Australian Government
Civil Aviation Safety Authority

**ADVISORY CIRCULAR**
**AC 21-32 v1.0**

# Approval of equipment used for carriage of persons external to a rotorcraft

**File ref:** D25/2972

May 2025

## 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.

Artwork: James Baban.

Advisory circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

**Advisory circulars should always be read in conjunction with the relevant regulations.**

# Audience

This advisory circular (AC) applies to:

- operators of Australian registered rotorcraft conducting human external load operations
- maintenance organisations that modify rotorcraft for external load operations
- designers of rotorcraft modifications
- production approval holders for appliances that are to be used during external load operations.

# Purpose

This AC provides guidance for the approval of personnel carrying device systems (PCDS) used with human external cargo (HEC) capable rotorcraft when performing HEC operations. The AC describes the methods of accepting or approving appliances used as part of an external load system.

To avoid duplication of content, this AC should be read in conjunction FAA Advisory Circulars 27.865 and 29.865, contained in FAA AC 27-1 and AC 29-2 respectively, that provide guidance for the airworthiness design requirements of external load systems. EASA acceptable means of compliance (AMC) for EASA CS-27 and CS-29 also provides valuable guidance relating to design criteria in relation to European Certification Specification (CS) 27.865 and 29.865.

# For further information

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

# Status

This version of the AC is approved by the National Manager, Airworthiness and Engineering Branch.

**Table 1: Status**

| Version | Date | Details |
|---|---|---|
| v1.0 | May 2025 | Initial AC. |

Unless specified otherwise, all subregulations, regulations, Divisions, Subparts and Parts referenced in this AC are references to the *Civil Aviation Safety Regulations 1998 (CASR)*.

# Contents

**1 Reference material 5**

1.1 Acronyms 5
1.2 Definitions 5
1.3 References 7
1.4 Forms 8

**2 Introduction 9**

2.1 Overview 9
2.2 Frequently asked questions (FAQ) 12

**3 Criteria for equipment approval under Part 21 15**

3.1 Assessment criteria 15
3.2 Third party certification 16
3.3 European standards (EN) 16
3.4 National Fire Protection Agency (NFPA) 17
3.5 Performance standards for unique or novel designs 18
3.6 Alternative standards 18

**4 Operational implementation 20**

4.1 Update to the approved Exposition (Part 133) or Operations Manual (Part 138) 20
4.2 Risk mitigation 20
4.3 Training 20

**5 Equipment approval pathways under Part 21 22**

5.1 Australian Parts manufacturer Approval (APMA) - paragraph 21.305(a) 22
5.2 Australian Technical Standard Order Authorisation - paragraph 21.305(b) 22
5.3 Type Certificate procedures - paragraph 21.305(c) 23
5.4 Approval of imported materials, parts and appliances - paragraph 21.305(d) 23
5.5 Approval in a manner prescribed by Part 21 MOS - paragraph 21.305(da) of CASR 23
5.6 Approval in any other manner approved by CASA - paragraph 21.305(e) of CASR 24

**Appendix A Rescue litter system 25**

# 1 Reference material

## 1.1 Acronyms

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

**Table 2: Acronyms**

| Acronym | Description |
|---|---|
| AC | advisory circular |
| ARC | authorised release certificate |
| ATSO | Australian Technical Standard Order |
| ATSOA | Australian Technical Standard Order Authorisation |
| CASA | Civil Aviation Safety Authority |
| CASR | *Civil Aviation Safety Regulations 1998* |
| ETSO | European Technical Standard Order |
| ETSOA | European Technical Standard Order Authorisation |
| HEC | human external cargo |
| MOS | Manual of Standards |
| PCDS | personnel carrying device system |
| RFM | rotorcraft flight manual |
| TSO | Technical Standard Order |
| TSOA | Technical Standard Order Authorisation |

## 1.2 Definitions

Terms that have specific meaning within this AC 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 AC and the civil aviation legislation, the definition in the legislation prevails.

**Table 3: Definitions**

| Term | Definition |
|---|---|
| air crew member | means a crew member for a flight of an aircraft (other than a flight crew member) who carries out a function during the flight relating to the safety of the operation of the aircraft, or the safety of the use of the aircraft.<br>(CASR Dictionary Part 1) |
| appliance | Means any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communication equipment, that is used or intended to be used in operating or controlling an aircraft in flight, is installed in or attached to the aircraft, and is not part of an airframe, engine or propeller. |

| Term | Definition |
|---|---|
| | (CASR Dictionary Part 1) |
| article | Means materials, parts, processes, or appliances, typically used in relation to an ATSO Authorisation.<br>CASR 21.601(3) |
| ATSOA | A design approval and manufacturing authorisation issued under CASR Subpart 21.O against an Australian Technical Standard Order (ATSO), Technical Standard Order (TSO) published by the FAA or a European Technical Standard Order (ETSO). |
| attaching means | Typically a reference to a cargo hook, but also includes items such as ropes, carabineers, shackles, etc. that attach the PCDS to the aircraft. |
| authorised release certificate | Means a document issued by a manufacturer or a maintainer to attest that a product meets its design criteria and has been manufactured or maintained (as the case may be) in accordance with relevant data and is in a serviceable condition.<br><br>The legislative CASR definition is given by clause 18 of Part 2 of the CASR Dictionary. |
| complex PCDS | Any PCDS appliance that does not meet the definition of a Simple PCDS |
| flight crew member | means a crew member who is a pilot or flight engineer assigned to carry out duties essential to the operation of an aircraft during flight time.<br>(CASR Dictionary Part 1) |
| human external cargo (HEC) | A person(s) that at some point in the operation is carried external to the rotorcraft. (Ref. FAA AC 29.865B) |
| installation | Refers to appliances, parts or materials that are included in the aircraft approved design and are fitted to the aircraft, in most cases with a maintenance certification by a person with the technical expertise required to perform the action.<br><br>Items of equipment such as harnesses that are approved and attached to the aircraft HEC system are not considered to be installed. |
| part | Means an individual component or an assembly of components that is used on aircraft |
| personnel carrying device system (PCDS) | Any device or system that has the structural capability and features needed to safely transport occupants external to the rotorcraft during HEC operations. A PCDS includes, but is not limited to, safety harnesses, and rigid baskets or cages either attached to a hoist or cargo hook or mounted to the rotorcraft airframe.<br>(Ref: FAA TSO 167) |
| production authorisation | An authorisation issued under CASR Part 21 for the production (manufacture) of any products, materials, parts or appliances. |
| simple PCDS | • designed to restrain no more than a single person (e.g. hoist or cargo hook operator, task specialist, etc.) inside the cabin, or to restrain no more than two persons outside the cabin; and<br>• it is not a rigid structure such as a cage, a platform or a basket; and<br>• it complies with any of the following:<br>– the acceptable standards and associated requirements prescribed by the Part 21 Manual of Standards: or |

| Term | Definition |
|---|---|
| | – Approved under an ATSOA (including relevant TSOA and ETSOA); or<br>– Approved by CASA under CASR 21.305(e) in any other manner approved by CASA. |
| task specialist | A task specialist, for an aerial work operation, means a crew member for a flight who carries out a function for the flight relating to the aerial work operation and is not a flight crew member or an air crew member for the flight.<br>Ref. CASR 138.015. |

# 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 |
|---|---|
| Part 21 | Certification and airworthiness requirements for aircraft and parts |
| Part 133 | Australian Air Transport Operations—Rotorcraft |
| Part 138 | Aerial work operations |

## Advisory material

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

**Table 5: Advisory material references**

| Document | Title |
|---|---|
| AC 11-02 | Exemptions against the CASR, CAR, CAO and MOS |
| AC 21-08 | Approval of modification and repair designs under Subpart 21.M |
| AC 21-12 | Classification of design changes |
| AC 21-15 | Supplemental Type Certificates |
| AC 21-16 | Approval of materials, parts, processes and appliances |
| AC 21-27 | Manufacturing approval - overview |
| AC 21-601 | Australian Technical Standard Order Authorisation |
| AC 138-01 | Part 138 core concepts |
| AC 138-05 | Aerial work risk management |

## Other reference material

**Table 6: Other reference material**

| Document | Title |
|---|---|
| FAA AC 27-865 | External Load Attaching Means (note: this AC is contained within FAA AC 27-1) |
| FAA AC 29-865 | External Load Attaching Means (note: this AC is contained within FAA AC 29-2) |
| EASA CS-27.865/29.865 | Acceptable Means of Compliance and Guidance Material - External loads |
| FAA AC 21-45 | Commercial Parts |
| EASA AMC1 SPO.SPEC.HEC.105(b) | Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Annex VIII Specialised operations [Part-SPO] |
| FAA SAIB SW-18-15 | External Load Devices for Human External Cargo |

# 1.4 Forms

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

**Table 7: Forms**

| Form number | Title |
|---|---|
| Form 849 | Application for CASR Part 21 production approval |

# 2 Introduction

## 2.1 Overview

2.1.1 This AC provides guidance for the identification and approval of operational equipment used for the carriage of persons external to a rotorcraft. This type of activity is referred to as Human External Cargo or HEC.

2.1.2 The guidance also encompasses appliances that may be used for the restraint of a person involved in the HEC operation inside the cabin with open door operations, such as a hoist operator.

2.1.3 Within the Parts 91, 133 and 138 Manuals of Standards (MOS) there are requirements for HEC equipment to be compliant with the requirements of, or approved under, Part 21 of CASR. Typically, this requirement applies to baskets, cages, litters (stretchers), fittings, lines, safety harnesses, restraint straps, rescue harnesses, etc.

2.1.4 Whenever a material, part, process, or appliance is required to be approved under Part 21 of CASR, it may only be approved by the following means:

- under an Australian Parts Manufacturer Approval (APMA)
- under an Australian Technical Standard Order Authorisation (ATSOA)
- in conjunction with Type Certification procedures of an aircraft, engine or propeller
- an imported item that meets the conditions of Subpart 21.N
- as specified in the Part 21 MOS
- in any other manner approved by CASA.

2.1.5 Section 5 of this AC provides further details relating to each of the above means of approval including the applicability of each method to HEC operations[1].

### 2.1.6 Types of equipment: simple and complex

2.1.6.1 A Personnel Carrying Device System (PCDS) used for the purposes of HEC can range from simple textile full-body harnesses through complex rigid structures and cages designed to carry multiple occupants.

2.1.6.2 EASA Acceptable Means of Compliance (AMC) for the CS-29 airworthiness standards makes a distinction between 'simple'' and ''complex' PCDS. The terms simple and complex are useful when discussing approval pathways. For the purposes of this AC, a simple PCDS is considered to meet the following criteria:

- it is designed to restrain no more than a single person, such as a hoist or cargo hook operator inside the cabin, or to restrain no more than two persons outside the cabin
- it is not a rigid structure such as a cage, a platform or a basket
- it complies with any of the following:
  - the acceptable standards and associated requirements prescribed by the Part 21 Manual of Standards (MOS)

  or

  - approved under an ATSOA (including relevant TSOA and ETSOA)

[1] Refer to regulation 21.305 of CASR.

or

– approved by CASA under paragraph 21.305(e) in any other manner approved by CASA.

2.1.6.3 Items that meet the above criteria are approved by CASA in accordance with Part 21 of CASR. These items are deemed by CASA to have the structural capability and personnel safety features essential for external occupant safety and satisfy the airworthiness requirements of 27/29.865(c)(2).

2.1.6.4 Equipment that does not meet the simple PCDS criteria are considered complex and require a more detailed assessment by CASA. An overview of the pathways of approval for both simple and complex PCDS is given in figure 1 below with a more detailed summary provided in section 5 of this AC.

2.1.6.5 When referring to simple PCDS, the associated attaching means must also be considered and be approved in the same manner. Attaching means refers to items such as ropes, carabineers, shackles, etc. that attach the simple PCDS to the approved hoist system or hook. The approval methods stated in 2.1.4 will also apply to the attaching means.

As of the date of this revision, the Part 21 MOS does not contain 'acceptable standards and associated requirements' related to simple PCDS. Section 3 provides a table of standards assessed by CASA and deemed acceptable that can be used in conjunction with other methods of approval until such time the list can be transitioned to the Part 21 MOS.

A paragraph 21.305(e) approval would be such a method of approval.

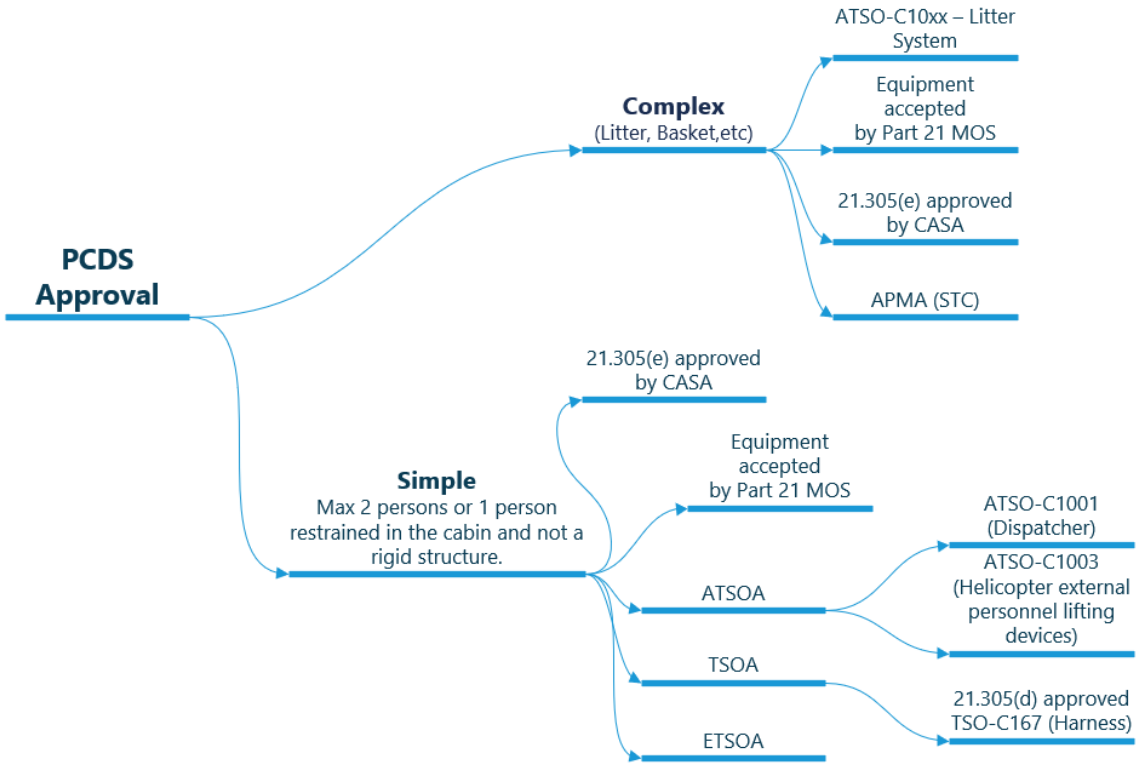


**Figure 1: Overview of the pathways of approval for both simple and complex PCDS**

**ATSO-C10xx - Litter systems is a reference to the standard provided in Appendix A of this AC which is anticipated to become a future published ATSO.*

## 2.1.7 Applicable airworthiness standards

2.1.7.1 A PCDS may be approved during certification of the hoist system or it may be approved after the external load system has been certified. A limitation in the RFM or RFMS requiring a PCDS to be approved by the local NAA (i.e. CASA) will allow for more flexibility for operators to select their own approved PCDS. In all cases, the compatibility with the helicopter should be approved through the certification activity or post certification.

2.1.7.2 When a PCDS is approved, it means that CASA is satisfied that the equipment meets the requirements of the applicable airworthiness standards for the PCDS. The assessment criteria is the same, regardless of whether the approval is provided during, or post certification.

2.1.7.3 The applicable airworthiness standards for the approval of a PCDS are primarily regulations 27.865 and 29.865 of both the FAA and EASA airworthiness standards and apply in all situations of HEC equipment approval.

2.1.7.4 FAA AC 29-2 and EASA AMC for CS-29 provide extensive guidance on means of compliance with the xx.865 requirements. In particular, the fatigue requirement of xx.865(f) must be satisfied for all PCDS.

2.1.7.5 EASA AMC No.1 to CS 29.865 (c)(6)(vi)(B) provides guidance on fatigue evaluation of HEC applications for complex PCDS.

2.1.7.6 EASA AMC No.2 to CS 29.865 provides guidance relating to simple PCDS and provides options for addressing fatigue when the PCDS is not a rigid structure.

2.1.7.7 Flammability properties should be considered against the requirements of 29.853, which makes reference to Part 25/CS 25 Appendix F. Textiles used in both simple and complex PCDS should not have an average burn rate greater than 64mm (2.5 inches) per minute when tested horizontally in accordance with the applicable portions of Appendix F. Alternative standards such as ASTM D6413/D6413M, Standard Test Method for Flame Resistance of Textiles (Vertical Test) would be considered acceptable to find compliance against flame resistance properties.

2.1.7.8 A PCDS that has been approved by CASA has been found to be satisfactory regarding:

- reliability
- structural capability
- flame resistance
- personnel safety features essential for external occupant safety
- fatigue.

2.1.7.9 Relevant Australian Technical Standard Orders for helicopter external personnel lifting devices and dispatcher restraints are currently published in the Part 21 MOS .

2.1.7.10 A manufacturer of equipment may propose an airworthiness standard for bespoke or novel designs. Appendix A of this AC provides an example standard for litter systems that could be used as a basis for airworthiness approval under CASR Part 21.

2.1.7.11 Alternatively, prospective applicants may develop their own standards for acceptance by CASA when the proposed standard addresses the criteria identified in 2.1.7.4 above.

## 2.1.8 Aircraft compatibility

2.1.8.1 Approval of a PCDS does not assure compatibility with the aircraft. The existing aircraft hoist capability must be reviewed to establish whether such equipment can be used. The Rotorcraft Flight Manual (RFM) must have the appropriate limitations and procedures incorporated for conducting human external cargo operations (ref: 27/29.865(c)(2)).

2.1.8.2 The RFM does not have to list each and every particular PCDS that may be used with the aircraft, but in all cases it must be clear which PCDS may be used with the aircraft (for example,

a broad statement in the RFM supplemented by additional detail in the operations manual). If the compatibility cannot be clearly established, a review of the hoist system when utilising the approved PCDS will need to be undertaken. This review may involve persons with engineering and flight operations expertise and will involve the amendment of the Flight Manual to clearly identify which PCDS can be used, including the limitations and procedures for conducting human external cargo operations with that particular PCDS.

### 2.1.9 Applicability of modifications

2.1.9.1 As equipment can only be approved under the methods identified in 2.1.4 above, the incorporation of unapproved materials, parts, processes and appliances in aircraft modifications are not within the scope of a Subpart 21.M approval.

2.1.9.2 It should be noted that equipment used for the purposes of Human External Cargo (HEC) is not eligible for inclusion in a modification as a Commercial Off The Shelf (COTS) part. Appendix C, subparagraph C.2.2.4 of AC 21-08 provides for the classification of COTS parts. HEC equipment is considered safety critical, required by the applicable airworthiness standards (27/29.865) and required by or under the applicable operational regulations. When referencing the classification of COTS parts these items are classified under 'd. Required operational instruments and equipment' and must be approved in a manner identified in 2.1.4 of this AC.

### 2.1.10 Application for approval under Part 21

2.1.10.1 Where approval of appliances and parts is sought post aircraft certification, an application can be made to CASA on a completed Form 849. This form covers APMA, ATSO Authorisations and 'other' approvals as described throughout this AC.

2.1.10.2 Applications for ATSOA can be made by an article manufacturer in accordance with the requirements of regulation 21.605 of CASR.

2.1.10.3 Application for a paragraph 21.305(e) approval should be made by the original equipment manufacturer or the operator wishing to use the equipment. The applicant must have access to the technical data that supports the requirements set out in this AC or equivalent means.

2.1.10.4 In all cases, applications should be supported with complete and detailed technical data that will allow CASA to find compliance against the guidance of this AC. To find compliance, CASA will confirm the appliance or part meets the design requirements of an acceptable standard, be manufactured under a quality system that assures the item meets the design requirements and can be inspected and maintained during its life to assure the item continues to meet the design requirements.

2.1.10.5 Other methods of showing compliance will be considered, however there must be clear equivalence shown to the methods and requirements set out in this AC.

## 2.2 Frequently asked questions (FAQ)

2.2.1 The following FAQ are intended as a quick reference to common questions.

### 2.2.2 How can I determine if my equipment meets the requirements of Part 21?

2.2.2.1 All equipment used for the purposes of the carriage of persons external to the aircraft must be compliant with the requirements of, or approved under, Part 21 of CASR. This means that everything that attaches to the hook system must have a specific CASA approval or acceptable foreign NAA equivalent. Verification that the equipment has been delivered with an ARC would initially assist in this determination.

2.2.2.2 Whilst it has always been a requirement for equipment to be approved in this manner, equipment approvals prior to the publishing of Parts 91, 133 and 133 may have been issued

and approved under Part 21 Subpart.M (typically through an Engineering Order or EO). Although this is an approval under Part 21, this does not comply with the requirements of Part 21 for the approval of appliances, part or materials which is undertaken under subparts 21.K and 21.O of CASR.

2.2.2.3 A technical review of existing equipment should be undertaken to confirm the approval has been made under one of the pathways explained in this AC. A design engineering organisation will be able to assist with this technical review should an operator not have the technical expertise required for this task.

## 2.2.3 Can I get the equipment approved as part of a modification under a Supplemental Type Certificate (STC)?

2.2.3.1 Equipment can be approved as part of an STC process, however the methods and process of approval are the same regardless of whether the equipment is approved during certification, modification via STC or at a future time.

2.2.3.2 The issuing of an STC occurs when the aircraft is found to comply with the applicable airworthiness standards and all equipment to be used with that aircraft is approved. The flight manual will typically need to be amended as a consequence of the changes introduced by the STC and must reflect the limitations and procedures for the HEC operation, including identifying what approved equipment can be used.

2.2.3.3 In all cases, any appliance or part must be approved by CASA under Subpart 21.K or 21.O, only then can an STC incorporate the items into the modification approval.

## 2.2.4 Do I need an installation approval for my CASA approved appliance?

2.2.4.1 The term *installation* is not specifically defined in the CASRs, but when used, it refers to the permanent attachment of an appliance, part, etc. usually involving a maintenance action and requiring a certification for the work performed. Applying the concept of installing HEC equipment brings complications regarding whether a maintenance action has occurred, configuration control, acceptable Authorised Release Certificate, applicability to the aircraft maintenance program, etc. Equipment covered by this AC is generally not considered as being ''installed' into an aircraft, but rather may be attached to the aircraft under the control of the operator as part of the operation of the aircraft.

2.2.4.2 When the equipment is required to be attached to the Hoist/HEC system, such as a litter system or full-body harness, then a compatibility assessment must be undertaken. The equipment must be approved by CASA and the Aircraft Flight Manual must clearly state that the aircraft, hoist and attaching means is approved for HEC operations.

2.2.4.3 The approved Flight Manual limitations and procedures provide the assurance the equipment has been assessed for compatibility and has been found as acceptable for use with the aircraft

## 2.2.5 What are my options if equipment I want to use has been certified to a standard that does not appear in the Part 21 MOS?

2.2.5.1 CASA can approve equipment that is certified to a standard that is not in the Part 21 MOS, if upon application CASA determines the proposed standard meets the minimum safety criteria. CASA will assess whether the certification body is acceptable to perform and monitor the certification activity with an approval provided under paragraph 21.305(e) of CASR.

2.2.5.2 The standards identified in Section 3 of this AC do not yet appear in the Part 21 MOS but have been deemed acceptable to CASA and would therefore be eligible for approval by CASA under Part 21.

2.2.5.3 Manufacturers or engineering organisations with unique or novel designs are encouraged to propose bespoke standards, based on existing standards or established practices for CASA consideration. Any proposal will have to meet all safety criteria, including the establishment of the structural capability and personnel safety features essential for external occupant safety.

## 2.2.6 Do I need an Authorised Release Certificate for my equipment?

2.2.6.1 If the equipment is approved under Part 21 and includes a CASA production authorisation, then an ARC will be issued with the product and should be retained by the operator as evidence that the equipment is approved for use under Part 21. An ARC is not required for the purposes of attaching the equipment to the aircraft but should be retained as evidence of the specification, origin and authenticity of the equipment.

2.2.6.2 Refer to section 1.2 for the definition of Authorised Release Certificate in the context of this AC.

## 2.2.7 Who is responsible for the equipment design following approval?

2.2.7.1 Where the equipment is approved through the Part 21 MOS, the ongoing certification that underpins the approval will need to be monitored by the operator. This will require the operators to keep themselves informed of the integrity of the products through awareness of product recalls or cancellation of the product by the relevant certifying authority.

2.2.7.2 Where an approval under paragraph 21.305 (e) includes a production authorisation, the holder of the approval becomes responsible and will be subject to CASA oversight activities in the same manner as any other CASA production authorisation holder.

# 3 Criteria for equipment approval under Part 21

Equipment attached to an existing HEC approved aircraft system, such as hoist or belly hook, and used for the purposes of HEC is required to be approved per the operational rules of Part 91, 133 and 138. These requirements align with the airworthiness standards of regulations 27.865 and 29.865 of CASR that require a personnel carrying device system (PCDS) to be approved.

The requirement to be approved is a general reference to any acceptable means of approval by CASA. A rescue harness marked with ATSO-C1003 (Helicopter external personnel lifting devices) supplied with an authorised release certificate would be one such example of approved equipment.

The rotorcraft flight manual (RFM) must be assessed to assure the equipment limitations and procedures for use are clear, otherwise a Flight Manual Supplement will be required. The operator's approved exposition (Part 133) or Operations Manual (Part 138) must also reflect procedures for managing the equipment, including but not limited to how maintenance requirements and any retirement lives will be managed.

## 3.1 Assessment criteria

3.1.1 There are two essential elements to be considered when assessing an item of equipment for Part 21 approval:

1. the ability to assess the design against an appropriate standard, and
2. consideration of the manufacturers' quality system to repeatedly produce items against the approved specifications of the design.

3.1.2 Equipment used for the purposes of air operations may be certified via a Type Certificate or Supplemental Type Certificate process, or through minimum performance standards (MPS) published in Australian Technical Standard Orders and authorised under Subpart 21.O.

3.1.3 TSO and ETSO issued by FAA and EASA respectively are also acceptable minimum performance standards.

3.1.4 In both instances, the design is assessed and approved against an accepted standard and the equipment is manufactured under a CASA Production authorisation, or in the case of an ATSOA, the quality system is validated, and production is approved in accordance with that quality system.

An appliance can only be approved under Part 21 if there is an acceptable standard to validate the design. In cases where a suitable standard is not published or readily available, an applicant can propose minimum performance standards to meet the needs of the equipment. Any proposed standard must be substantiated with quantitative and/or qualitative data that establishes an acceptable level of safety.

Additionally, an appliance cannot be approved if the method of production cannot demonstrate the capability to repeatedly produce items against the approved specifications of the design.

An appliance that cannot be assessed against a standard, or that cannot satisfactorily demonstrate production capabilities, is not necessarily fundamentally unsafe, but it cannot be approved under a Part 21 standards based assessment process as required by the operational regulations.

In some cases, such as exceptional circumstances or for equipment that does not meet Part 21 requirements but can be shown to be acceptably safe for specified uses via other means, limited authorisations may be possible under an exemption (see AC 11-02).

3.1.5 ATSO Authorisations (ATSOA) include the ability to deviate from the MPS under regulation 21.609 of CASR where the differences are compensated for by factors or design features providing an equivalent level of safety. Any deviation is at CASA discretion and should be identified upon application.

## 3.2 Third party certification

3.2.1 Section 3.1 discusses how an appliance cannot be approved under Part 21 unless there is an accepted standard identified to validate the design and the method of production demonstrates the capability to repeatedly produce the appliance against the approved specifications of the design. The aviation system has used this fundamental approach for generations, leading the way in how to assure products and appliances perform as expected with a high degree of reliability.

3.2.2 In recent times, sectors outside of aviation have adopted a similar approach to production, allowing CASA to consider items for approval that are produced under equivalent systems and can demonstrably show equivalent levels of rigour in the approval process.

3.2.3 Appliances that are certified by a reputable organisation to an acceptable standard are eligible for approval by CASA through a paragraph 21.305 (e) approval or through prescription in the Part 21 MOS.

3.2.4 Certified products will need to demonstrate a design approval, a manufacturing authorisation and continuing oversight activities to be eligible.

3.2.5 It should be noted that manufacturer claims of compliance or equivalence are not acceptable. Phrases such as 'meets the requirements of' or ''manufactured to' typically do not reflect a certified product.

## 3.3 European standards (EN)

3.3.1 The European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC) combine to develop and implement technical standards primarily for the European market. Technical committees are formed to develop a range of standards across a diverse range of industries.

3.3.2 For a product to be certified in the European system, it must first be issued with a valid European (EU) Type Examination Certificate by a notified body. A notified body is designated by a European country to perform the conformity procedures on products and organisations that seek certification. A list of notified bodies is published by the European commission and the bodies themselves are subject to competence verification by accreditation organisations.

3.3.3 A European (EU) Type Examination Certificate is analogous to a Type Certificate issued in the aviation system.

3.3.4 Once a product receives a Type Examination Certificate, the manufacturer will start production of the items and issue a Certificate of Conformance, attesting the product has been manufactured in accordance with the conditions of the issue of the Type Examination Certificate. The Certificate of Conformance is analogous to CASA Form 1 in the Australian aviation system and both are considered to meet the definition of an ARC for the purposes of this AC.

3.3.5 The notified body that issued the Type Examination Certificate will perform ongoing oversight of the manufacturer to assure the certificate holder continues to attain the standard.

3.3.6 Table 8 provides a non-exhaustive list of EU standards that are considered acceptable and therefore eligible for approval by CASA under paragraph 21.305 (e) of CASR. The listed standards are developed by the European Committee for Standardisation (CEN) Technical Committee CEN/TC 160 - Protection against falls from height including working belts.

3.3.7 In some cases, such standards as EN 12277 Mountaineering equipment - Harnesses, have been omitted from the list as the equipment is primarily designed for sporting activities and developed by the technical committee CEN/TC 136 - Sports, playground and other recreational equipment. In this example, the static testing of the equipment is equivalent to the standards listed in Table 8, but there is no dynamic test which requires, amongst other things, the body to come to rest in a vertical position. Standards that are not included in Table 8 may still be eligible for approval, but an applicant would need to justify why the available alternatives are not suitable.

**Table 8: European Standards**

| Standard | Title |
|---|---|
| EN 354:2010 | Personal protective equipment for work positioning and prevention of falls from a height — lanyards |
| EN 358:2018 | Personal protective equipment for work positioning and prevention of falls from a height — belts for work positioning and restraint and work positioning lanyards |
| EN 361:2002 | Personal protective equipment against falls from a height — full body harnesses |
| EN 362:2004 | Personal protective equipment against falls from a height — connectors |
| EN 363:2018 | Personal fall protection equipment — personal fall-protection systems |
| EN 364:1992/AC:1993 | Personal protective equipment against falls from a height — test methods |
| EN 365:2004/AC:2006 | Marking/packaging/instructions to use |
| EN 813:2008 | Personal fall-protection equipment — sit harnesses |
| EN 1497:2007 | Personal protective equipment against falls from a height — rescue harnesses |
| EN 1498:2008 | Personal protective equipment against falls from a height — rescue loops |
| EN 1891:1998 | Personal protective equipment for the prevention of falls from a height — low stretch kernmantle ropes |

## 3.4 National Fire Protection Agency (NFPA)

3.4.1 The National Fire Protection Agency (NFPA) Standard 1983 - Standard on Life Safety Rope and Equipment for Emergency Services provides standards for many types of equipment, such as full body harnesses, ropes, litters, and carabineers. Similar to the European Standards described in section 3.3, NFPA 1983 is developed by the Special Operations and Fire and Emergency Services Protective Clothing and Equipment technical committee.

3.4.2 The independent validation of products certified to NFPA 1983 is undertaken by third parties such as UL Solutions [2]. The general approach is like the European model in that the product

[2] Formerly Underwriters Laboratories.

design, manufacturing, and continuing oversight forms part of the certification. However, in the case of UL, a product and manufacturer are 'listed' in lieu of a 'Type Certificate'' such as the Type Examination Certificate issued in Europe. Listing through the UL website allows for confirmation that any given product has a valid certification. Any products that fail to consistently meet the standards are removed from the listing.

3.4.3 A Certificate of Conformance is still issued by the manufacturer for the product attesting to compliance with the standard.

3.4.4 Table 9 provides a non-exhaustive list of NFPA standards that are considered acceptable and therefore eligible for approval by CASA under paragraph 21.305(e) of CASR. As with the European system, any standards that are not included in Table 9 may still be eligible for approval.

**Table 9: National Fire Protection Agency (NFPA) standards**

| Standard | Title |
|---|---|
| NFPA 1983 | Standard on Life Safety Rope and Equipment for Emergency Services |
| | Life Safety Harness - Class III |
| | Victim Extrication Device - Class III |
| | Carabiner – (G) General Use (technical use equipment is explicitly excluded from this table) |

## 3.5 Performance standards for unique or novel designs

3.5.1 Where an appropriate MPS is not published for the equipment, CASA can assess a proposed MPS and if found acceptable, can approve the design and production activity in a similar manner to the ATSOA process using paragraph 21.305 (e) of CASR.

3.5.2 Appendix A of this AC provides an MPS for a litter system that includes the rigid structure and the restraint system. In this example, there are existing published MPS for a general rigid litter (without restraint), and standards that cover systems of restraint and lifting hardware. However, when referred in isolation, these standards do not appropriately address the requirements of 27/29.865 mentioned in section 2.1.7.3 for the ''personnel safety features essential for external occupant safety''.

3.5.3 By combining the relevant MPS of relevant existing standards, a case for compliance against the applicable airworthiness standards can be made. In the case of Appendix A - Litter systems, this standard can be used to apply for an approval of a litter system under paragraph 21.305 (e) of CASR. An application under this method includes a design and production authorisation. The ability to deviate from the MPS is also available, on the condition that the differences are compensated for by factors or design features providing an equivalent level of safety as per the ATSO process.

3.5.4 It is anticipated that Appendix A of this AC will transition to be published as an ATSO in the Part 21 MOS at the next revision. Should any other proposed MPS be accepted by CASA for the purposes of approval of equipment at any time in the future, then that MPS may become a candidate for being added to the MOS at the next revision.

## 3.6 Alternative standards

3.6.1 The standards identified above in sections 3.3.6 and 3.4.4 have been reviewed and are provided as examples of the type of system and standard that would be acceptable to CASA for

an approval. The tables are not exhaustive, and many standards will be eligible for approval if the criteria laid out in this AC are adhered to.

3.6.2 The Part 21 MOS may be updated from time to time. Where appropriate, standards that are acceptable to CASA will be listed, thereby satisfying the requirement to be approved under Part 21 without further CASA approval if a system of product certification that meets the criteria is evident.

### Example:

Part 133 MOS Chapter 5, Division 1 provides for external load operations conducted during medical transport operations. Section 5.06 specifically requires the external load equipment, fittings, lines, safety harnesses, restraint straps and rescue harnesses to meet the requirements of, or be approved under, Part 21 of CASR.

An operator has selected a full body harness that has been manufactured and certified to EN 361:2002 - 'Personal protective equipment against falls from a height — full body harnesses'.

Review of the flight manual for compatibility states the following: 'Operation of the external hoist equipment with HEC requires the use of a Personnel Carrying Device System (PCDS), which must be approved by the Local Aviation Authority. TSO-C167 provides one acceptable means of approval for such systems.'

At the time of review, the MOS does not state acceptance of the EN standard for body harnesses. However the standard is identified as acceptable in this AC, so an application to CASA for a paragraph 21.305(e) approval can be made with sufficient supporting data. In this example, sufficient data would be the active Type Examination Certificate, an example Certificate of Conformance of the product and the flight manual extract that shows compatibility with the aircraft system.

Assuming the application is complete, the harness will be approved by CASA without further showing. The Part 133 exposition (for this example) will be updated to reflect the management procedures for use, maintenance and retirement of the equipment.

# 4 Operational implementation

Approved equipment does not automatically qualify for use in an aircraft operation. The Part 21 approval of equipment confirms the appliance is expected to perform within its design specifications and to a level of durability for the conditions for which it is designed.

The following paragraphs summarise some of the additional items that must be considered to use approved equipment.

## 4.1 Update to the approved Exposition (Part 133) or Operations Manual (Part 138)

4.1.1 The continuing airworthiness programs for the aircraft do not necessarily consider this kind of equipment, so important management functions such as configuration control, maintenance task scheduling, retirement life, etc must be controlled through operational procedures.

4.1.2 The operator's exposition (Part 133) or Operations Manual (Part 138) will need to be updated to reflect the management processes in relation to the equipment. These procedures are in addition to, and supportive of the flight manual limitations and procedures.

## 4.2 Risk mitigation

4.2.1 A safety analysis of the user function should be performed to assure personnel safety features that are essential for occupant safety are maintained. For example, dynamic rollout of the attachment hardware, trip hazard from lanyards, etc.

4.2.2 The risk management practices should be documented and reviewed, and where required updated on a frequent basis.

**Note:**

CASA has issued the following AWBs relating to helicopter personnel carrying operations:

- AWB 25-030 - Helicopter Personnel Winching - Human External Cargo (HEC) Operations.
- AWB 25-033 - Helicopter Personnel Winching - Inadvertent Disconnect.

4.2.3 In the case of restraint systems provided for crew members restrained within the cabin, for example the hoist operator, the:

- user of the equipment should have the ability to disengage from the restraint system in the event of an emergency egress.
- system must restrict the travel of the crew member to assure the crew member cannot fall any distance from the aircraft.
- harness and lanyard combination (however described) must not be used to suspend or hold a body in tension.

## 4.3 Training

4.3.1 Consideration should be given to the training requirements for any person associated with the use and management of the equipment. The training should consider the basic use of the equipment, as informed by the manufacturer's documentation, but also consider the supply, usage, handling, and storage.

4.3.2 Persons tasked with performing maintenance actions such as visual inspections should show competence in understanding and identifying unacceptable features of the equipment and the procedures used to manage such findings (i.e. discard, return to approved repairer, etc).

# 5 Equipment approval pathways under Part 21

Equipment used for the purposes of HEC falls under the category of an appliance when referring to the CASR dictionary. Appliances are approved under subpart 21.K (approval of materials, parts, processes, and appliances) and subpart 21.O (Australian Technical Standard Order Authorisations). Appliances cannot be approved under subpart 21.M as that subpart deals with the design of modifications and repairs.

The primary function of equipment approval is to assure the product will perform to its intended design. The following sections expand on the methods that may be used for the approval of equipment under Part 21.

## 5.1 Australian Parts manufacturer Approval (APMA) - paragraph 21.305(a)

5.1.1 An APMA is a replacement or modification part. Although included here for completeness, an APMA pathway is not a method of approval for HEC equipment as an APMA is replacing an existing part or being used to modify an existing aircraft system. Introducing a new item of equipment for use with an existing aircraft system is not considered a modification to the aircraft.

5.1.2 An APMA would be appropriate for a structure that is permanently attached to the aircraft such as a powerline inspection platform.

5.1.3 CASA AC 21-27 - 'Manufacturing approval - overview' and AC 21-16 - Approval of materials, parts, processes and appliances provide further detail on AMPA approvals.

## 5.2 Australian Technical Standard Order Authorisation - paragraph 21.305(b)

5.2.1 An Australian Technical Standard Order Authorisation (ATSOA) is an authorisation to manufacture an article to a design that has been found to meet the requirements of a TSO, ETSO or ATSO.

5.2.2 A TSO, ETSO or ATSO contains the minimum performance standards (MPS) for an article and may include references to a published technical design standard. The Order will state the technical data requirements (including operating instructions and limitations) and the requirements for part marking and supply.

5.2.3 CASA Advisory Circular AC 21-601 - Australian Technical Standard Order Authorisation provides guidance on aspects of ATSOA.

5.2.4 CASA publishes ATSOs in the Part 21 MOS. Current ATSOs relating to external loads are:

- ATSO-C1001 – Dispatcher’s restraint strap
- ATSO-C1003 – Helicopter external personnel lifting devices.

5.2.5 An example TSO published by the FAA in relation to external loads is:

TSO-167 - Personnel Carrying Device Systems (PCDS), also known as Human Harnesses.

5.2.6 An ATSOA does not confer installation authority, and in the case of HEC equipment it does not consider compatibility with the aircraft system. Section 2.1.8 of this AC discusses the considerations for assessment of compatibility.

5.2.7 For products that are manufactured to a TSO or ETSO by a foreign state, refer to section 5.5 - Approval of imported materials, parts and appliances - paragraph 21.305(d).

**Note:** Appendix A of this AC provides an acceptable standard for litter systems and is expected to be transitioned to an ATSO in the Part 21 Manual of Standards in the future.

## 5.3 Type Certificate procedures - paragraph 21.305(c)

5.3.1 The approval of materials, parts, processes and appliances in conjunction with type certification procedures is specifically used for aircraft being produced under a type certificate. This is not a common situation and is usually undertaken for prototype aircraft, where a production certificate would be issued upon successful completion of the manufacture of the aircraft and proving of the quality system (Production Inspection System).

5.3.2 This option has been included for completeness, however the approach would not be used for the purposes of approval of HEC equipment.

## 5.4 Approval of imported materials, parts and appliances - paragraph 21.305(d)

5.4.1 Paragraph 21.305(d) provides for approvals of imported materials, parts and appliances under Subpart 21.N. Within that Subpart, regulation 21.502 provides the requirements for the approval of imported equipment from recognised countries and foreign states that have an agreement with CASA to accept such items.

5.4.2 A harness manufactured to FAA TSO C167 is an example of approved equipment under provision in paragraph 21.305(d).

5.4.3 Regulation 21.502A of CASR provides for approval of equipment that is not from a recognised country, however the applicant must, on request, provide any technical data for the design of the material, part or appliance and meet the requirements prescribed by the Part 21 MOS.

5.4.4 Paragraph 21.305(d) is very similar to 21.305(da) below due to the need for the manual of standards to prescribe requirements. It is therefore unlikely to be used for approval in lieu of the other pathways mentioned below.

## 5.5 Approval in a manner prescribed by Part 21 MOS - paragraph 21.305(da) of CASR

5.5.1 Paragraph 21.305(da) of CASR provides for an article to be approved in a manner prescribed by the Part 21 MOS. Several ATSOs are currently published in the MOS, and these are to be used in conjunction with an ATSOA (as described above).

5.5.2 The MOS may prescribe alternate specifications that have been assessed by CASA and deemed acceptable for use however there are currently no other specifications prescribed for this pathway other than ATSOs. CASA may consider alternate standards/specifications for inclusion and add them to the MOS from time to time.

5.5.3 Section 3 of this AC discusses currently issued standards that are deemed acceptable to CASA. These standards may be added to future revisions of the Part 21 MOS that will allow for direct acceptance of certain equipment, however until such time that the MOS is updated, approval under paragraph 21.305(e) will be the pathway.

## 5.6 Approval in any other manner approved by CASA - paragraph 21.305(e) of CASR

5.6.1 Paragraph 21.305(e) of CASR may be used by exception when the other pathways identified in regulation 21.305 of CASR are not appropriate. For example, in the absence of a suitable, published ATSO, TSO or ETSO (and therefore the inability to receive an ATSOA), paragraph 21.305(e) of CASR provides that CASA may approve a material, part, process, or appliance in any manner approved by CASA.

5.6.2 An approval provided under paragraph 21.305(e) is issued through an instrument that will set out the manner approved by CASA. The instrument can stipulate the accepted Performance Standards, the manufacturing quality system, the continuing airworthiness requirements for the product and any other condition that CASA deems necessary to establish a minimum acceptable level of safety.

5.6.3 An approval under paragraph 21.305(e) may involve a design and production authorisation and the ability to issue an ARC. When this is the case, the holder of the approval will be subject to CASA oversight activities in the same manner as any other CASA production authorisation holder.

5.6.4 Where equipment is certified to a published standard that is found to be acceptable to CASA and not published in the Part 21 MOS, the equipment may be approved without an approval holder being identified (refer the guidance for third party certification of section 3.2). Section 3.3 through 3.6 discusses currently issued standards and methods that may be acceptable to CASA.

5.6.5 It should be noted that any approval provided using paragraph 21.305(e) would be valid within Australia only and would typically not be accepted internationally, for example as part of the US bi-lateral agreement on the acceptance of manufactured parts.

5.6.6 An application for a paragraph 21.305(e) approval should be made using CASA Form 849.

# Appendix A
# Rescue litter system

## A.1 Application

This Appendix applies to a rescue litter system when used as part of a personnel carrying device system (PCDS) manufactured for the purposes of human external cargo (HEC) operations. The complete litter system consists of the:

- rescue litter or stretcher used to carry a person external to the aircraft
- restraint system that retains the occupant in the litter while external to the aircraft.

## A.1 Definitions

**Table 10: Definitions**

| Term | Definition |
|---|---|
| adjuster | Device which is not required to sustain a full force of a fall-arrest and which is used to fit and adjust webbing to a litter occupant. |
| AS/NZS 1891.1:2020 | Australian/New Zealand Standard AS/NZS 1891.1:2020 - Personal equipment for work at height - Part 1: Manufacturing requirements for full body combination and lower body harnesses. |
| attachment point | Point on a litter for connecting to a lifting bridle or similar device. |
| basket type litter | A conveyance for the sick or injured usually consisting of a tubular metal frame enclosing a moulded plastic or wire shell. Also known as a basket stretcher. (ASTM) |
| human external cargo (HEC) | A person(s) that at some point in the operation is carried external to the rotorcraft. |
| litter bridle | A manufactured or improvised system that attaches the litter to the raising or lowering system. |
| personnel carrying device system (PCDS) | A device or system that has the structural capability and features needed to safely transport occupants external to the rotorcraft during HEC operations. A PCDS includes, but is not limited to, life safety harnesses, and rigid baskets or cages either attached to a hoist or cargo hook or mounted to the rotorcraft airframe (see TSO C167). |
| product label | A label or marking affixed to a product by the manufacturer that provides general information, warnings, instructions for care, maintenance, and other information. |
| rescue litter system | An apparatus, also called a stretcher, designed to secure, protect and transport a patient horizontally during Human External Cargo (HEC) operations. The system includes the basket type litter and the restraint system as an assembly. |
| restraint hardware | Any component of the restraint system that is not part of the webbing. |
| restraint system assembly | Each item of the restraint system that retains a person in the litter. This includes belts, harnesses, webbing, buckles, etc. |

# A.2 Minimum performance standards – Rescue litter

## A.2.1 Litter design requirements

A.2.1.1 Litters shall not be designed or constructed in a manner that allows for self-destructive action. For example, single weld failures leading to structural failure.

A.2.1.2 Litters designed to split apart shall have an integral connection system.

A.2.1.3 Litters designed for use in water retrievals shall provide buoyancy such that the mouth and nose of a completely relaxed person are kept above the water line.

## A.2.2 Materials – general

A.2.2.1 All materials selected for the design shall be entirely suitable for the purpose intended, including giving due consideration to strength, durability and all possible environmental conditions that may be encountered.

A.2.2.2 Metallic parts shall be made of corrosion resistant material, or they shall be suitability protected against corrosion.

A.2.2.3 All metals shall conform to the chemical requirements of the applicable specifications for the grade(s) selected.

A.2.2.4 All materials shall be finished smooth, with no voids, discontinuities, damage or features that may affect the integrity of the litter.

## A.2.3 Frame – welded

A.2.3.1 All joints and intersections of the frame, ribs and basket rim shall be welded by competent persons to American Welding Society AWS D17.1:2024 – Specification for Fusion Welding for Aerospace Applications.

A.2.3.2 All welds shall be visually inspected; acceptable welds shall not exhibit any cracks or voids with complete fusion between the weld layers and base metal.

A.2.3.3 All projections, loose weld spatter or other defects that may cause injury to patient or handler shall be removed.

A.2.3.4 Following welding, the litter shall be cleaned by an appropriate mechanical or chemical process, however grinding is prohibited as this may weaken the structural element.

## A.2.4 Rigidity

A.2.4.1 The frame shall not show permanent deformation of the top rail or evidence of sag, bow, distortion or strain in any part of the main structural elements when tested in accordance with the procedure identified in section Testing (A.2.6.1)

## A.2.5 Workmanship

A.2.5.1 The finished article shall be free from sharp or rough edges and shall be free from defects. Any tools used in the fabrication of the litter shall be free of dust contaminants or other artefacts that may impair the serviceability of the article.

# A.3 Minimum performance standards – Restraint system

## A.3.1 Webbing and thread

A.3.1.1 All components of the restraint system which are in contact with the body shall be made from webbing or material equivalent to webbing in respect of strength, durability and load transfer characteristics.

A.3.1.2 All webbing and thread used for the restraint system shall be considered as load-bearing material.

A.3.1.3 Webbing and thread should conform to section 2.2 of Australian/New Zealand Standard AS/NZS 1891.1:2020 - Personal equipment for work at height - Part 1: Manufacturing requirements for full body combination and lower body harnesses.

A.3.1.4 Threads used for sewing shall be physically compatible with the webbing material and should be manufactured from high tenacity synthetic fibre, having a melting point and chemical resistance that is equivalent to or superior to the material being sewn.

A.3.1.5 The thread shall be of contrasting shade to facilitate visual inspection.

A.3.1.6 Holes, rivets or eyelets shall not be used in webbing.

## A.3.2 Restraint hardware

A.3.2.1 All hardware of the restraint system shall be as follows:

- Designed and tested (i.e. type tested and routine tested as appropriate) to meet the applicable strength requirements for their application as specified in AS/NZS 1891.1:2020 clauses 2.3.3 to 2.3.5 (where applicable)
- Free from any material or manufacturing defects.
- Designed to minimize damage to webbing.
- Protected from corrosion in accordance with Clause 2.3.2 of AS/NZS 1891.1:2020.

A.3.2.2 The buckle shall not be susceptible to inadvertent release or be opened through a single action. Buckles of the restraint system should require a dual action such as a simultaneous depressing by use of the thumb and index finger.

A.3.2.3 Any 'D' ring or 'O' ring used as part of the restraint system shall have a minimum capacity of 22 kN.

A.3.2.4 Products being used to perform the same function as a D ring or O ring, manufactured from rigid material other than metal, shall meet the same requirements specified in AS/NZS 1891.1:2020 clauses 2.3.1, 2.3.2 and 2.3.4.

# A.4 Minimum performance standards - General

## A.4.1 Testing

### Rescue Litter

A.4.1.1 Testing of the litter shall be conducted in accordance with ASTM International F2821 - Standard Test Methods for Basket Type Rescue Litters.

A.4.1.2 The litter must meet or exceed the test requirements for horizontal lift for structural failure under load and permanent deformation of the top rail or the main structural elements.

### Restraint system

A.4.1.3 Webbing shall be tested in accordance with section 2.2.3 Performance requirements of AS/NZS 1891.1:2020.

A.4.1.4 The webbing shall be tested in accordance with Appendix A for resistance to degradation by either artificial light or daylight.

A.4.1.5 When tested in accordance with Appendix A the minimum breaking strength of the three exposed samples shall be at least 70 % of the mean of the breaking strength of the three unexposed samples.

A.4.1.6 Testing of 'D' rings and 'O' rings shall be in accordance with ANSI/ASSP Z359.12.

## A.4.2 Fatigue

A.4.2.1 The litter system shall be reviewed on a component-by-component basis to determine which, if any, components are fatigue critical. The litter structure and all relevant components should be analysed or tested to ensure that their fatigue life limits are properly determined. The limits should be placed in the user information refer section A.5.5.

## A.4.3 Flammability

A.4.3.1 All materials shall have flammability properties consistent with EASA CS 25 Appendix F Part 1. Webbing used in restraint systems shall not have an average burn rate greater than 64 mm (2.5 inches) per minute when tested horizontally in accordance with the applicable portions of EASA CS 25 Appendix F.

## A.4.4 Labelling

### Rescue Litter

A.4.4.1 Each litter shall have a product label stamped, engraved, or otherwise permanently marked with the following information:

- manufacturer’s name, trade name or trademark.
- country of manufacture
- serial number.
- model and type/Identification.
- month and year of manufacture.

A.4.4.2 All letters shall be at least 2 mm (5⁄64 in.) high.

A.4.4.3 Multi-label pieces shall be permitted to carry all statements and information required to be on the product label, however, all label pieces comprising the entire product label shall be located adjacent to each other.

### Restraint system

A.4.4.4 Each restraint system assembly shall be clearly and permanently labelled with the following information:

- manufacturer’s name, trade name or trademark.
- serial number.
- model and type/Identification.
- standard number and year to which it conforms.

- month and year of manufacture.

> **Note:** Facility may be provided for user marking of an 'in service' date.

- The month and year to remove from service which shall be no more than 10 years from the date of manufacture.

A.4.4.5 Readability:

- Labelling shall be legible and readable, enabling the user to clearly distinguish individual letters or characters from each other.
- The labelling shall be designed to be clearly legible throughout the life of the product under normal usage conditions.

## A.4.5 User information

A.4.5.1 The manufacturer of the litter assembly system shall furnish the purchaser with information that addresses the following:

- inspecting the litter assembly periodically according to the manufacturer's inspection procedure
- removing the litter assembly from service if the equipment does not pass inspection or if there is any doubt about the safety or serviceability of the equipment
- maintaining the litter assembly in accordance with the manufacturer's instructions where metal components are subjected to corrosion or deterioration
- returning the litter assembly to the manufacturer or to a qualified inspection person/centre if the equipment is dropped or impact-loaded
- repairing the litter assembly only in accordance with the manufacturer's instructions.

A.4.5.2 The manufacturer of the litter assembly shall furnish the purchaser with a sample of suggested records to be maintained by the purchaser or user of the litter and a list of items that the records need to contain.