CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

Advisory Circular
AC115-3

Revision 1

13 June 2023

Adventure Aviation—Parachute Drop-Aircraft Operations

General

Civil Aviation Authority (CAA) Advisory Circulars (ACs) contain information about standards, practices, and procedures that the Director has found to be an **acceptable means of compliance** with the associated rule.

Consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable they will be added to the appropriate AC.

Purpose

This AC describes an acceptable means of compliance with Civil Aviation Rule Part 115 *Adventure Aviation Certification and Operations* relating to parachute-drop aircraft operations.

Related Rules

This AC relates specifically to Civil Aviation Rule Part 115 – Subpart J, *Parachute-Drop Aircraft Operations,* but also refers to Part 91 and Part 105, Subpart A, *General*.

Change Notice

Revision 1 updates the text of rule 91.513, adds a reference to Part 105, Subpart A, *General*, adds an Appendix A for easy reference and updates the style to align with current ACs. We have also added a Version History.

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Version History

History Log

Revision No.	Effective Date	Summary of Changes
0	26 July 2016	Initial issue of this AC.
1	13 June 2023	Updates the text of rule 91.513 Adds a reference to Part 105, Subpart A, *General* Adds an Appendix A for easy reference Updates the style to align with current ACs Adds a Version History

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Rule 91.513 VFR Communication equipment

The requirements of rule 91.513 specify that:

(a) Unless authorised by ATC to operate under VFR without radio communication, an aircraft operating under VFR in controlled airspace classified under Part 71 as Class B, C, D, or in Class E airspace at night, must be equipped with radio communications equipment that:

(1) meets level 1 or 2 standards specified in Appendix A, A.9, and

(2) is capable of providing continuous two-way communications with an appropriate ATC unit.

(b) An aircraft operating under VFR outside controlled airspace must be equipped with radio communications equipment that meets level 1 or 2 standards specified in Appendix A, A.9 if the equipment is to be used for communication with any ATS unit.

The relevant standards for Appendix A.9 are:

For Level 1:

i. communication equipment, one of the following TSO as applicable: C31, C32, C37, C38, or C50, or

ii. navigation equipment, one of the following TSO as applicable: C34, C35, C36, C40, C41, C60, C94, or C129, or

iii. United Kingdom Civil Aviation Authority approval for Category WR, VC, or LA Class I, or

iv. Australian Airborne Radio Navigation Publication No. 50 (Pub 50) Class I, or

For Level 2:

i. United Kingdom Civil Aviation Authority approval for Category LA Class II, or

ii. Pub 50 V or L.

Rule 115.555 Maintenance parachute drop aircraft

In accordance with (IAW) rule 115.61 an operator needs to maintain the aircraft and its equipment IAW an approved maintenance programme, and needs to have a review of airworthiness carried out IAW rule 91.615.

Where the aircraft is fitted with role-specific equipment such as handles and steps, parachuting doors and restraints etc., the operator must include Instructions for Continued Airworthiness (ICAs) for such items, in the maintenance programme.

Seating Configuration and Restraint System Safety

Not all seating and restraint system configurations used in jump aircraft provide the same level of safety in the event of an emergency landing or load shift. This AC provides general information concerning the relative safety of commonly used seating configurations and restraint systems. These safety assessments are based on available research data and in-service experience.

(a) **Quick release track fittings**. Single stud quick release track fittings have been shown to release from the track at dynamic loads much lower than their rated strength. Dual stud quick release fittings did not exhibit this behaviour in dynamic tests. Therefore, dual stud quick release track fittings provide a much more reliable restraint anchorage than single stud fittings.

(b) **Lap belts**. Lap belts are only effective if there is a solid support surface behind the occupant, such as a seat back, aircraft sidewall, or bulkhead. Otherwise, a tether restraint that attaches to the parachute harness provides more effective restraint.

(c) **Restraint for aft-facing parachutists**. Research has shown that to restrain aft-facing parachutists, the most effective point to attach a tether restraint to a parachute harness is at the junction of the leg straps, main lift web, and the horizontal back strap. One way to achieve this is to route the tether loop under the upper leg strap, then under the main lift web before latching the loop. Since these two components of the harness are both easily accessible and visible to the wearer, this attachment method should not be prone to misuse. It also provides more effective restraint than attaching at other points on the parachute harness, since the restraining force is applied near the seated occupant's centre of gravity (C of G).

(d) **Restraint belts or tethers**. Past experience and testing have shown the validity of attaching a restraint belt(s) or tether(s) to the parachute harness as part of the overall integrated restraint system. However, most manufacturers have not tested their parachute harness configurations to see if they can accept the load vectors that would be experienced during the actual use of this type of restraint configuration. Because of this, any parachute harness that has been subjected to actual use as part of an integrated restraint system must be removed from service and inspected by the manufacturer or a parachute rigger designated by the manufacturer to determine the continued airworthiness of that parachute harness. If the inspection shows that the harness is airworthy, it may be returned to service.

Specific Seating/Restraint Configurations

(a) **Side-facing.** Conventional side-facing bench seats employing dual point lap belts are a superior means of carrying parachutists in aircraft large enough to accommodate them. They offer the advantages of being simple to use and of having been designed to provide significant vertical energy absorption. They effectively prevent movement forward and aft of the parachutist.

Rear-Facing Floor Seating

(a) Restraints are more effective if attached to the floor instead of the sidewall. Only use sidewall attachments if floor attach points are not available.

(b) While the effectiveness of this system is not as good as the side facing lap strap for restricting rearwards movement (take off), effectiveness can be increased if:

i. the overall tether length is kept as short as possible, and

ii. the tether attachment to the aircraft is aft of the harness attachment point and as near to vertical as possible.

(c) Single point, single tether restraints are not recommended.

(d) Dual point, dual tether restraints offer superior restraint compared to single point, single tether restraints. This restraint method consists of two straps, each connecting the parachute harness to the aircraft floor on both sides of the parachutist.

Use of oxygen

(a) If operators intend to conduct operations above 13 000 feet above mean sea level (AMSL):

i. the aircraft must be fitted with an approved supplementary oxygen system meeting the requirements of rule 91.209 and Part 91 Appendices A.16, A.17, A.18 and A.19 (provided in Appendix A), and

ii. each person on board is to use the supplementary oxygen above 10 000 feet AMSL.

Part 105, Subpart A, *General*

Subpart A of Part 105 contains more detailed rules governing parachute operations in particular, rule 105.13, *Parachute descents*, and rule 105.15, *Parachute landing area*. As these rules are very specific and clear, they have not been furthered explained here. It is important, however, that participants are aware of these rules before doing parachute descents.

Appendix A: Part 91 Appendices A.16, A.17, A.18 and A.19

Note: *Please refer to Part 1 for abbreviations used in this appendix.*

App. A.16 - Oxygen

Oxygen used in aircraft must be of Aviation Oxygen Standard which is gaseous oxygen with a minimum purity of 99%, maximum moisture of 0.0056 grams per cubic metre, and nil carbon monoxide.

App. A.17 - Passenger oxygen masks

Each passenger oxygen mask must meet the requirements of TSO C64.

App. A.18 - Crew member on-demand oxygen masks

(a) Each crew member on-demand oxygen mask must meet the requirements of TSO C78.

(b) Each on-demand oxygen mask for flight crew members must, without causing undue delay in proceeding with emergency duties, be:

(1) capable of being placed on the face with one hand from the stowed position, and

(2) properly secured, sealed, and capable of supplying oxygen upon demand within five seconds, and

(3) able to provide for:

i. the use of corrective eyeglasses without undue impairment of vision or loss of protection, and

ii. communication by interphone with each flight crew member while in their normally seated position, and

iii. communication between each of two flight crew member stations and at least one crew member station in each passenger compartment.

App. A.19 - Oxygen equipment

(a) Flight crew member oxygen equipment must provide an oxygen flow rate:

(1) for continuous flow equipment, that is, the greater of:

i. two litres per minute STPD, or

ii. that required to maintain a MTOPP of 149 mm Hg when breathing 15 litres per minute BTPS with a tidal volume of 700 millilitres, and

(2) for on-demand equipment:

i. for flights up to 35 000 feet AMSL, not less than that required to maintain a MTOPP of 122 mm Hg, and

ii. for flights above 35 000 feet AMSL, not less than 20 litres per minute BTPS, and

iii. for flights above 41 000 feet AMSL, that progressively increases until not less than 15 mm Hg above ambient pressure and 30 litres per minute BTPS is achieved at 45 000 feet AMSL, and

(3) for protective equipment, of 30 litres per minute BTPD at a pressure altitude of 8 000 feet AMSL.

(b) Crew member and passenger oxygen equipment must provide an oxygen flow rate:

(1) for flights from 10 000 feet to 18 500 feet AMSL, not less than that required to maintain a MTOPP of 100 mm Hg when breathing 15 litres per minute BTPS with a tidal volume of 700 millilitres, and

(2) for flights from 18 500 feet to 40 000 feet AMSL, not less than that required to maintain a MTOPP of 83.8 mm Hg when breathing 30 litres per minute BTPS with a tidal volume of 1100 millilitres, and

(3) for flights from 40 000 feet to 45 000 feet AMSL, not less than that required to maintain a MTOPP of 55 mm Hg when breathing 30 litres per minute BTPS with a tidal volume of 1100 millilitres.

(c) Portable oxygen equipment must provide an oxygen flow rate of not less than:

(1) two litres per minute STPD on a low setting, and

(2) four litres per minute STPD on a high setting.

(d) On-demand oxygen regulators must meet the requirements of TSO C89.