Operators are advised to review section 19 of CASA EX69/24 (for Part 121 operators), section 13 of CASA EX70/24 (for Part 133 operators), section 13 of CASA EX71/24 (for Part 135 operators) and section 12 of CASA EX72/24 (for aerial work certificate holders).

This regulation does not apply if regulation 121.285, 133.240 or 135.280 applies to an operation.

This regulation does not apply to Part 131 operations.

The MOS content for this regulation is contained in Division 20.3 of the Part 91 MOS.

Refer to AC 91-19 - Passenger safety information for guidance on safety briefings and instructions.

Not delivering safety briefing to previously carried passengers

PIC are cautioned that although this regulation permits a safety briefing to not be delivered to previously carried passengers, it is dependent on the circumstances being reasonable.

Pilots are reminded about the critical nature of safety briefings for passenger survivability in an emergency and are strongly recommended to spot check passenger retention of a previously delivered safety briefing before deciding to not deliver this briefing.

GM 91.570 Passengers—safety directions by pilot in command

This regulation does not apply if regulation 105.105 applies to an operation.

This regulation does not apply to Part 103 or Part 131 operations.

GM 91.575 Passengers—compliance with safety directions

This regulation does not apply if regulation 105.110 applies to an operation.

This regulation does not apply to Part 103 or Part 131 operations.

GM 91.580 Passengers—compliance with safety instructions by cabin crew

This regulation does not apply to Part 131 operations.

GM 91.585 Restraint and stowage of cargo

Regulations 21.305 and 21.305A address the approval of materials, parts, processes and appliances.

This regulation does not apply to Part 103 or Part 131 operations.

Loose items can pose a safety hazard, and pilots need to ensure items in the cabin are appropriately restrained. Cargo must be restrained using approved equipment or securely stowed in a place designed and approved for that purpose.

There are exceptions, such as carrying assistance animals in the cabin and carry-on baggage.

Refer to GM 91.590 for further guidance on stowage of carry-on baggage, and GM 91.620 for carriage of assistance animals in the cabin.

AMC 91.590 Restraint and stowage of carry-on baggage

Restraint and stowage of small portable electronic devices

This acceptable means of compliance applies to subparagraph 91.590(1)(b)(ii), i.e. the words “otherwise safely restrained”, solely in relation to the restraint and stowage of small portable electronic devices. Paragraph 91.590(1)(a) specifies the circumstances during a flight when this stowage and restraint rule apply, and these circumstances are when:

- the aircraft is taking off or landing

  or

- the PIC has directed that carry-on baggage be securely stowed.

A small portable electronic device is a portable electronic device that forms part of a person’s carry-on baggage. These 3 terms are defined as follows:

From the CASR Dictionary:

carry-on baggage means baggage or personal effects taken into, or to be taken into, the cabin of an aircraft, for carriage on the aircraft, by:

– a person (including a crew member of the aircraft) travelling on the aircraft, or

– a member of the personnel of the operator of the aircraft on behalf of a person mentioned in paragraph (a).

For the purposes of this AMC:

portable electronic device means lightweight, electrically-powered equipment including a mobile phone, music player, e-reader, tablet computer, laptop computer, portable video game console, or camera.

small portable electronic device means a portable electronic device with a mass of less than 1 kg.

It is an acceptable means of compliance with the requirements of subparagraph 91.590(1)(b)(ii), in relation to the restraint and stowage of small portable electronic devices, if the PIC ensures that small portable electronic devices are carried by a person during the circumstances mentioned in paragraph 91.590(1)(a).

Operators holding an AOC, Part 141 certificate or aerial work certificate can also incorporate the contents of this AMC into their operations manual or exposition.

GM 91.590 Restraint and stowage of carry-on baggage

There is an exemption in force in relation to this regulation for Part 121 operators. Operators are advised to review section 20 of CASA EX69/24.

This regulation does not apply if regulation 121.265 applies to an operation.

This regulation does not apply to Part 103 or Part 131 operations.

Carry-on baggage means baggage or personal effects taken into, or to be taken into, the cabin of an aircraft, for carriage on the aircraft, by:

- a person (including a crew member of the aircraft) travelling on the aircraft

  or

- a member of the personnel of the operator of the aircraft on behalf of a person mentioned in paragraph (a).

Carry-on baggage is a subset of the general definition of cargo and therefore the requirements of regulation 91.600 also apply. For example, paragraph 91.600(2)(c) requires cargo (other than passenger service equipment or galley equipment in an aisle on a temporary basis while in use) to not obstruct an aisle and paragraph 91.600(2)(d) requires cargo to not obstruct, or restrict access to, an emergency exit unless the operator or PIC holds an approval under regulation 91.045.

Stowage procedures

Procedures established by the operator to ensure that carry-on baggage and cargo are adequately and securely stowed should consider the following:

- each item carried in a cabin should be stowed only in a location that can restrain it
- under-seat stowage should not be used unless the seat is equipped with a restraint bar and the baggage is of such size that it may adequately be restrained by this equipment
- items should not be stowed in lavatories or against bulkheads that are incapable of restraining articles against movement forwards, sideways or upwards unless the bulkheads carry a placard specifying the greatest mass that may be placed there
- baggage and cargo placed in lockers should not be of such size that they prevent latched doors from being closed securely
- baggage and cargo should not be placed where they can impede access to emergency equipment
- checks should be made before take-off and landing, whenever the seat belt sign is illuminated, or it is otherwise so ordered, to ensure that baggage is stowed where it cannot impede evacuation from

the aircraft or cause injury by falling (or other movement), as may be appropriate to the phase of flight.

Dangerous goods in carry-on baggage

Small amounts of dangerous goods (such as portable electronic devices, powerbanks, toiletry items, alcohol etc.) for personal use by passengers or crew are permitted in carry-on baggage. Requirements for the carriage of dangerous goods as carry-on baggage are prescribed by regulation 92.030 (Compliance with Technical Instructions—passengers and crew).

Refer to AC 92A-01, and the dangerous goods section of the CASA website for detailed guidance on the carriage of dangerous goods.

GM 91.595 Restraint and stowage of certain aircraft equipment

There is an exemption in force in relation to this regulation for Part 121 operators. Operators are advised to review section 20 of CASA EX69/24.

This regulation does not apply if regulation 121.265 applies to an operation.

This regulation does not apply to Part 103 or Part 131 operations.

GM 91.600 Carriage of cargo—general

This regulation does not apply to Part 103 operations.

Cargo must not be carried where it:

- could damage, obstruct or cause the failure of any equipment essential to the safe operation of the aircraft
- is heavier than the load limitations for the floor structure or any other load-bearing components
- obstructs an aisle (except for the temporary access of passenger service or galley equipment)
- obstructs or restricts an emergency exit – unless CASA has granted an approval under regulation 91.045 for the purposes of this regulation.

Pilots and operators must ensure that aircraft are loaded in accordance with the respective aircraft flight manual instructions.

Carriage of cargo introduces bespoke risks and can affect the weight and balance of an aircraft during all phases of flight. The risks of loose or unsecured cargo include, but are not limited to, the following matters:

- cargo shifting during flight leading to out of balance situations and resultant flight control difficulties
- interference with essential flight control systems
- distraction of the pilot during critical phases of flight.

Operators and pilots are encouraged to conduct appropriate risk assessments before flight and during a flight to ensure risks are controlled in an adequate manner.

GM 91.605 Carriage of cargo—cargo compartments

This regulation does not apply to Part 103 or Part 131 operations.

GM 91.610 Carriage of cargo—unoccupied seats

This regulation does not apply to Part 103 or Part 131 operations.

If any modifications are made to an aircraft to enable the carriage of cargo on a seat (such as removing flight controls), applicable airworthiness requirements must be adhered to.

GM 91.615 Carriage of cargo—loading instructions

This regulation does not apply to Part 103 or Part 131 operations.

GM 91.620 Carriage of animals

There is an exemption in force in relation to this regulation. The exemption provides for an operator that is an Australian air transport AOC holder or an aerial work certificate holder to give permission for the carriage of an animal in place of the PIC. Operators and pilots are advised to review section 14 of CASA EX67/24.

The MOS content mentioned in subregulation 91.620(5) is not currently being used. A placeholder for any future content is contained in Division 20.4 of the Part 91 MOS. Adding any new content would be subject to the consultation rules contained in Subpart 11.J.

This regulation includes all animals and is not limited to only assistance animals.

The regulation places the responsibility on the PIC and the operator for ensuring the safety of the flight when an animal is carried on an aircraft. It applies to a small private aircraft through to an air transport aircraft, and each circumstance will require different considerations. It also allows the PIC or the operator discretion as to whether to carry an animal.

In general, carrying an animal is no different to carrying cargo. They must not block, impede access to, or escape through, an emergency exit. A large animal should be secured at all times so as not to damage or affect the balance of the aircraft in flight. As a minimum, a small or medium-sized animal carried in the cabin would normally need to be restrained during take-off and landing and in turbulence.

When giving permission, consideration should be given to:

- the type of animal
- how it is being carried, contained and/or restrained
- its reaction to noise and being out of its natural environment
- nuisance to other passengers
- distraction to flight crew
- how excrement or fluids will be contained.

An AOC holder’s exposition should provide instructions for carrying animals, including any limitations or requirements the operator expects personnel to observe and respect.

Animals carried during flight generally fall into two categories

- animals such as livestock, horses, domestic pets and snakes
- assistance animals in the company of a person with a disability.

Rather than requiring CASA approval for the carriage of animals, this regulation allows the operator and PIC to decide whether an animal can be carried without risking the safety of an aircraft, passengers and cargo on board. Before permitting an animal on board a flight it is recommended that the operator and PIC of the aircraft consider the following:

- Containerisation: Where possible, animals should be carried in individual containers, secured in accordance with regulations pertaining to the carriage of cargo. Containers provide a form of restraint and a means to ensure the containment of excreta.

- Escape: The size and nature of some animals means that their escape from a container or handlers could place the safety of the aircraft in jeopardy.
- Co-location with sensitive cargo: Like humans, animals are sensitive to toxic and infectious substances. Furthermore, they could pose a threat to the cleanliness of food intended for human consumption.
- Adverse reaction to aircraft: Aircraft noise and vibration may cause distress to an animal. Whenever possible, animals should be restrained, muzzled or located in such a way that any reaction to such conditions does not pose a threat to the safety of the aircraft.
- Consideration of passengers on board: Passengers with allergies to, or a phobia of, animals should be considered when deciding on the carriage of animals.
- Carriage of associated dangerous goods: The carriage of live fish and other aquatic animals as cargo may require a separate permission from CASA if cylinders of compressed air or oxygen are required. Part 92 regulates the carriage of dangerous goods, and AC 92-5 - Use of compressed oxygen: Carriage and consignment of live aquatic animals for transport by air discusses the use of compressed oxygen or air in support of the consignment and carriage of live aquatic animals by air.

Assistance animals

Refer to AC 91-03 - Carriage of assistance animals for detailed guidance on the carriage of assistance animals on aircraft.

4.8 Division 91.D.8—Instruments, indicators, equipment and systems

GM 91.625 Use of radio—qualifications

The MOS content for this regulation is contained in Division 21.1 of the Part 91 MOS. As a result of this MOS content, the total requirement of this regulation can be expressed as:

Unless a person is authorised or qualified as listed in paragraph 91.625(1)(b), the person must not transmit on a radio frequency published in the AIP or NOTAMs that is any of the following:

- used by Air Traffic Services
- used for communications at a:
  - » certified aerodrome or registered aerodrome
  - » military aerodrome
  - » designated non-controlled aerodrome listed in section 17.01 of the Part 91 Manual of Standards (MOS)[4]
  - » the CTAF for a non-controlled aerodrome (this effectively encompasses aerodromes with a published CTAF that are not certified, registered, military or designated non-controlled aerodromes)
- used in aeronautical emergencies
- used for communications in a mandatory broadcast area (MBA).

[4] At the time of publishing v2.5 of the Part 91 AMC/GM document, there were no designated non-controlled aerodromes in section 17.01 of the Part 91 MOS.

Note: The MBAs mentioned here are those listed in section 11.10A of the Part 91 MOS. These areas are not all areas referred to as 'Broadcast Areas'.

For a person piloting an aircraft or providing an air traffic service, the requirements in paragraph 91.625(1)(b) generally relate to having the right kind of pilot, or air traffic service, licence or authorisation.

For other persons, Part 64 prescribes authorisations for non-licensed personnel. The relevant Part 64 authorisation is called an *Aeronautical Radio Operator Certificate* (AROC). The AROC authorises a person to transmit on an *aviation safety radio frequency*. The term *aviation safety radio frequency* is defined in the CASR Dictionary as follows:

> ***aviation safety radio frequency*** means a radio frequency that is published in the AIP or NOTAMs and covered by any of the subparagraphs of paragraph 91.625(1)(a).

However, a person does not need to hold an AROC to transmit on a radio frequency that is not listed above and is therefore not an *aviation safety radio frequency*.

GM 91.630 Use of radio—broadcasts and reports

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24. There is an exemption in force in relation to this regulation and the conduct of certain aerobatic activities under the auspices of the Australian Aerobatic Club (See section 20B of CASA EX67/24).

This regulation does not apply to Part 131 operations.

The MOS content for this regulation is contained in Division 21.2 of the Part 91 MOS.

See the AMC 2 entry in AMC 91.055 for information relating to avoiding the creation of an aviation safety hazard by using appropriate radio phraseology.

To avoid radio congestion, it is recommended that pilots should:

- plan the content of the message before transmitting
- listen out before transmitting to avoid interference with other transmissions.

Common traffic advisory frequency (CTAF) – prescribed reports

Refer to AC 91-10 - Operations in the vicinity of non-controlled aerodromes for detailed guidance on operations in the vicinity of non-controlled aerodromes.

Controlled aerodromes and controlled airspace – prescribed reports

A variety of reports are prescribed for operation in controlled airspace and at controlled aerodromes. Where a difference exists between a requirement of this regulation and an ATC instruction, the ATC instruction must be followed.

The ATS frequency to report on is particular to the type of operation and ATS service provided. Airborne and departure reports should be made on the relevant Centre, Approach or Departures frequency. For operation at Class D aerodromes, pilots will have to determine whether an approach control service is in operation.

GM 91.635 Communication monitoring in controlled airspaces

There is an exemption in force in relation to this regulation to permit a pilot occupying a pilot seat to monitor the primary communications medium in place of the PIC. Pilots are advised to review section 15 of CASA EX67/24.

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24.

GM 91.640 Use of radio outside controlled airspaces—listening watch of radio transmissions

There are exemptions in force in relation to this regulation and air displays, including practicing for air displays. Pilots and operators are recommended to review sections 20 and 20A of CASA EX67/24. There is an exemption in force in relation to this regulation and the conduct of certain aerobatic activities under the auspices of the Australian Aerobatic Club. (See section 20B of CASA EX67/24).

This regulation requires that for an aircraft equipped with a radio and where the PIC is qualified to use it, the PIC (or another pilot occupying a pilot seat) must monitor radio transmissions continuously when flying outside controlled airspace.

Pilots should be aware that some aircraft conducting day VFR operations below 5000 ft AMSL in Class G airspace are not required to be fitted with a radio (note that certain weather conditions and certain areas of Class G airspace do require a radio to be fitted or carried) and therefore may not be maintaining listening watch on ATS or aerodrome frequencies.

Sections 3.1 and 8.1 of AC 91-10 - Operations in the vicinity of non-controlled aerodromes contain guidance relating to the use of radios in Class G airspace. Chapters 3 and 4 of AC 91-14 - Pilot's responsibility for collision avoidance contain guidance relating to the concepts of unalerted see-and-avoid and alerted see-and-avoid.

AMC 91.645 Availability of instructions for flight data and combination recorders

It is an acceptable means of compliance with this regulation if the operator has the documentation listed below available for immediate provision to the ATSB, which must be sufficient to ensure that the ATSB has the necessary information to read out the data in engineering units:

- parameter allocation
- conversion equations
- periodic calibration
- other serviceability/maintenance information.

GM 91.645 Availability of instructions for flight data and combination recorders

The intent of this regulation is to ensure operators whose aircraft is required to be fitted with a flight data recorder or a combination recorder always have certain information about the recorder available to be supplied to the ATSB in the event of an incident or accident that necessitates the ATSB accessing the recorder. This regulation is intended to ensure operators satisfy the relevant requirements of ICAO Annex 6 Parts I, II and III.

GM 91.650 Flight recorders—preserving recordings of immediately reportable matters

The list of immediately reportable matters is defined in Section 2.3 of the *Transport Safety Investigation Regulations 2003*. Refer to the AIP for further details.

Following an immediately reportable matter, the ATSB might provide instructions to the operator of an aircraft regarding the preservation of recorders and/or recordings.

Instructions might include any of the following:

- that recorders and/or recordings do not have to be preserved
- that recorders and/or recordings are to be preserved for a certain period.

When no instructions are received, the operator of an aircraft must preserve the recorders and recordings for 72 hours from the time of the report being made. This requirement does not apply if the recordings or recorders are not preserved, and the operator took reasonable steps in the circumstances to preserve them.

GM 91.655 RVSM airspace

Refer to AC 91-20 Reduced vertical separation minima[5] for guidance on obtaining approval to operate in RVSM airspace.

Before departing on a flight that will enter RVSM airspace, the PIC should check the following are fitted to the aircraft and operational:

- 2 independent primary altimetry systems
- a Mode C-capable SSR transponder
- an altitude alert system
- an autopilot with height lock.

If the aircraft is not fitted with this equipment, or it is unserviceable, an aircraft may still be operated in RVSM airspace. However, ATC must be advised the aircraft is being operated ‘Negative RVSM’.

GM 91.660 Performance-based navigation

The MOS content for this regulation is contained in Chapter 22 of the Part 91 MOS.

Refer to AC 91-05 - Performance-based navigation for detailed guidance on PBN theory and approvals. AMC 91.287 earlier in this document also contains information relevant to the acceptable means of compliance for the IFR requirements relating to compliance with navigation specifications.

Due to the expiry of CASA EX161/21 which granted temporary extensions to holders of approvals granted under the rules in force before 2 December 2021, it is recommended that holders of such approvals review AC 1-03 for details on transitioning to the flight operations regulations.

4.9 Division 91.D.9—Miscellaneous

Reserved.

[5] At the time of publication of this AMC and GM document, this AC is under development. Once published, it will be available from the CASA website.

4.10 Division 91.D.10—Signals, emergencies and hazards

GM 91.670 Standard visual signals

Standard visual signals are defined, and details of marshalling signals are referenced in Chapter 2 of the Part 91 MOS.

Details of marshalling signals are shown in Plain English Guide for new flight operations regulations.

Marshalling signals are designed for use by the marshaller (with hands illuminated as necessary to facilitate observation by the pilot) facing the aircraft in a position:

- for fixed-wing aircraft, on the left side of the aircraft, where best seen by the pilot
- for rotorcraft, where the marshaller can best be seen by the pilot.

The meaning of the relevant signals remains the same if bats, illuminated wands or torchlights are held.

The aircraft engines are numbered, for the marshaller facing the aircraft, from right to left (i.e., No. 1 engine being the port outer engine).

References to wands may also be understood as daylight-fluorescent table-tennis bats or gloves (daytime only).

The marshaller should check that the area within which an aircraft is to be guided is clear of objects which the aircraft might otherwise strike. The design of many aircraft is such that the path of the wing tips, engines and other extremities cannot always be monitored visually from the flight deck while the aircraft is being manoeuvred on the ground.

GM 91.675 Pilot in command to report hazards to air navigation

When reporting the existence of a hazard to air navigation under this regulation, it is recommended that the reports include any detail which may be pertinent to the safety of other aircraft.

Potential weather-related hazards to air navigation might include:

- wind shear
- severe turbulence
- severe icing
- severe mountain wave
- thunderstorms, with or without hail, that are obscured, embedded, widespread or in squall lines
- heavy dust storm or heavy sandstorm
- volcanic ash cloud
- unusual and/or increasing volcanic activity or a volcanic eruption.

Readers are advised that CASA has moved operational information relating to volcanic ash into a new AC - see AC 91-33 Flight in airspace with volcanic ash contamination.

Other aircraft in distress

A hazard to air navigation includes reporting any other aircraft observed to be in distress. If a pilot observes that another aircraft is in distress the pilot **must** report this hazard in accordance with this regulation. When reporting the hazard, the pilot is recommended to include as much of the following information as possible:

- type of craft in distress, its identification and condition
- its position, expressed in geographical or grid coordinates or in distance and true bearing from a distinctive landmark or from a radio navigation aid
- time of observation expressed in hours and minutes Coordinated Universal Time (UTC)
- number of persons observed
- whether persons have been seen to abandon the craft in distress
- on-scene weather conditions.

Additionally, if a pilot observes that another aircraft is in distress, the pilot is requested to, if possible and unless considered unreasonable or unnecessary:

- keep the aircraft in distress in sight until compelled to leave the scene or advised by the rescue coordination centre that it is no longer necessary
- determine the position of the craft in distress
- act as instructed by the rescue coordination centre or the air traffic services unit.

If the first aircraft to reach the scene of an accident is not a search and rescue aircraft, it is requested, if able, to take charge of on-scene activities of all other aircraft subsequently arriving until the first search and rescue aircraft reaches the scene of the accident.

If, in the meantime, the on-scene commander aircraft is unable to establish communication with the appropriate rescue coordination centre or air traffic services unit, it is recommended, by mutual agreement, to hand over to an aircraft capable of establishing and maintaining such communications until the arrival of the first search and rescue aircraft.

When it is necessary for an aircraft to convey information to survivors or surface rescue units, and two-way communication is not available, it is requested that the aircraft, if practicable, drop communication equipment that would enable direct contact to be established, or convey the information by dropping a hard copy message.

When a ground signal has been displayed, the overhead aircraft is recommended to indicate whether the signal has or hasn't been understood by direct communications, if available. If not, it should make appropriate visual signal (such as rocking the wings or flashing the landing or navigation lights twice to signal that the message was understood).

When it is necessary for an aircraft to direct a surface craft to the place where an aircraft is in distress, the aircraft shall do so by transmitting precise instructions by any means at its disposal. If no radio communication can be established, the aircraft shall make the appropriate visual signal (such as circling the surface craft and then pass overhead the craft rocking the wings before heading in the desired direction).

If a pilot intercepts a distress transmission and has reason to believe the transmission was not received by the intended recipient then, if feasible, the pilot is requested to:

- acknowledge the distress transmission
- record the position of the craft in distress (if given)
- take a bearing on the transmission (if able)
- inform the appropriate rescue coordination centre or air traffic services unit of the distress transmission, giving all available information
- at the pilot’s discretion and while awaiting further instructions from the rescue coordination centre or air traffic services unit, proceed to the position given in the transmission.

Pilot reports about aerodrome hazards, including aircraft braking

Pilots are required to report a hazard on an aerodrome to the operator of the aerodrome, as soon as circumstances permit. Hazards on an aerodrome include those relating to the runway surface condition and the expected braking action associated with that surface condition.

Runway condition reports (RCRs) are provided to pilots when significant 'standing water' is present on the runway surface, or the surface is 'slippery wet', or is 'otherwise contaminated'. These RCRs are provided by NOTAM or FIS at non-controlled certified aerodromes, or at controlled aerodromes where ATC is no longer present and includes a runway condition code (RWYCC) and runway surface description for each third of a runway.

Multi-Part AC 91-32 and AC 139-22 - Global reporting format – Runway surface condition provides guidance on the braking action associated with each RWYCC e.g. a 'WET' runway has a braking action of 'GOOD' and a 'SLIPPERY WET' runway has a braking action of 'MEDIUM'.

If a pilot at a certified aerodrome, where ATC is not present, experiences a braking action not as good as that reported via the RWYCC, the pilot should report that braking action directly to the aerodrome operator. Contact details for aerodrome operators are included in AIP-ERSA.

GM 91.680 Pilot in command to report emergencies

In the event of an emergency, the PIC should be aware of the phrase ‘aviate, navigate, communicate’. The priorities in order of importance are to maintain (or regain) control of the aircraft, navigate clear of obstacles and communicate with ATS or other stations.

If the aircraft is carrying dangerous goods, the PIC must also advise ATS of the nature and state of any dangerous goods carried as cargo on the aircraft. Wherever possible, this information should include the information as provided on the notification to the captain (NOTOC). When it is not considered possible to include all the information (e.g., in a critical emergency), those parts thought most relevant in the circumstances or a summary of the quantities and class or division of dangerous goods in each cargo compartment should be given. Further information regarding the NOTOC and requirements for dangerous goods emergency response are contained in regulation 92.025 and AC 92A-01 - The consignment and carriage of dangerous goods on all aircraft in Australian territory and on Australian aircraft overseas: An overview of the legislative framework and procedures.

GM 91.685 Multi-engine aircraft—pilot in command to land at nearest suitable aerodrome if emergency occurs

When considering the suitability of an aerodrome for a landing in the event of an engine failure or a precautionary shut down, the PIC should consider the following:

- nature of the malfunctioning and the possible mechanical difficulties which may be encountered if the flight is continued
- the nature and extent of any city, town or other populous area over which the aircraft is likely to fly

> **Note:** See GM 91.265 for further information on populous areas.

- availability of the inoperative engine to be used
- altitude, aircraft weight, and usable fuel at the time of engine stoppage
- distance to be flown coupled with the performance availability should another engine fail
- relative characteristics of aerodromes available for landing
- weather conditions en-route and at possible landing points
- air traffic congestion

- type of terrain, including whether the flight is likely to be over water
- familiarity of the pilot with the aerodrome to be used.

Also refer to the kit Safety behaviours: human factors for pilots for educational material on decision making. The kit is available from the CASA website.

GM 91.690 Pilot in command to report contraventions relating to emergencies

Incident, accident and emergency reporting is a valuable tool in maintaining aviation safety. Effective reporting allows organisations, such as CASA and the ATSB, to notice trends occurring within the aviation sector. Only where trends are observed can mitigating actions be identified and implemented.

Under the *Transport Safety Investigation Act 2003*, reports of accidents and incidents are defined by the AIP as either Immediately Reportable Matter (IRM) or Routinely Reportable Matter (RRM). The definition and reporting requirements of an IRM or RRM are contained in the AIP. In addition to reporting of IRM and RRM, a report must be made to CASA whenever a CASR is contravened during the management of an emergency situation.

For regulation 91.690, the PIC must give notice of a contravention of the regulations that occurred during a flight to deal with an emergency that threatened the safety of the aircraft. CASA is currently[6] still developing the form that will be the reporting mechanism for this regulation. Prior to the issuance of the form, pilots and/or operators are to report the information required by this regulation direct to the following email address: response.surveillance@casa.gov.au.

The PIC is not excused from reporting such a contravention on the grounds that giving the notice or information might tend to incriminate or expose them to a penalty. However, except where the report contains false or misleading statements, information or documents, the information provided cannot be used as evidence in criminal proceedings.

GM 91.695 Interception of aircraft

The MOS content for this regulation is contained in Chapter 23 of the Part 91 MOS.

The procedures to be followed during an aircraft interception are shown in Annex 2 to the Chicago Convention, Rules of the Air. The procedures are replicated in the AIP.

GM 91.700 Aviation distress signals

Reserved.

GM 91.705 Flight in icing conditions—adherence of frost, ice or snow

Reserved.

GM 91.710 Flight in icing conditions—requirements for flight

Reserved.

[6] At the time of publishing v2.5 of this Part 91 AMC/GM document.

4.11 Division 91.D.11—Causing or simulating failures etc.

4.11.1 Subdivision 91.D.11.1—Causing or simulating instrument failure etc.

GM 91.715 Causing or simulating failure of flight instruments

Reserved.

GM 91.720 Simulating IMC flying

This regulation does not apply to Part 103 operations.

GM 91.725 Training flight limitations etc.

There is a Part 11 direction in force in relation to this regulation and permitted persons that are conducting audits. Pilots are advised to review section 8 of CASA EX67/24.

There is a Part 11 direction in force in relation to the training of flight crew members for an aircraft class rating, type rating, or foreign equivalent, to be granted under a law of a foreign country. Operators and pilots are advised to review section 10 of CASA EX67/24.

There are 2 exemptions in force in relation to this regulation. Operators and pilots are advised to review sections 16 and 17 of CASA EX67/24.

This regulation does not apply to Part 103 operations.

For this regulation, a permitted person in relation to an aircraft means:

- a crew member of the aircraft
- a person authorised by the operator of the aircraft to conduct an audit of the operation involved, or to supervise it

  or
- an authorised officer carrying out an examination, inspection or test of the work of the aircraft's crew under these regulations.

A person is a crew member of an aircraft if the person is carried on the aircraft and is:

- a person:
  - who is authorised by the operator of the aircraft to carry out a specified function during flight time relating to the operation, maintenance, use or safety of the aircraft, the safety of the aircraft's passengers or the care or security of any cargo which may affect the safety of the aircraft or its occupants
  - who has been trained to carry out that function.

  or
- a person who is on board the aircraft for the purpose of:
  - giving or receiving instruction in a function mentioned in subparagraph (a)(i)

    or
  - being tested for a qualification associated with a function mentioned in subparagraph (a)(i)

    or

– a person authorised by CASA under these Regulations, or by the operator, to carry out an audit, check, examination, inspection or test of a person mentioned in paragraph (a) or (b).

Table 15 sets out the number of permitted persons that may be carried on a given type of training flight.

Table 15: Number of permitted persons on training flights

Type of training	Permitted Persons that may be carried[7]
Flight training (defined term) for a flight crew member who does not hold a class rating or type rating for the aircraft.	Maximum of four permitted persons.
The simulation (other than verbally) of an emergency or abnormal situation that may affect the handling characteristics of an aircraft other than a rotorcraft.	Maximum of three permitted persons.
The simulation (other than verbally) of an emergency or abnormal situation that may affect the handling characteristics of a rotorcraft.	Maximum of 3 permitted persons, unless the PIC is satisfied that the presence of a fourth permitted person is essential for the safe conduct of the flight[8].
Below 500 ft above ground level (AGL) (other than training for take-off and landing).	No limit to number of permitted persons unless another restriction within this table also applies to the flight.
For a Part 61 of CASR low-level rating or aerial application rating (or training for an equivalent qualification under a law of a foreign country).	Maximum of four permitted persons[9].
For a Part 61 of CASR aerobatic endorsement or spinning endorsement (or training for an equivalent qualification under a law of a foreign country).	Maximum of three permitted persons.

The PIC is not permitted to test the aircraft or any of its instruments, indicators, items of equipment or systems if a person, other than a permitted person or a member of the aircraft's maintenance personnel (who is required, as part of their duties, to be on the aircraft) is on board the aircraft.

Note: These restrictions do not include testing the aircraft during checks associated with the normal operation of the aircraft.

[7] For clarity, the number of permitted persons includes the pilot in command.

[8] Section 17 of CASA EX67/24 amends the effect of regulation 91.725, thereby creating this outcome.

[9] Section 16 of CASA EX67/24 amends the effect of regulation 91.725, thereby creating this outcome.

4.11.2 Subdivision 91.D.11.2—Causing or simulating engine failure etc. for aeroplanes

GM 91.730 Aeroplane flights in IMC or at night—engine not to be shut down

Reserved.

GM 91.735 Single-engine aeroplane—VFR flights by day—engine not to be shut down

Reserved.

GM 91.740 Single-engine aeroplane—simulating engine failure in IMC or at night

Reserved.

GM 91.745 Multi-engine aeroplane—simulating engine failure—general

This regulation uses the undefined phrase 'recognised national aviation authority of a foreign country'. CASA applies this phrase as meaning 'recognised foreign State' within the meaning of this term that is specified in regulation 61.010.

Some multi-engine aeroplanes are permitted to simulate engine failures in an aircraft and are not mandated to use a simulator. CASA **strongly recommends** the use of simulators where possible. If a simulator is not used, CASA also recommends that any planned simulated engine failure in flight be the subject of a thorough and comprehensive risk management plan.

Note that regulation 91.750 imposes additional conditions on the simulation of engine failures in IMC or at night. CASA recommends, but the regulations do not mandate, that operators and PICs use similar risk controls relating to the competence of the person simulating the engine failure during day VMC.

There are 2 issues with this regulation that CASA intends to address in a future regulation update:

- The current wording of subregulation 91.745(2) is not clear. Operators are advised to read the explanation of this subregulation below.
- The regulation does not include an approval power for multi-engine aeroplanes with a maximum take-off weight (MTOW) of greater than 8,618 kg that are certified to carry 9 or less passengers (such as the Lear 45). If operators of these aircraft desire to conduct in-aircraft simulated engine failures (and are not prohibited from doing so by another regulation), CASA advises that an exemption could be applied for, with the operator providing evidence equivalent to what would be needed if an approval power was in place..

For subregulation 91.745(2), the legal interpretation of this rule is as follows:

- Paragraph 91.745(2)(a) has the effect that an aeroplane which is type certificated to carry 9 or less passengers **AND** type certificated with a maximum take-off weight of 8,618 kg or less, is **not** required to use a flight simulator to simulate engine failures **unless another rule applies** (for example, regulations 61.205 and 121.510).
- Paragraph 91.745(2)(b) has the effect that an aeroplane which is type certificated to carry between 10-19 passengers (regardless of MTOW) must use a flight simulator to simulate engine failures if a simulator is available for the aeroplane in Australia unless an approval is granted by CASA. If a

simulator is not available in Australia for an aeroplane of this passenger capacity, then engine failures can be simulated in the aircraft, subject to regulations 61.205 (for the events mentioned in that regulation) and 121.510 (for the events encompassed by that regulation) of CASR.

- Paragraph 91.745(2)(c) has the effect that an aeroplane which is type certificated to carry 20 or more passengers (regardless of MTOW) must use a flight simulator to simulate engine failure if a simulator is available for the aeroplane in Australia or overseas (see the paragraph earlier in this GM for an explanation of which overseas simulators) unless an approval is granted by CASA. If a simulator is not available in Australia or within the relevant overseas countries for an aeroplane of this passenger capacity, then engine failures can be simulated in the aircraft, subject to regulations 61.205 (for the events mentioned in this regulation) and 121.510 (for the events encompassed by this regulation).

Refer to CAAP 5.23-1 - Multi-engine aeroplane operations and training for detailed guidance.

GM 91.750 Multi-engine aeroplane—simulating engine failures in IMC or at night

Regulation 91.750 describes the requirements that must be met by the PIC of a multi-engine aeroplane if they intend to simulate the failure of one of its engines in instrument meteorological conditions (IMC) or at night.

The requirements cover the following topics:

- the necessary qualifications and authority of the PIC to carry out the simulation
- that the flight itself must be for pilot training, checking or testing
- that only flight crew members are to be carried on the flight
- briefing and supervision of the operation
- the permissible minimum heights and locations (different conditions apply for IMC, or at night in VMC).

The PIC needs to closely consider the permissible minimum height and location requirements in their pre-flight planning, risk assessment and flight management requirements for the flight, and in the construction of the associated flight profile.

The flight profile will need to be designed to meet the requirements of the training, check or test objectives for the flight and remain compliant with regulation 91.750.

The reference in the regulation to circling areas as defined in the authorised aeronautical information is stated in the AIP Book as meaning:

- a prescribed IFR circling area for the aerodrome associated with an authorised instrument approach procedure, or
- if there is no prescribed IFR circling area of this kind for the aerodrome – within 3 NM of the aerodrome reference point, but only for an aeroplane with MTOW ≤ 5 700 kg.

It is recommended that appropriate risk assessment and hazard mitigation processes be applied when conducting these operations. These processes are recommended to include, but are not limited to, the following:

- the PIC having a full understanding of the aeroplane handling characteristics during and after simulating an engine failure
- the PIC having a full understanding of the aeroplane performance during and after simulating an engine failure

- the addition of appropriate safety buffers to airspeeds, altitudes, rates of descent, acceptable minimum climb profiles, minimum descent altitudes and setting maximum rate of attitude and heading change criteria
- the establishment of stabilised approach and go around criteria for the operation
- ensuring all failures are pre-briefed and closely monitored throughout
- the establishment of conservative take-over criteria
- the PIC having a full knowledge of the terrain over which the intended operation will be carried out, including knowledge of man-made obstacles such as buildings and towers and temporary obstacles such as cranes which may be notified via NOTAM
- establishment by the operator of appropriate exposition and operations manual procedures for the planning of such flights, the risk assessment and management processes and their conduct as air exercises.

Some flight manuals or POHs may include simulated engine failure in-flight procedures that are not stated as being mandatory. However, PICs and operators are strongly encouraged to fully understand the effect of not deciding to follow any manufacturer recommended procedures.

Where simulated engine failure in-flight procedures are mandatory in a flight manual, the most conservative requirements of either the regulations or the flight manual must be followed.

4.11.3 Subdivision 91.D.11.3—Causing or simulating engine failure etc. for rotorcraft

GM 91.755 Single-engine rotorcraft—engine not to be shut down

Reserved.

GM 91.760 Single-engine rotorcraft—engine failure not to be simulated and autorotation of main rotor system not to be initiated in IMC

Reserved.

GM 91.765 Single-engine rotorcraft—simulating engine failure or initiating autorotation of main rotor system at night

Reserved.

GM 91.770 Multi-engine rotorcraft—engine not to be shut down at certain altitudes in IMC or at night

Reserved.

GM 91.775 Multi-engine rotorcraft—simulating engine failure in IMC or at night

There is an exemption in force in relation to this regulation. Operators and pilots are advised to review section 18 of CASA EX67/24.

Regulation 91.775 describes the requirements that must be met by the PIC of a multi-engine rotorcraft if they intend to simulate the failure of one of its engines in instrument meteorological conditions (IMC) or at night.

The requirements cover the following topics:

- the necessary qualifications and authority of the PIC to carry out the simulation
- that the flight itself must be for pilot training, checking or testing
- that only flight crew members are to be carried on the flight
- briefing and supervision of the operation
- the permissible minimum heights and locations (different conditions apply for IMC, or at night in VMC).

The PIC needs to closely consider the permissible minimum height and location requirements in their pre-flight planning, risk assessment and flight management requirements for the flight and in the construction of the associated flight profile.

The flight profile will need to be designed to meet the requirements of the training, check or test objectives for the flight and remain compliant with regulation 91.775.

The reference in the regulation to circling areas as defined in the authorised aeronautical information is stated in the AIP Book as meaning:

- a prescribed IFR circling area for the aerodrome associated with an authorised instrument approach procedure, or
- if there is no prescribed IFR circling area of this kind for the aerodrome – within 3 NM of the aerodrome reference point, but only for an aeroplane with MTOW ≤ 5 700 kg.

It is recommended that appropriate risk assessment and hazard mitigation processes be applied when conducting these operations. These processes are recommended to include, but are not limited to, the following:

- the PIC having a full understanding of any simulated engine failure flight manual instructions and training selector switch (if any) requirements
- the PIC having a full understanding of rotorcraft's handling characteristics during and after simulating an engine failure
- the PIC having a full understanding of the rotorcraft's performance during and after simulating an engine failure
- the addition of appropriate safety buffers to airspeeds, altitudes, rates of descent, acceptable minimum climb profiles, minimum descent altitudes and setting maximum rate of attitude and heading change criteria
- the establishment of stabilised approach and go around criteria for the operation
- the establishment of conservative take-over criteria
- the PIC having a full knowledge of the terrain over which the intended operation will be carried out, including knowledge of man-made obstacles such as buildings and towers and temporary obstacles such as cranes which may be notified via NOTAM, or via the operator's HLS register temporary obstacle reporting system
- establishment by the operator of appropriate exposition and operations manual procedures for the planning of such flights, the risk assessment and management processes and their conduct as air exercises.

Some flight manuals or POHs may include simulated engine failure in-flight procedures that are not stated as being mandatory. However, PICs and operators are strongly encouraged to fully understand the effect of not deciding to follow any manufacturer recommended procedures.

Where simulated engine failure in-flight procedures are mandatory in a flight manual, the most conservative requirements of either the regulations or the flight manual must be followed.

4.12 Division 91.D.12—Psychoactive substances

GM 91.780 Passengers—alcohol

This regulation does not apply to Part 103 operations.

GM 91.785 Crew—provision of alcohol

This regulation does not apply to Part 103 operations.

GM 91.790 Prohibiting person affected by psychoactive substances from boarding

The intent of this rule is to provide operators and crew members with the power to deny aircraft boarding to persons believed to be affected by psychoactive substances to an extent that may present a hazard to the aircraft or a person on the aircraft.

This rule is intended to function in conjunction with multiple other rules regulating ensuring safe aircraft operations, the kinds of persons permitted to be onboard an aircraft and the obligations and powers of crew members.

These include (but are not limited to) the following:

- Section 24 of the *Civil Aviation Act 1988* (the Act) which states that a person commits an offence if the person does an act and the act either interferes with a crew member of an aircraft in the course of the performance of his or her duties as such a crew member or threatens the safety of an aircraft or of persons on board an aircraft.
- For an AOC holder, subsection 28BE(1) of the Act requires an AOC holder to at all times take all reasonable steps to ensure that every activity covered by the AOC, and everything done in connection with such an activity, is done with a reasonable degree of care and diligence.
- Regulation 91.060 states that a person commits an offence if the person travels on an aircraft for a flight and, at the time of the travel, does not have the consent of the operator or the PIC to travel on the aircraft.
- Regulation 91.215 states that the PIC of an aircraft has final authority over the aircraft and the maintenance of discipline by all persons on the aircraft; and must ensure (in part) the safety of persons on the aircraft and the safe operation of the aircraft during the flight.
- Regulation 91.220 states that the operator or PIC of an aircraft may do one of the following things if the operator or PIC believe it is necessary for the safety of the aircraft, a person on the aircraft or a person or property on the ground or water:
  - direct a person to do something while the person is on the aircraft
  - direct a person not to do something, or to limit the doing of something, while the person is on the aircraft
  - direct a person to leave the aircraft before the flight begins
  - with such assistance and by the use of such force as is reasonable and necessary:

  - » remove a person or a thing from the aircraft before the flight begins
  - » restrain a person for the duration of the flight or part of the flight
  - » seize a thing on the aircraft for the duration of the flight or part of the flight
  - » place a person on the aircraft in custody
  - » detain a person or a thing, until the person or thing can be released into the control of an appropriate authority.
- Regulation 91.220 further states that if the operator or PIC of an aircraft gives the person a direction to do something while the person is on the aircraft, not to do something, or to limit the doing of something, while the person is on the aircraft, or leave the aircraft before the flight begins, and the person does not comply with the direction, then the person has committed an offence.
- Regulation 91.225 provides aircraft crew members with a limited power of arrest (refer to the regulation for precise details).
- Subregulation 91.525(2) states that the operator or a crew member of an aircraft may refuse to allow a person to board the aircraft if there are reasonable grounds to believe that the person is likely to behave in an offensive or disorderly manner that is likely to endanger the safety of the aircraft or persons on the aircraft. Subregulation 91.525(3) contains a non-limiting description of what constitutes behaving in an offensive or disorderly manner.

Broadly, it is incumbent on the operator and the PIC to ensure the safety of the aircraft operation and the persons onboard an aircraft.

If an operator or PIC was to permit persons believed to be affected by psychoactive substances, to an extent that may present a hazard to the aircraft or a person on the aircraft, to board an aircraft, it would be reasonable to expect that the operator or PIC (as appropriate to the kind of operation being performed) to have robust procedures in place to ensure that such a person could not present a hazard to the aircraft or a person on the aircraft.

5 Subpart 91.F—Performance

There are exemptions in force in relation to this Subpart for Part 121, 133, 135 operators and aerial work certificate holders. Operators are advised to review section 21 of CASA EX69/24 (for Part 121 operators), section 14 of CASA EX70/24 (for Part 133 operators), section 14 of CASA EX71/24 (for Part 135 operators) and section 13 of CASA EX72/24 (for aerial work certificate holders).

This Subpart does not apply if Subpart 121.F, 133.F, 135.F or 138.F applies to an operation.

This Subpart does not apply to Part 131 operations.

AMC 91.795 Take-off performance

Clearing obstacles by a safe margin (sections 24.02 and 24.03 of the Part 91 MOS)

For a multi-engine aeroplane with a MTOW < 5 700 kg, or any multi-engine rotorcraft, that is conducting a take-off as an IFR aircraft when day VMC cannot be maintained until the minimum height required by regulation 91.305, it is an acceptable means of compliance with the requirement to clear obstacles by a safe margin from section 24.02 or 24.03 of the Part 91 MOS if one of the following is met:

- the requirements of an authorised instrument departure procedure can be achieved, with the aircraft engine-out climb gradient under ambient conditions specified in the manufacturer's data being at least 0.3% greater than the gradient specified in the procedure with the loss of the most critical engine (or either engine if for a rotorcraft there is no critical engine)

  or

- all of the following:
  - the aircraft engine-out climb gradient under ambient conditions specified in the manufacturer's data is at least 0.3% greater than the obstacle free gradient for the runway length required
  - either:
    - » published obstacle free gradients are only used if such gradients are surveyed to at least a distance of 7 500 m from end of take-off distance available (TODA)

      or

    - » an operator-established obstacle free gradient is used only if:
      - + the gradient (having a 150 m baseline at the end of TODA), 12.5% splays, and at least 7 500 m distance) is established not more than 30° from runway heading
      - + the procedures involve not more than 15° of bank to track within the splay.

> **Note:** For Australian runways listed in the AIP-ERSA, a particular aerodrome runway has a surveyed area if the aerodrome and the specific runway have a specified *code number* (labelled as CN and either 1, 2, 3 or 4) in the ERSA Runway Distance Supplement (RDS) section (at the time of publishing this content was at the end of the AIP-ERSA document). The interpretation of the RDS information is explained in the "Runway distances legend" section of the AIP-ERSA Introduction. The length (or distance) of the surveyed area for different CNs is specified in section 1.6 (Take off runway survey areas) of the AIP-ERSA Introduction.

For a multi-engine aeroplane with a MTOW >= 5 700 kg conducting a take-off as an IFR aircraft where day VMC cannot be maintained until the minimum height required by regulation 91.305, it is an acceptable means of compliance with the requirement to clear obstacles by a safe margin from section 24.02 of the Part 91 MOS if the requirements of sections 9.03, 9.04, 9.05 and 9.06 of the Part 121 Manual of Standards (MOS) are met.

For a multi-engine rotorcraft conducting a take-off as an IFR aircraft where day VMC cannot be maintained until the minimum height required by regulation 91.305, it is an acceptable means of compliance with the requirement to clear obstacles by a safe margin from section 24.03 of the Part 91 MOS if the requirements of sections 10.33 and 10.34 in combination, or 10.37 and 10.38 in combination, of the Part 133 MOS are met.

For a single-engine aeroplane or rotorcraft conducting a take-off as an IFR aircraft where day VMC cannot be maintained until the minimum height required by regulation 91.305, it is an acceptable means of compliance with the requirement to clear obstacles by a safe margin from section 24.02 or 24.03 of the Part 91 MOS if terrain and obstacles are cleared by:

- the use of an authorised instrument departure procedure, with the aircraft climb gradient under ambient conditions specified in the manufacturer's data being at least 0.3% greater than the gradient specified in the procedure

  or

- a minimum of 50 ft vertically within a lateral distance of:
  - 45 m plus 0.10 D (where D is the horizontal distance the aircraft will travel from the end of the take-off distance available)
  - to a maximum of:
    - » 600 m;

      or

    - » 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.

GM 91.795 Take-off performance

The take-off performance requirements are contained in Chapter 24 of the Part 91 MOS.

The performance information presented in an AFM is often based on measured flight test data corrected to ICAO standard day conditions and analytically expanded for the various parameters of weight, altitude, temperature etc.

The performance charts are often unfactored and do not make any allowance for varying degrees of pilot proficiency or mechanical deterioration of the aircraft. Effects of conditions not considered on the charts should be evaluated by the pilot, such as the effect of soft or grass runway surface on take-off performance.

In addition to the AFM providing figures for determining the take-off distance required, the PIC should take into consideration obstacles that may be limiting or that may infringe the intended flight path. Consideration should also be given to obstacles that may infringe any flight path intended for use during abnormal situations.

See AC 91-02 – Guidelines for aeroplanes with MTOW not exceeding 5 700 kg - suitable places to take off and land, for recommended safety factors to be used during the take-off and landing of aeroplanes.

The following ACs address air transport operations in rotorcraft, however the content will be useful for pilots of rotorcraft in Part 91 operations:

- AC 133-01 - Performance class operations
- AC 133-02 - Performance Class 2 with exposure operations.

GM 91.800 Landing performance

The landing performance requirements are contained in Chapter 25 of the Part 91 MOS.

The performance information presented in an AFM is often based on measured flight test data corrected to ICAO standard day conditions and analytically expanded for the various parameters of weight, altitude, temperature etc.

Effects of conditions not considered on the charts should be evaluated by the PIC, such as the effect of soft or grass runway surface on landing performance.

The performance charts are often unfactored and do not make any allowance for varying degrees of pilot proficiency or mechanical deterioration of the aircraft.

In addition to the AFM providing figures for determining the landing distance required, the PIC should take into consideration obstacles that may be limiting or that may infringe the intended flight path of a missed approach. Consideration should also be given to obstacles that may infringe any flight path intended for use during abnormal situations.

See AC 91-02 – Guidelines for aeroplanes with MTOW not exceeding 5 700 kg - suitable places to take off and land, for recommended safety factors to be used during the take-off and landing of aeroplanes.

The following ACs address air transport operations in rotorcraft, however the content may be useful for pilots of rotorcraft in Part 91 operations:

- AC 133-01 - Performance class operations
- AC 133-02 - Performance Class 2 with exposure operations.

Actual landing distance

In response to recommendations of the FAA's Take-off and landing performance assessment aviation rule making committee (TALPA ARC), the manufacturers of some jet-engine aeroplanes now supply actual landing distance information to help pilots make more accurate in-flight assessments of the landing distance required in unusual situations. Actual landing distance information takes into account; reported meteorological and runway surface conditions, runway slope, aircraft configuration, planned approach speed, thrust reversers and any other deceleration devices planned to be used for the landing. The FAA's Safety Alert For Operators (SAFO 19001) contains useful information about the recommendations of the TALPA ARC.

Actual landing distance information is intended to show landing performance that can realistically be achieved by flight crews in commercial operations. This is distinct from landing performance demonstrated by test pilots during flight tests for aircraft type certification. The safety factor applicable to in-flight actual landing distance information is 1.15. The safety factor applied to aircraft type certification for pre-flight planning landing distance is 1.67. Pilots of jet-engine aeroplanes that do not have actual landing distance information should continue to make in-flight assessment of landing distance required using the manufacturers landing distance information with an applicable safety factor.

Two major manufacturers (Boeing and Airbus) have introduced a new reference for in-flight landing distance performance, catering for both normal and abnormal system operations. The new distances are referred to by Airbus as Operational Landing Distances (OLD) and In-flight Landing Distance (IFLD) whereas Boeing incorporates the actual landing distance in the Performance In-flight section of the Quick Reference Handbook. Both manufacturers have included this data in their respective performance applications. The actual landing distances are a realistic representation of operationally achievable landing performance. The representation of this information is generally "unfactored" unless otherwise stated. The CAO 20.7.1B amendment facilitates the adoption of manufacturers' performance applications along with the application of the 1.15 safety factor. The FAA and EASA have adopted the in-flight landing distance factoring as policy, along with ICAO.

Landing in very wet conditions

Operators and flight crews should be aware that landing distance factors – whether based on type certification testing or actual landing distance data provided by OEMs separately – may not provide adequate stopping distance in very wet but not yet contaminated runway surface conditions.

Issues that contribute to such incidents include runway conditions such as texture (polished or rubber contaminated surfaces), drainage, puddling in wheel tracks and active precipitation. For un-grooved runways, wheel braking may be degraded when the runway is very wet. Research conducted by the FAA has indicated that 30 to 40 percent of additional stopping distance may be required in certain cases where the runway is very wet, but not yet classified as contaminated.

In order to manage some of the risks associated in operating to very wet runways, it is recommended that operators consider the landing safety factor of 1.15 (which is the difference between 1.67 and 1.92 for type certification data and the value mentioned in the actual landing distance data) to be a minimum value.

If moderate or heavy precipitation is expected at the time of landing, operators and flight crews should consider assuming a braking action of medium or fair, or increasing the landing safety factor used during in-flight landing performance calculations. The FAA's Safety Alert For Operators (SAFO 19003) contains useful information about the recommendations on landing safety factors.

6 Subpart 91.J—Weight and balance

There is an exemption in force in relation to this topic for the conduct of aerial application operations under Part 137. The effect of regulation 137.020 means that regulation 137.190 overrides regulation 91.805. After this override occurs, relevant operators and persons can then utilise instrument CASA EX92/22 if they elect to do so.

There are exemptions in force in relation to this Subpart for Part 121, 133, 135 operators and aerial work certificate holders. Operators are advised to review section 22 of CASA EX69/24 (for Part 121 operators), section 15 of CASA EX70/24 (for Part 133 operators), section 15 of CASA EX71/24 (for Part 135 operators) and section 14 of CASA EX72/24 (for aerial work certificate holders).

This Subpart does not apply if Subpart 121.J, 133.J, 135.J or 138.J applies to an operation.

This Subpart does not apply to Part 131 operations.

GM 91.805 Loading of aircraft

It is critical to flight safety that an aircraft remains within its weight and balance limits.

Aircraft that are operated over the maximum permitted weight will not exhibit performance in accordance with manufacturer data. For example, the aircraft may not be able to take-off, or, for an aeroplane, will take longer than expected to take-off. If the aircraft does take-off, it may exhibit unexpected and unusually poor flight characteristics.

The weight of an aircraft can be significantly affected by changes to the aircraft fixed equipment. Aircraft modifications are a clear example of changing the weight of an aircraft.

An aeroplane operated in a nose-heavy condition is likely to have problems in controlling pitch and raising the aircraft nose, especially during take-off and landing. Conversely, the longitudinal stability of an aeroplane operated in a tail-heavy condition will be significantly impacted, and a tail-heavy aeroplane will have very light control forces and a reduced capability to recover from stalls and spins. Light control forces make it particularly easy for a pilot to inadvertently overstress an aeroplane.

If an aircraft experiences a failure, malfunction, or non-normal event, operation above maximum weights can further exacerbate the hazards associated with the event. This circumstance can significantly increase pilot workload to an intolerable level during an already hazardous condition (i.e. managing an emergency). An example would be an engine failure in a twin-engine aeroplane that results in a non-liner response to V_{MCA}, control margins and cross-coupling, which in isolation or combination could result in poor predictability to aircraft response with potential loss of control.

Because the probability of overloading in a small aircraft is high if standard weights are used, the use of standard weights in aircraft with less than seven seats is not recommended by CASA. Load calculations for these aircraft should be made using actual weights arrived at by weighing all occupants and baggage, including cabin baggage. Operators and pilots conducting Part 91 operations in larger aircraft should refer to Multi-Part AC 121-05, AC 133-04 and AC 135-08 - Passenger, crew and baggage weights.

All cargo transported on an aircraft should be weighed and secured to avoid movement in flight. In addition, cargo carried for the purpose of being dropped from the aircraft must be secured for take-off and until the point of the drop. The PIC must ensure the dropping of the item(s) will not result in the aircraft centre of gravity moving to the extent that it exceeds aircraft limits.

Parachuting aircraft operators are recommended to be particularly vigilant regarding the maintenance of balance limits during flight, as the anticipated movement of parachutists during flight must be accounted for in the balance calculations made before flight. It is strongly recommended that the PIC ensures that pre-flight balance calculations for all loads not only examine the location of parachutists during take-off, but also their positions in the aircraft as they position themselves as part of the jump run and parachutist exit sequence.

> Operators may have alternative methods of weight and balance calculation, e.g., EFB applications. CAO 100.7 requires that such applications must be validated by a weight control authority. Section 5 of CAO 100.7 sets out requirements for aircraft load data sheets and loading systems. Aircraft PICs must not commence a flight unless they have received evidence and taken the necessary actions to ensure compliance with the loading data..

7 Subpart 91.K—Equipment

There are exemptions in force in relation to this Subpart for Part 121, 133 and 135 operators. Operators are advised to review section 23 of CASA EX69/24 (for Part 121 operators), section 16 of CASA EX70/24 (for Part 133 operators) and section 16 of CASA EX71/24 (for Part 135 operators).

This Subpart does not apply if Subpart 121.K, 133.K or 135.K applies to an operation.

This Subpart does not apply to Part 103 or Part 131 operations.

AMC 91.810 Requirements relating to equipment

Sections 26.02, 26.07, 26.08, 26.10, 26.11 and 26.12 of the Part 91 Manual of Standards – accuracy of time measurement

Item 3 of tables 26.02(2), 26.10(2) and 26.11(5), and item 4 of tables 26.07(4), 26.08(4) and 26.12(7), of the Part 91 MOS all require the fitment or carriage of equipment to measure time. The common requirement in relation to accuracy is that the equipment must "display accurate time in hours, minutes and seconds".

Multiple legislative requirements rely on the accuracy of the time equipment used for aircraft flights.

It is an acceptable means of compliance with the requirement for time equipment to "display accurate time" if the accuracy of the equipment is to within plus or minus 30 seconds.

Section 26.18 of the Part 91 Manual of Standards – radiocommunication system requirements

Paragraph 26.18(1)(a) of the Part 91 MOS requires an aircraft to be fitted with radiocommunication systems capable of collectively communicating on the frequencies necessary to meet the reporting, broadcast and listening watch requirements under regulations 91.630, 91.635, 91.640 and 91.675, from any point on the route of the flight, including in the event of any diversions.

Radiocommunication systems – HF (section 26.18 of the Part 91 MOS)

If an HF radio is fitted to an aircraft to comply with paragraph 26.18(1)(a) of the Part 91 MOS—generally this would be in geographical areas where a VHF radio cannot ensure the required communications—then the radio must, in order to be fitted as an acceptable means of compliance:

- take into account the expected radio propagation conditions during the period of operation
- be capable of delivering a peak envelope power to the antenna transmission line of at least 100 watts and not greater than 400 watts under standard conditions.

Radiocommunication systems – SATCOM (section 26.18 of the Part 91 MOS)

Where 2-way communications cannot be maintained using a VHF radio in the event of emergency and/or abnormal operations en-route, it is an acceptable means of compliance to use SATCOM telephone that is fitted to the aircraft in accordance with Part 21, instead of an HF radio, provided that all of the following conditions are met:

- routes are selected so that the anticipated period beyond VHF coverage, in the event of emergency and/or abnormal operation, does not exceed 30 minutes
- appropriate checks have been incorporated into the pre-flight check list and form part of the company's operating procedures
- the system is equipped with an external antenna and operated via a common VHF headset/microphone
- SATCOM telephone transmissions will be recorded by the Cockpit Voice Recorder
- the system is inter-operable with existing NAV systems

- power can be removed from the system
- defect reports will be issued and dispatched as for other COM systems
- the system has been incorporated in the MEL if there is one for the aircraft.

Note: SATCOM telephone contact procedures are described in AIP ERSA. Additionally, to facilitate ATC initiated calls to the aircraft during contingencies, it is recommended that the phone number of the aircraft be included in Field 18 of the flight plan. Any pre-flight radio check of the SATCOM telephone should not be made to ATS to avoid congesting ATS phone lines.

Section 26.21 of the Part 91 Manual of Standards – independent portable lights

The information in this section outlines acceptable means of compliance regarding what constitutes “an independent portable light” for a flight crew member as required by paragraph 26.21(1)(c) of the Part 91 MOS.

For the purposes of the previously mentioned MOS paragraph, a torch carried onboard by the flight crew member is considered to constitute “an independent portable light” provided that the flight crew member has confirmed on the day of the flight that the torch:

- is serviceable
- has sufficient light output to properly illuminate any control, switch or display within the cockpit that the flight crew member would be required to view, manipulate or action during normal, abnormal or emergency situations.

Division 26.11 of the Part 91 Manual of Standards – oxygen equipment and oxygen supplies

Note: This acceptable means of compliance continues the previous standards specified in subsection 3 of 108.26 prior to 2 December 2021 when this CAO was repealed.

It is an acceptable means of compliance if a gaseous oxygen system complies with one of the following specifications:

- C.I.G. Gas Code 420 or 430
- RAAF Specification G172
- U.K. Ministry of Defence DEF STAN 68-2 1/1
- U.S. Military Specification MIL-0-272 10.

It is an acceptable means of compliance if oxygen produced through chemical means in an oxygen system complies with one of the following specifications:

- U.S. Military Specification MIL-E-83252
- Scott Engineering Report 1024.

Sections 26.43 and 26.44 of the Part 91 Manual of Standards – supplemental oxygen and oxygen mask requirements

Note: This acceptable means of compliance continues previous standards specified in paragraph 8.2 of CAO 20.4 and subsections 5 and 6, and Appendix II, of 108.26 prior to 2 December 2021 when these CAOs were repealed.

The information in this section outlines acceptable means of compliance regarding the fitment of supplemental oxygen equipment, the means of calculating the supplemental oxygen supply and the dispensing units for supplemental oxygen, including the minimum mass flow requirements, in relation to the requirements of sections 26.43 and 26.44 of the Part 91 MOS. None of these requirements override a higher requirement imposed by a design standard (however described) related to the type certification, or supplemental type certification, of the aircraft.

In determining the amount of oxygen required to be carried, the amount is to be determined on the basis that:

- a cabin pressurisation failure will occur at a point on the planned flight route which is most critical from the standpoint of oxygen need; and
- after the failure, the aircraft will descend in accordance with the emergency procedures specified in the aircraft's flight manual (without exceeding its normal operating limitations) to a flight altitude or a Flight Level, as the case may be, that will allow the safe termination of the flight.

In relation to the requirement of subsection 26.43(1) of the Part 91 MOS that certain aircraft must be 'fitted with' supplemental oxygen equipment, it is acceptable that portable oxygen units are carried to meet this requirement.

Dispensing units must meet the following requirements:

- An individual dispensing unit must be installed for each occupant for whom supplemental oxygen is to be supplied.
- A unit must be equipped with a suitable means to retain the unit in position on the face.
- A unit:
  - must not, while using the unit, adversely affect a person's ability to use the crew intercommunications equipment or radiocommunication equipment required to be fitted to the aircraft by the civil aviation legislation; or
  - must provide alternative communication equipment that can achieve equivalent outcomes that the person can use while using the unit.
- The units provided in an aircraft operating at or below flight level 180 must include at least 1 unit designed to cover the nose and mouth for every 15 units provided.
- Every unit provided in an aircraft operating above flight level 180 must be designed to cover the nose and mouth.
- Every unit installed in an unpressurised aircraft must have all of the following information clearly visible on it:
  - a notice prohibiting smoking while the unit is used
  - an illustration showing how to put the unit on
  - a notice describing the dangers of flying with any kind of nasal obstruction or congestion.
- For flight crew members or assisting crew members, they must be provided with oxygen demand equipment with the oxygen dispensing unit connected to an oxygen supply terminal which is immediately available to each of these crew members when seated at their crew station.

The following minimum mass flow requirements must be met:

- One of the following:
  - if continuous flow equipment is installed for the use by flight crew members – the minimum mass flow of supplemental oxygen available for each crew member must not be less than the flow required to maintain, during inspiration, a mean tracheal oxygen partial pressure of 149 mm Hg when breathing 15 litres per minute, body temperature and pressure saturated (BTPS) and with a maximum tidal volume of 700 cc with a constant time interval between respirations; or
  - if continuous flow equipment is installed for the use by flight crew members – the flow rates and mask efficiencies in Figure 5 below may be used instead of the above flow rates; or

  - a nasal cannula manufactured under the name “Oxymizer” may be used subject to the following conditions:
    - » the minimum flow of supplemental oxygen available for each flight crew member at various cabin pressure altitudes must not be less than 0.3 litre per minute at 10,000 feet altitude, increasing by 0.1 litre per minute for every 2,000 feet up to 18,000 feet altitude; and
    - » the aircraft must not operate above 18,000 feet altitude.

- If demand equipment is installed for use by flight crew members, the minimum mass flow of supplemental oxygen available for each flight crew member must not be less than the flow required to maintain, during inspiration, a mean tracheal oxygen partial pressure of 122 mm Hg, up to and including a cabin pressure altitude of 35,000 feet and 95 per cent oxygen between cabin pressure altitudes of 35,000 feet and 40, 000 feet, when breathing 20 litres per minute BTPS. In addition, there must be means to allow the crew to use undiluted oxygen at their discretion.
- For passengers or cabin crew members using masks, the minimum mass flow of supplemental oxygen available for each person at various cabin pressure altitudes must not be less than the flow required to maintain, during inspiration and while using the oxygen equipment provided, the following mean tracheal oxygen partial pressures:
  - at cabin pressure altitudes above 10,000 feet up to and including 18,500 feet, a mean tracheal oxygen partial pressure of 100 mm Hg when breathing 15 litres per minute, BTPS, and with a tidal volume of 700 cc with a constant time interval between respirations
  - at cabin pressure altitudes above 18,500 feet up to and including 40,000 feet, a mean tracheal oxygen partial pressure of 83.8mm Hg when breathing 30 litres per minute, BTPS, and with a tidal volume of 1100 cc with a constant time interval between respirations. The flow rates and mask efficiencies specified in Figure 5 below may be used at cabin pressure altitudes up to 25,000 feet instead of the above flow rates.
- For passengers or cabin crew members using nasal cannulas manufactured under the name “Oxymizer”, the minimum flow of supplemental oxygen available for each person at various cabin pressure altitudes must not be less than 0.3 litre per minute at 10,000 feet altitude, increasing by 0.1 litre per minute for every 2,000 feet up to 18,000 feet altitude.

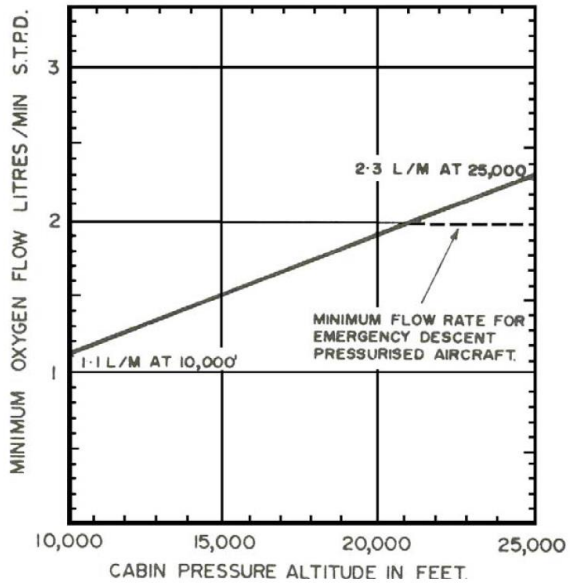


Figure 4: Minimum oxygen flow rates for flight altitudes not exceeding FL250 when using masks with efficiencies equal to, or better than, the A 8 B oronasal mask, the Scott 28302-11 semi disposable mask or the K-S disposable mask

Sections 26.45 and 26.46 of the Part 91 Manual of Standards – protective breathing equipment

Note: This acceptable means of compliance continues previous standards specified in subsection 10 of CAO 20.4 and subsection 7 of 108.26 prior to 2 December 2021 when these CAOs were repealed.

The information in this section outlines acceptable means of compliance related to the protective breathing equipment required by sections 26.45 and 26.46 of the Part 91 MOS.

The portable protective breathing equipment required by paragraphs 26.46(3)(b) and (3)(c) of the MOS must comply with (E)TSO-C116 (or any later version).

Except for the portable protective breathing equipment required by paragraph 26.46(3)(a) of the MOS which may, in relation to the 15 minute supply requirement of paragraph 26.46(2)(c) of the MOS, comply with (E)TSO-C116 (or any later version), the 15 minute supply requirement of paragraphs 26.45(2)(c) and 26.46(2)(c) must be calculated in reference to a pressure altitude 0 feet with a respiratory minute volume of 30 litres per minute, body temperature and pressure dry (BTPD) with the acceptable means of compliance being:

- If a demand oxygen system is used, a supply of 300 litres of free oxygen at 20°C and 760 mm Hg pressure is considered to be of 15 minute duration at the prescribed altitude and minute volume.
- If a continuous flow protective breathing system is used (including a mask with a standard rebreather bag) a flow rate of 60 litres per minute at 8 000 feet (45 litres per minute at sea level) and a supply of 600 litres of free oxygen at 20°C and 760 mm Hg pressure is considered to be of 15 minute duration at the prescribed attitude and minute volume.

Section 26.53 and 26.54 of the Part 91 Manual of Standards – Hand-held fire extinguishers

The Part 91 MOS requires that "at least" a certain number of extinguishers be fitted. The MOS does not specify a fire extinguisher standard that must be met. It is an acceptable means of compliance if the hand-held fire extinguisher meets any of the following standards:

- Civil Aviation Safety Authority Australia, Australian Technical Standard order (ATSO)
- Civil Aviation Safety Authority Australia, Civil Aviation Order CAO 103.16
- Australian Department of Defence Specifications (DEF (Aust))
- Standards Association of Australia Australian Standards (AS)
- United States of America Federal Aviation Administration Technical Standard Order (TSO)
- United States of America, Federal Services Administration Federal Specifications
- United States of America, Air Force-Navy Aeronautical Standards (AN)
- United States of America, Military Standards (MS)
- United States of America, Military Specifications (MIL)
- US Coast Guard
- American Society of Automotive Engineers, Aerospace Material Specifications (AMS)
- Aerospace Industries Association of America, National Aerospace Standards (NAS)
- Underwriters Laboratories
- United Kingdom Ministry of Technology, Aircraft Material Specifications (DTD)
- British Standards Institution Specifications (BSI)

- Society of British Aerospace Companies Standards (AS)
- Society of British Aerospace Companies Aircraft General Standards (AGS).

Subsection 26.69(8) of the Part 91 Manual of Standards – pressure altitude reporting standards

Note: This acceptable means of compliance continues previous standards alluded to in the pre-2 December 2021 CAO 20.18 Appendix XI subsection 5 and Appendix XII subsection 4, and also mentioned in section 3.6.2 of AC 21-45.

For paragraph 26.69(8)(b) of the Part 91 MOS, in relation to other systems approved under Part 21 of CASR that have a level of performance equivalent to a system mentioned in paragraph 26.69(8)(a) (which is a barometric encoder of a type authorised in accordance with (E)TSO-C88a), it is an acceptable means of compliance if the other systems meet a standard specified in paragraph 3.6.2 of AC 21-45 *Airworthiness approval of airborne automatic dependent surveillance broadcast equipment*.

GM 91.810 Requirements relating to equipment

The MOS content for subregulation 91.810(1) is contained in Chapter 26 of the Part 91 MOS. This regulation enables the Part 121 MOS to prescribe requirements relating to fitment and carriage of equipment on an aeroplane.

For equipment required by Subpart 91.K, an approved item of equipment is defined by the relevant airworthiness requirements. Refer to regulations 21.305 and 21.305A for additional information.

The prescribed equipment provisions are the minimum required equipment level and do not prevent a PIC from fitting or carrying additional items of equipment if they comply with the rule about additional equipment in subsection 26.02(7) of the Part 91 MOS.

TSO and ETSO version references in the MOS (section 1.05 of the Part 91 MOS)

Many equipment rules require equipment to meet certain TSO or ETSO standards. However, in most cases both the specific version of the TSO or ETSO mentioned in the rule AND later versions of the TSO or ETSO are acceptable. To avoid significant duplication throughout the MOS of the words "or a later version" or similar, there are rules in section 1.05 of the MOS describing how a provision that mentions a TSO or ETSO version is to be treated. The basic rule is that, unless an individual MOS rules states otherwise, any references to a particular TSO or ETSO version is to be taken as a reference to that TSO or ETSO version or any later versions.

Serviceability of equipment (Section 26.04 of the Part 91 MOS)

Any aircraft equipment required by the Part 91 MOS be serviceable unless:

- a provision in the Part 91 MOS allows otherwise; or
- the defect has been approved as a permissible unserviceability.

The aeroplane MEL must not allow an aeroplane to be dispatched with any equipment required by the MOS unserviceable unless the MOS permits the operation of the aeroplane with the equipment unserviceable. Any conditions and/or time limits provided in the MOS for operating with certain equipment unserviceable should be provided for in the aircraft MEL and be the equivalent of, or more restrictive than the master minimum equipment list (MMEL) or the MOS requirements.

An exemption is in force providing additional equipment serviceability provisions which may be applied in accordance with the aircraft approved MEL, it is recommended operators review CASA

EX14/25 – Serviceability of Equipment under the Part 91, 121, 133 and 135 Manuals of Standards – Exemption Instrument 2025.

Stabilised heading (sections 26.07, 26.08, 26.11 and 26.12 of the Part 91 MOS)

A stabilised heading flight instrument is required to be fitted to aeroplanes and rotorcraft conducting IFR and night VFR flights by sections 26.07, 26.08, 26.11 and 26.12 of the Part 91 MOS. The requirements for this flight instrument are the same for the aeroplane and rotorcraft night VFR, but different between IFR and night VFR, and different between the aeroplane and rotorcraft IFR instances as well. These differences were present in the pre-2 December 2021 rules in place before the Part 91 rules commenced and have been carried across into the new Part 91 rules.

Queries have been made to CASA whether the heading displayed in the Garmin GNS 430 equipment satisfies any of these stabilised heading requirements. At the time of publishing, a Garmin GNS 430 is **not approved** under Part 21 (either by CASA or the FAA) as an HSI instrument, i.e. as an approved source of stabilised heading information.

Typical (acceptable) in-cockpit sources of stabilised heading flight information are either:

- an analog (gyroscopic) DI or HSI gauge

  or

- an equivalent electronic HSI display, an example of which would be a Garmin GI 275 HSI or the HSI component of an integrated EFIS/PFD display.

These instruments have been approved under Part 21 of CASR for the purpose of providing stabilised heading flight information. Such an approval is conveyed in one of several ways:

- A stand-alone approval as an HSI instrument, whether OEM-installed or retrofitted, under an appropriate TSO. An example would be TSO-C5f for a non-magnetic HSI.
- Approved under the TC (type certificate) of the OEM (which would require a demonstration of performance equivalent to the TSO standard) – most commonly the case for integrated flight deck systems in larger transport category aircraft.
- Approved, as a retrofitted instrument, under an STC with an associated AML (approved model list). An example would be the newer Garmin electronic ‘multi-function’ instruments (e.g. the GI 275 in HSI mode); which again would have required a demonstration of compliance (by Garmin to the FAA in this case) to the equivalent HSI performance standard.

For the case of a non-magnetic HSI, the performance standard referenced in TSO-C5f is *AS8021 Minimum Performance Standard for Direction Instrument, Non-Magnetic (Gyroscopically Stabilized)*. There are additional requirements beyond simply the presentation of a heading figure to be an approved stabilised heading instrument. For example, the above standard has requirements for the following matters:

- malfunction indication (section 3.6 of AS8021)
- indicating method (section 3.8 of AS8021) [i.e. an appropriate dial presentation and visual cueing by display of rotating dial display or horizontal scale display with moving graduations during the turn]
- dial markings (section 3.10 of AS8021) [requirements for numerically marked graduations]
- course setting input knob (section 3.11 of AS8021).

> **Note:** This is not a complete list of the requirements included in the AS8021 standard.

GNSS displays of heading value do not meet any of these broader requirements, which is why many are not approved by regulators for this purpose.

Helicopter automatic pilot and automatic stabilisation systems (sections 26.11 and 26.12 of the Part 91 MOS)

Helicopter automatic pilot and automatic stabilisation systems are required for certain IFR and night VFR flights by rotorcraft under sections 26.11 and 26.12 of the Part 91 MOS.

Because of variation in the characteristics of helicopter automatic pilot and automatic stabilisation systems approved by a certifying authority, it is not possible to prescribe specifications for this equipment. Accordingly, each application for approval to conduct IFR category operations will be individually assessed on the basis of the specific helicopter type and its associated automatic pilot or autostabilisation equipment and the proposed operating environment.

Carbon monoxide detectors/warning devices

Crew and passengers in piston engine aircraft have the potential for carbon monoxide (CO) poisoning from cracked exhaust units and unserviceable heat exchange assemblies. This situation can be further exacerbated by unsealed penetration through the firewall and can go unnoticed through the fitment of inadequate or inappropriate CO detection units. The fitment of placards designed to change colour when exposed to CO may not necessarily provide adequate warning to the pilot and passengers of the elevated levels of CO within the cabin. More modern devices which include audible and improved visual warnings are more suited to detect and warn cabin occupants of the elevated levels of CO.

While audible/visual CO detectors are not mandated, they are available, and they more effectively communicate the presence of CO.

It is strongly recommended that pilots wear personal CO detectors. As not all aircraft are required to have CO detectors fitted, small electronic personal devices are readily available at affordable prices. These devices allow for continual monitoring of CO levels with audible and visual warnings when escalated CO levels are detected. Examples of small electronic personal devices are shown in Figure 5.

Figure 5: Electronic CO detector devices available for personal use

Aircraft certified and hard-wired products are also available that can be installed by approved maintenance repair organisations. Reliance on only the visual CO indicator placard, that changes colour in the presence of CO, is considered suboptimal. If the aircraft is only fitted with the placard type CO indicator, the operator should ensure the placard is placed in the field of view of the pilot, is regularly checked to ensure that the placard is not time-expired and that the indicator is not faded from ultraviolet exposure or contamination.

AWB 02-064 Preventing Carbon Monoxide Poisoning in Piston Engine Aircraft also contains useful information on this topic.

Terrain awareness and warning systems (TAWS) – nuisance alerts and inhibiting

The installation of TAWS is not mandated by the Part 91 rules. However, many aircraft may be fitted with these systems. Certain aeroplanes and rotorcraft are required to be fitted with TAWS and H-TAWS by Parts 121, 133 or 135 of CASR.

TAWS offer enhanced vertical situational awareness but nuisance alerts can be detrimental and distract a pilot, which sometimes leads to a pilot decision to inhibit the system.

Inhibiting warning systems and/or ignoring warnings can lead to CFIT. Pilots should ensure they are thoroughly trained and familiar with any TAWS fitted to their aircraft, and that they have carefully considered any decision to inhibit a TAWS.

Uncertified terrain alert systems

Many aircraft might be fitted with an uncertified terrain alerting system, for example as an additional function of a GNSS. The use and fitment of these systems is not required by any civil aviation legislation.

These systems can provide enhanced vertical situational awareness provided that the pilot is adequately trained on the use of the system and the database on which the system relies is kept up to date. Similar to a certified TAWS, nuisance alerts can be detrimental and distract a pilot, which sometimes leads to a pilot decision to inhibit the system. Pilots should carefully consider any decision to inhibit a useful alerting system.

Survival equipment - signalling (section 26.62 of the Part 91 MOS)

In determining whether Electronic Visual Distress Signals (EVDS) meet the requirements of paragraph 26.62(2)(b) of the Part 91 MOS, it is recommended that the operator consider whether:

- using the EVDS would constitute an offence under section 24 of the *Civil Aviation Act 1988*
- the EVDS meets all relevant safety standards including the requirements within Australian Standard AS 2092-2004 and the International Maritime Organization (IMO) Life Saving Appliance Code
- the light emitted by the EVDS would be recognised and effect an appropriate response in a distress situation, noting that lights of this kind are not internationally approved distress signals
- the use of EVDS is restricted by State and Territory legislation (Australian States and Territories restrict the types of lasers, including laser pointers and other laser signalling devices that can be lawfully used).

Supplemental oxygen – pre-flight considerations

The altitudes at which supplemental oxygen must be carried, as specified in Division 26.11 of the Part 91 MOS, represent the minimum generally acceptable standard of safety for the operations regulated by this rule. However, it is strongly recommended that prior to a flight, pilots carefully consider whether supplemental oxygen should be carried even if not required by the Part 91 MOS. It is recommended that pilots consider the following factors in making this decision:

- likely causes of hypoxia and their relevance to the planned flight and the persons on board (depressurisation, increased altitude due weather, and the potentially earlier onset of hypoxia for an individual due to either a medical condition, medications, smoking, age, disability, experience in flights at high altitude, altitude of the place of residence or any other relevant factor)
- specific flight characteristics that might affect the onset of hypoxia (altitude, duration of time at that altitude).

It is also recommended that pilots review their knowledge of the following matters:

- early symptoms of hypoxia (can be subtle and may include diminished mental capacity, rapid breathing, euphoria, slurred speech, headache, drowsiness, nausea or irritability)
- actions during flight if hypoxia is suspected (use supplemental oxygen and return to a safe altitude).

Regulation 91.565 requires pilots in command to give passengers a safety briefing and instructions in accordance with the requirements of the Part 91 MOS. Under paragraph 20.06(i) of the Part 91 MOS, the passenger safety briefing and instructions must cover how and when to use emergency oxygen when this is carried for the flight. PICs are recommended to consider whether part of the passenger briefing needs to include hypoxia symptoms (this may depend on the nature of the oxygen equipment being carried).

Supplemental oxygen – In flight monitoring

The onset of hypoxia can be very insidious, even for pilots that have conducted specific hypoxia symptom awareness training. During flight, it is recommended that pilots regularly check:

- for early symptoms of hypoxia (subtle changes of crew or passengers in diminishing mental capacity and/or behavioural change including rapid breathing, euphoria, slurred speech, headache, drowsiness, nausea and irritability)
- if in an unpressurized aircraft:
  - pilot oxygen saturation levels if a finger mounted pulse oximeter or similar device can measure oxygen saturation levels is carried and used (typically 100% oxygen saturation is normal at sea level, 95% is considered a minimum and below 90% is where people usually experience hypoxia)
  - the time spent at higher altitudes – for example above 8,000 feet – especially if the flight was not originally planned to be flown at higher altitudes but this has occurred).
- if in a pressurized aircraft, the cabin pressure altitude to ensure continued proper functioning of the pressurisation system
- if supplemental oxygen is being used the quantity of oxygen remaining at regular periods of its use.

Figure 6: Electronic oximeter devices available for personal use

Supplemental oxygen – suspected hypoxia

Act immediately if hypoxia is suspected.

If hypoxia is suspected, the pilot should immediately:

- lower the cabin altitude (descend and/or adjust pressurisation)

- use supplemental oxygen, if available.

Lack of oxygen affects people differently and some people are more sensitive to hypoxia. Any delay can lead to an inability to recognise or react to the danger of hypoxia.

The supplemental oxygen requirements and usage rules in Division 26.11 of the 91 MOS do not stop prevent the use of supplemental oxygen at lower altitudes if hypoxia is suspected.

Supplemental oxygen - cabin crew

Supplemental oxygen is provided for cabin crew to help ensure they retain consciousness during an emergency descent following a loss of pressurisation, therefore enabling them to provide assistance to passengers (such as the application of first aid oxygen once a safe level is reached and the aeroplane stabilises after the emergency). Operator procedures should consider the different hazards cabin crew are exposed to during an emergency and how different cabin crew actions should be prioritised. Examples of the kinds of actions requiring prioritisation might be securing themselves and other movable items in their immediate vicinity, providing directions to passengers and when to access supplemental oxygen.

Note: It is not envisaged that cabin crew will always be able to provide assistance to passengers during emergency descent procedures which may be required in the event of loss of pressurisation.

Emergency locator transmitters (sections 26.58 to 26.52 inclusive of the Part 91 MOS)

Emergency locator transmitters (ELT's) are an essential tool for emergency situations and are required to be fitted to or carried on Australian aircraft under some circumstances.

The Australian Maritime Safety Authority (AMSA), via JRCC Australia, is responsible for co-ordinating search and rescue within Australian territory and maintaining Australia's national beacon registration system. When a distress beacon is registered, JRCC Australia can quickly investigate critical contact information and determine if assistance is needed. An ELT required to be fitted to or carried on an Australian aircraft must be registered.

Pilots and operators can fit or carry ELTs even when not required under the civil aviation legislation.

The process of registering a distress beacon is relatively simple and is free. It is crucial to keep the registration details up to date, especially whenever contact details or emergency contacts change. Registering a distress beacon helps to ensure a more efficient and effective rescue operation in the event of an emergency.

Ensure that distress beacons are working correctly by following manufacturers and TSO maintenance requirements, specifically battery replacements.

See Multi-Part AC 91-30, 121-12, 133-03 and 135-14 and www.amsa.gov.au/beacons for more details.

Hand-held fire extinguishers (sections 26.53 and 26.54 of the Part 91 MOS)

The MOS requires that "at least" a certain number of extinguishers be fitted.

In determining whether additional extinguishers are required, beyond the absolute regulatory minimum, it is recommended that operators consider the following matters:

- the size of the passenger compartment
- the location of any cargo or baggage compartments

- whether each extinguisher is located and installed to be readily accessible for use by crew and/or passengers
- whether the location is clearly evident to persons who may be required to use it
- whether the extinguisher is located in an environment, and mounted in an attitude, that complies with the manufacturer's recommendations
- whether an extinguisher is mounted in a position which might lead to accidental discharge or restrict access to other equipment
- whether additional hand-held fire extinguishers may be required for the protection of other compartments accessible to the flight crew in flight.

Note: These considerations may result in a number of hand-held fire extinguishers greater than the minimum required.

Unless a specific location is required by section 26.53 or 26.54 of the Part 91 MOS, hand-held fire extinguishers are not necessarily exclusive to particular locations. If the location of a cargo/baggage or passenger compartment coincides with each other, and have common agent applicability, the various requirements may be considered common.

Where only one hand-held fire extinguisher is carried in the passenger compartment, it is recommended that this extinguisher be located near a crew member's station. Where two or more hand-held fire extinguishers are carried in the passenger compartment it is recommended that the additional extinguishers are distributed throughout the cabin as evenly as is practicable.

In relation to the types of fire extinguishers carried, it is recommended that:

- where 2 or more extinguishers are required in the passenger compartment, at least 2 contain Halon 1211 (BCF) or a CASA accepted equivalent
- extinguishers located in the pilot compartment are suitable for fighting both flammable fluid and electrical fires
- dry chemical or water-based extinguishers are not used in the pilot compartment or any compartment not separated by a partition from the pilot compartment
- water based extinguishers are not located in the passenger compartment of aircraft which do not carry a cabin crew member.

Additional information is contained in the following Airworthiness bulletin: AWB Airframes 26 - Fire Protection for further information on fire protection.

ADS-B (sections 26.66 to 26.73 inclusive of the Part 91 MOS)

Refer to AC 91-23 - ADS-B for enhancing situational awareness for information on ADS-B and electronic conspicuity (EC) devices for operations under the VFR.

8 Subpart 91.P—Cabin crew

There are exemptions in force in relation to this Subpart for Part 121 and 133 operators. Operators are advised to review section 24 of CASA EX69/24 (for Part 121 operators) and section 17 of CASA EX70/24 (for Part 133 operators).

This Subpart does not apply if Subpart 121.P, 133.P or 135.P applies to an operation.

This Subpart does not apply to Part 131 operations.

GM 91.820 Cabin crew—when required

Reserved.

GM 91.825 Cabin crew—number

Reserved.

GM 91.830 Cabin crew—knowledge of emergency and safety equipment and procedures

Reserved.

9 Subpart 91.T—Operations under certain special certificates of airworthiness and special flight permits

9.1 Division 91.T.1—Preliminary

GM 91.835 Aircraft with more than one certificate of airworthiness—application of Subpart 91.T

Refer to AC 21-1 - Aircraft Airworthiness Certification Categories and Designations Explained for detailed information on aircraft airworthiness certification and operational classifications.

9.2 Division 91.T.2—Restricted category aircraft—operating requirements

GM 91.840 Restricted category aircraft—general operating requirements

Restricted category applies to aircraft that carry out certain special purpose operations. Aircraft types which may be eligible for issue of a special CofA in the restricted category include:

- those designed and type certificated specifically as restricted category e.g., specialist water bombers, agricultural aircraft
- ex-military aircraft of:
  - the Australian Defence Force
  - an armed force of Canada, the USA or the UK
- aircraft which may have been in a standard category but have been modified for special purpose operations noting that, under certain conditions, such aircraft can be transferred from restricted to a standard CofA category, and back.

Note: Standard airworthiness categories are Transport, Normal, Utility, Acrobatic, Commuter, Manned free balloons, Special class (e.g., airships).

GM 91.845 Restricted category aircraft—kinds of operations permitted

A *special purpose operation* mentioned in paragraph 91.845(1)(a) is one of the following:

- agricultural operations (e.g., spraying, dusting, seeding, and livestock and feral animal control)
- forest and wildlife conservation

- firefighting
- aerial surveying or scientific research (e.g., photography, mapping, and oil and mineral exploration)
- patrolling (e.g., pipelines, power lines, and canals)
- weather control and atmospheric research (e.g., cloud seeding)
- aerial advertising (e.g., skywriting, banner towing, airborne signs and public address systems)
- glider towing
- target towing
- target designation
- any other operation similar to any of these operations.

Source: Regulation 21.025 of CASR.

Refer to AC 21.6 - Restricted category aircraft - certification for detailed information.

9.3 Division 91.T.3—Provisionally certificated aircraft—operating requirements

GM 91.850 Provisionally certificated aircraft—operating requirements

Reserved.

GM 91.855 Provisionally certificated aircraft—kinds of operations permitted

Reserved.

GM 91.860 Provisionally certificated aircraft—operation for type certification or supplemental type certification

Reserved.

GM 91.865 Provisionally certificated aircraft—requirements for the carriage of people

Reserved.

GM 91.870 Provisionally certificated aircraft—additional requirements for operators

Reserved.

9.4 Division 91.T.4—Experimental aircraft—operating requirements

GM 91.875 Experimental aircraft—operating requirements

There is an exemption in force in relation to this regulation and the use of certain aeroplanes for glider towing. Operators and pilots in command are recommended to review section 26 of CASA EX67/24.

There is an exemption in force in relation to this regulation and which areas of land trigger the requirement to hold a specific approval from CASA to overfly those areas. Operators and PICs are recommended to review section 25 of CASA EX67/24.

This specific exemption has the effect of no longer requiring an approval to be held for an experimental aircraft to overfly certain areas as listed below:

- a public gathering provided that the aircraft is passing over a public gathering only for one of the following purposes:
  - arrival at or departure from an aerodrome, in the course of normal navigation
  - transit, in the course of normal navigation.
- the part of a populous area that is **not** the built-up area of a city or town.

> **Note:** See GM 91.265 for a comprehensive explanation of the meaning of the defined term *populous area*.

An experimental aircraft is therefore only required to gain a specific approval for overflying an area of land in the following circumstances where the:

- area is the built-up area of a city or town (this approval will still be issued under regulation 91.045 or 91.050 for the purposes of paragraph 91.875(2)(f))
- aircraft is passing over a public gathering and the overflight is **not** in the course of normal navigation during the arrival at or departure from an aerodrome, or in transit (this approval will still be issued under regulation 91.045 or 91.050 for the purposes of paragraph 91.875(2)(g)).

These approvals are required to be applied for using the 'Part 91 Approvals - General' form as explained in GM 91.045.

A person holding a CAR 262AP(5) authorisation for a particular experimental aircraft to overfly the built-up area of a city or town is deemed to hold the requisite approval due to the effect of a transitional rule located in item 10 of the table in regulation 202.416 of CASR.

The MOS content for subparagraph 91.875(2)(i)((iii) is contained in section 27.01 of the Part 91 MOS.

Other information contained in this document related to experimental aircraft can be found in GM 91.045, 91.050 and 91.055.

Experimental aircraft are not type-certificated. 'Experimental' is a designation and not a category. It is also important to note that an experimental certificate does not attest to an aircraft being fully airworthy.

The experimental certificate system allows any person or commercial concern to construct an aircraft of any size and seating capacity, and with any number and type of engines. Experimental certificates can be issued for one or more of a number of specific recognised purposes.

Regulation 21.191 allows an experimental certificate to be issued for one or more of the following purposes:

- research and development

- showing compliance with regulations
- training the applicant's flight crew
- exhibition
- air racing
- market surveys
- operating an amateur-built aircraft
- operating a kit-built aircraft
- private operations of prototype aircraft previously certificated under paragraph 21.191 (a), (b) or (d)
- operating a light sport aircraft that:
  - has been assembled from a kit in relation to which the applicant can give the information, statement and documents required by paragraph 21.193(e)
  - has been assembled in accordance with the kit manufacturer's instructions for assembling the aircraft
  - is of the same make and model as a production aircraft covered by regulation 21.186 that has been issued with a special certificate of airworthiness (CofA)
- operating any other light sport aircraft covered by regulation 21.186 for which a special CofA for light sport aircraft, or another document of similar effect under a law of a Contracting State, has been issued.

If the issuance of the approval mentioned in this regulation requires the issuance or re-issuance of an experimental certificate, then the approval is likely to be subject to the safety standard mentioned in subregulation 11.055 (1C).

Refer to AC 21-10 - Experimental certificates for detailed guidance.

GM 91.880 Experimental aircraft—kinds of operations permitted

There is an exemption in force in relation to this regulation and the use of certain aeroplanes for glider towing. Operators and pilots in command are recommended to section 26 of CASA EX67/24.

Operations may be conducted under an experimental certificate for a range of reasons. Generally, this regulation requires the experimental certificate operation to occur for either the purposes listed in Part 21 or the additional supporting purposes listed under this Part 91 regulation.

Additional information relating to experimental certificates can be found in AC 21-10 - Experimental certificates.

GM 91.885 Experimental aircraft—maximum number of persons to be carried

If the issuance of the approval mentioned in this regulation requires the issuance or re-issuance of an experimental certificate, then the approval is likely to be subject to the safety standard mentioned in subregulation 11.055 (1C).

9.5 Division 91.T.5—Primary category aircraft and intermediate category aircraft—operating requirements

GM 91.890 Primary category aircraft and intermediate category aircraft—operating requirements

Aircraft certified in the primary category are of simple design and intended for pleasure and personal use only. Regulation 21.024 provides that an aircraft can be certified in the primary category if the aircraft:

- is:
  - unpowered
  - an aeroplane powered by a single, naturally aspirated engine with a stall speed of 61 knots

    or
  - a rotorcraft powered by a single, naturally aspirated engine with a 29.3 kgm^{-2} main rotor disc loading limitation (under sea level standard day conditions)
- has a maximum take-off weight of not more than 1 225kg or, if the aircraft is a seaplane, a maximum take-off weight of not more than 1 530 kg
- has a maximum seating capacity of not more than four (4) persons, including the pilot
- has an unpressurised cabin.

Refer to AC 21-7 - Primary category aircraft - certification for detailed guidance.

Regulation 21.026 allows an aircraft to be certified in the intermediate category if the aircraft:

- is an aeroplane with a stall speed of 61 knots
- is a rotorcraft with a 29.3 kgm^{-2} main rotor disc loading limitation (under sea level standard day conditions)
- has a maximum take-off weight of not more than 1 750 kg
- has a maximum seating capacity of 4 persons, including the pilot
- has an unpressurised cabin.

9.6 Division 91.T.6—Light sport aircraft—operating requirements

GM 91.895 Light sport aircraft—operators

A light sport aircraft (LSA) is a small, simple-to-operate, low performance aircraft. With regard to the requirements of CASR, a light sport aircraft is an aircraft, other than a helicopter, that complies with the following criteria:

- maximum take-off weight of not more than 600 kg, or 650 kg for an aircraft intended for operation on water, or 560 kg for a lighter-than-air aircraft

- maximum stalling speed in the landing configuration (V_{S0}) of not more than 45 kts Calibrated Airspeed (CAS) at the aircraft's maximum certificated take-off weight and most critical centre of gravity
- maximum seating capacity of no more than two persons, including the pilot
- if powered, a single, non-turbine engine fitted with a propeller
- non-pressurised cabin
- for an aircraft operating over land, a fixed landing gear
- for an aircraft intended for operation on water, a fixed or repositionable landing gear
- for a glider, a fixed or retractable landing gear
- for a glider, a maximum never exceed speed (V_{NE}) of 135 knots CAS.

The types of aircraft that may satisfy these criteria are:

- fixed-wing aircraft
- powered parachutes
- weight shift aircraft
- gliders
- balloons
- airships
- gyroplanes.

Refer to AC 21-41 - Light Sport Aircraft Certificate of Airworthiness and AC 21-42 - Light sport aircraft manufacturers' requirements for detailed guidance.

GM 91.900 Light sport aircraft—pilots

The MOS content for paragraph 91.900(2)(c) is contained in section 27.02 of the Part 91 MOS.

9.7 Division 91.T.7—Special flight permits—operating requirements

GM 91.905 Flights under special flight permits

The purposes for which a Special Flight Permit (SFP) may be issued are:

- flying the aircraft to a base where repairs, alterations or maintenance is to be performed, or to a point of storage
- delivering or exporting the aircraft
- production flight testing of a new production aircraft
- evacuating the aircraft from areas of impending danger
- conducting customer demonstration flights of a new production aircraft, which has satisfactorily completed production flight tests
- assisting in searching for, bringing aid to, or rescuing persons in danger on a particular occasion

- assisting with a state of emergency
- operating the aircraft above its certificated MTOW.

Flight tests for the purpose of completion of a maintenance action or assessment flights as detailed in the aircraft maintenance manual may be conducted by entering the requirement on the aircraft flight and technical log. No SFP is issued for this purpose.

Refer to AC 21-09 - Special flight permits for details on the circumstances in which an SFP may be required, the process for applying for a special flight permit and other information.

9.8 Division 91.T.8—Miscellaneous

GM 91.910 Application of Division 91.T.8

A special CofA is issued to an aircraft that does not meet the requirements of an applicable comprehensive and detailed airworthiness code as required for standard category aircraft.

A special CofA may be issued in the following categories:

- primary
- intermediate
- restricted
- limited
- amateur built (accepted under an amateur built aircraft acceptance).

Refer to AC 21.1 - Aircraft airworthiness certification categories and designations explained for detailed guidance.

GM 91.915 Aircraft with special certificates of airworthiness—maintenance release etc.

This regulation does not apply to Part 103 operations.

GM 91.920 Aircraft with special certificates of airworthiness—flight tests to be conducted in certain areas

Airworthiness flight tests are controlled by Part 21 and occur for a range of circumstances. For example, an aircraft may need a formal flight test under an experimental certificate to show compliance with the applicable airworthiness standards for a TC, STC or other modification to be approved.

Refer to AC 21-47 – Flight test safety for additional information relating to flight tests.

10 Subpart 91.Y—Minimum equipment lists

10.1 Division 91.Y.1—Preliminary

GM 91.925 Definitions

Reserved.

GM 91.930 Requirements for minimum equipment lists

The MOS content for this regulation is contained in Chapter 28 of the Part 91 MOS (except for section 28.09 which encompass the MOS content for paragraph 91.945(5)(b)).

A MEL is a document that allows for the operation of an individual aircraft by a specific operator under specified conditions, with item(s) of equipment inoperative at the time of dispatch for an intended flight.

An MEL consists of an approved list of the specific inoperative equipment for a particular aircraft, not an aircraft make and model. Its use is described in the associated procedures contained in an operator's maintenance control manual and/or operations manual, or other appropriately documented procedures (for class B aircraft).

An MEL is derived from the master minimum equipment list (MMEL) and is normally not less restrictive than the corresponding MMEL, except where regulatory requirements permit. An operator's MEL must consider the aircraft configuration, type of operation and operating environment.

An approved MEL for an aircraft is a non-transferable document. If an aircraft moves from one operator to another, the new operator cannot automatically use the previously approved MEL.

> **Note:** Importantly, an operator, such as an air transport operator, who cross-hires an aircraft becomes the operator of the aircraft. This new operator cannot satisfy their obligations under Part 121, 133 or 135 to have an MEL for the aircraft by using the previous operator's MEL - the new operator's MEL must encompass the aircraft.

Irrespective of the provisions of the MEL, the PIC may require a defect to be rectified after considering operational implications, multiple unserviceability's, and additional failures during continued operation with inoperative systems or components.

The requirement to have an MEL is defined according to the type of operations conducted. Refer to the regulations below for requirements:

- 121.060 Operator to have minimum equipment list for certain flights (air transport operations - larger aeroplanes)
- 133.035 Operator to have minimum equipment list for certain flights (air transport operations - rotorcraft)
- 135.045 Operator to have minimum equipment list for certain flights (air transport operations - smaller aeroplanes.)

The regulations above prescribe the requirement for an operator to have an MEL in some circumstances. Subpart 91.Y prescribes the technical requirements of a MEL.

The conduct of Part 91 operations does not necessitate the use of a MEL. However, due to the associated safety benefits, operators may choose to apply to CASA seeking approval for an MEL.

Refer to CAAP 37-1 - Minimum Equipment Lists (MEL) for detailed guidance.

10.2 Division 91.Y.2—Approval of minimum equipment lists

GM 91.935 Approval of minimum equipment lists

A request for the approval mentioned in this regulation, where that request is being made to CASA is via email to regservices@casa.gov.au.

Note: Certain other persons mentioned in the regulation can grant the approval.

Paragraph 91.935(2)(b) states that applications for MELs may be made to a continuing airworthiness management organisation that is permitted, in accordance with Part 42 of CASR, to approve MELs. However, CASA advises that currently[10] Part 42 of CASR does not yet enable any CAMOs to approve MELs and therefore this option in regulation 91.935 cannot be used.

Due to the expiry of CASA EX161/21 which granted temporary extensions of approvals granted under the rules in force before 2 December 2021, it is recommended that holders of such approvals review AC 1-03 for details on transitioning to the flight operations regulations.

10.3 Division 91.Y.3—Variations of minimum equipment lists

GM 91.940 Approval of variations

A request for the approval mentioned in this regulation, where that request is being made to CASA is via email to regservices@casa.gov.au.

Note: Certain other persons mentioned in the regulation can grant the approval.

Paragraph 91.940(2)(b) states that applications for variations to MELs may be made to a continuing airworthiness management organisation that is permitted, in accordance with Part 42, to approve MEL variations. However, CASA advises that currently[11] Part 42 of CASR does not yet enable any CAMOs to approve MEL variations and therefore this option in regulation 91.940 cannot be used.

[10] This specific GM paragraph was published in April 2022 as part of v2.3 of the Part 91 AMC/GM document.

[11] This specific GM paragraph was published in April 2022 as part of v2.3 of the Part 91 AMC/GM document.

Updates to MMEL and impact on MEL

An operator does not need to immediately alter their approved MEL to reflect changes in the MMEL. As per the Part 91 MOS, an MEL 'must be based on' an MMEL, but this does not mean the MEL must be identical in all respects to the MMEL.

It is expected that the holder of an approved MEL will review any changes to the MMEL when they occur, and, if they determine that changes to the MEL are required, they will seek approval for any appropriate variations to the approved MEL to address the changes in the MMEL.

It is generally expected that the MEL would be updated within a period of 90 days, but if the changes to the MMEL necessitate changes to the MEL sooner than 90 days, then those changes should be managed accordingly.

10.4 Division 91.Y.4—Extensions of rectification intervals

GM 91.945 Approval of extensions of rectification intervals

The MOS content for paragraph 91.945(5)(b) is contained in section 28.09 of the Part 91 MOS.

Paragraph 91.945(2)(a) states that applications for extensions of MEL rectification intervals may be made to a continuing airworthiness management organisation that is permitted, in accordance with Part 42 of CASR, to approve such extensions. However, CASA advises that currently[12] Part 42 of CASR does not yet enable any CAMOs to approve MEL rectification interval extensions and therefore this option in regulation 91.945 cannot be used.

Refer to CAAP 37-1 - Minimum Equipment Lists (MEL) for detailed guidance.

MEL interval extension requests are treated by CASA as a variant on the permissible unserviceability process. Therefore, if a request for the approval mentioned in this regulation is to be made to CASA then it is to be made using the relevant application form (see section 1.4 of this AC). Once completed, this form is to be submitted to CASA via email to regservices@casa.gov.au.

Note: Certain other persons mentioned in the regulation can grant the approval.

GM 91.950 Effect of approval

Reserved.

GM 91.955 CASA to be notified of extensions approved by a continuing airworthiness management organisation

The intent of this regulation is that CASA is aware of extension of MEL rectification intervals approved by an operator's CAMO. This awareness provides CASA with information that enables ongoing evaluation of the use by CAMOs of this extension power. The requirement for regulator notification in this area is consistent with international practice.

[12] This specific GM paragraph was published in April 2022 as part of v2.3 of the Part 91 AMC/GM document.

However, at the time of publishing this GM[13], the requirement for operators to notify CASA under this regulation does not apply since Part 42 of CASR does not enable rectification interval extensions to be approved by CAMOs. Therefore, these extensions can only be approved by CASA or by delegates of CASA. The delegates are separately required to notify CASA on a regular basis in the form of activity reports, thereby providing CASA with equivalent information.

10.5 Division 91.Y.5—Other

GM 91.960 Operation of aircraft with multiple inoperative items not permitted in certain circumstances

Refer to CAAP 37-1 - Minimum Equipment Lists (MEL) for detailed guidance on minimum equipment lists.

[13] This specific GM paragraph was published in April 2022 as part of v2.3 of the Part 91 AMC/GM document.

11 Subpart 91.Z—Foreign aircraft

GM 91.965 Foreign registered aircraft—Chicago Convention

This regulation sets out requirements which must be met by the operator and pilot in command of a foreign registered aircraft being flown in Australian territory.

One of the requirements is that the aircraft must comply with any requirements of the Chicago Convention relating to aircraft certificates of airworthiness.

Pilots and operators of foreign registered aircraft must be aware that the requirements of the Chicago Convention about certificates of airworthiness relate to aircraft with a standard certificate of airworthiness. Foreign aircraft with the equivalent of a special certificate of airworthiness or a special flight permit require a special flight authorisation to be flown in Australian territory: see regulation 91.970.

For operators proposing to carry passengers in aircraft operated under a foreign special certificate of airworthiness, an example being a foreign experimental certificate for exhibition purposes, please ensure that you read the GM 119.010 entry in the Part 119 AMC/GM document regarding CASA's broad interpretation of the concept of 'hire or reward' and how the specific wording of Australian definitions and rules relating to air transport operations can affect the permissions and authorisations needed for such an activity.

GM 91.970 Foreign registered aircraft—special flight authorisations

For a foreign registered aircraft to be flown in Australian territory under a foreign special certificate of airworthiness (i.e. not a standard certificate of airworthiness under the equivalent of FAR Part 23, 25, 27 or 29) or foreign special flight permit, a special flight authorisation must have been issued by CASA under this regulation.

Aerial work operators proposing to operate aircraft in Australian territory under a foreign restricted category certificate of airworthiness must be particularly aware that a significant change approval to use such an aircraft under an aerial work certificate, or the grant of an initial aerial work certificate that includes the use of such an aircraft, does not obviate or remove the requirement to hold a special flight authorisation under this regulation. The special flight authorisation must be held in addition to any authorisation under an aerial work certificate.

Special flight authorisations granted under this regulation are not 91.045 approvals but are instead a separate and unique kind of authorisation. However, they are authorisations as defined in Part 11 of CASR and are subject to the requirements of regulation 11.055. Readers should particularly note that the test of safety for the grant of these authorisation is subregulation 11.055(1A), not subregulation 11.055(1B) as per 91.045 approvals.

GM 91.975 Foreign state aircraft—approval to fly in Australian territory

Operators of foreign state aircraft should email International_Ops@casa.gov.au for information relating to the approval mentioned in this regulation.

GM 91.980 Foreign registered aircraft—major defect—CASA direction

Reserved.

GM 91.985 Foreign registered aircraft—CASA to notify Contracting State of direction

Reserved.

GM 91.990 Foreign registered aircraft—CASA may revoke direction

Reserved.

GM 91.995 Foreign registered aircraft—when direction or revocation takes effect

Reserved.