

ETSO-C90e**CARGO PALLETS, NETS AND CONTAINERS (UNIT LOAD DEVICES)****1 Applicability**

This ETSO provides the requirements which Cargo Unit Load Devices (ULDs) that are designed and manufactured on or after the date of this ETSO must meet in order to be identified with the applicable ETSO marking. This ETSO also provides the requirements to enable a ULD to be additionally classified as a Fire-Resistant Container (FRC).

2 Procedures**2.1 General**

Applicable procedures are detailed in CS-ETSO, Subpart A.

2.2 Specific

None.

3 Technical Conditions**3.1 Basic****3.1.1 Minimum Performance Standard (MPS)**

For new models of Type I ULDs, the standards set forth in standard of Aerospace Industries Association of America, Inc. (AIA), National Aerospace Standard, NAS 3610, 'Cargo Unit Load Devices.- Specification for', Revision 10, dated November 1, 1990, as modified by Appendix 1 to this ETSO, are to be used when applicable.

For new models of Type II ULDs, the standards set forth in the SAE Aerospace Standard (AS) 36100, 'Air Cargo Unit Load Devices - Performance Requirements and Test Parameters', Revision C, dated September 2020, as modified by Appendix 2 to this ETSO, are to be used when applicable.

Note: Refer to paragraph 3.1 of SAE AS36100C for definitions of Type 1 and Type 2 ULDs, and paragraph 2.2 of the same standard for general definitions.

For Type I and II ULDs, the standards set forth in SAE AS36102B, 'Air Cargo Unit Load Devices - Testing Methods', dated March 2017, as modified by Appendix 3 to this ETSO, are applicable.

For FRCs, all above-mentioned applicable ULD standards and the standards set forth in SAE AS8992, 'Fire Resistance Container Design, Performance and Testing Requirements', dated October 2020, as modified by Appendix 4 to this ETSO, are to be used when the ULD container integrates fire containment functionality.

3.1.2 Environmental Standard**3.1.2.1 Generic**

See CS-ETSO Subpart A, paragraph 2.1.

3.1.2.2 Specific

For ULDs and FRCs, environmental degradation due to ageing, ultra-violet (UV) exposure, weathering, etc., for any materials used in the construction of pallets, nets and containers must be considered. Where applicable, testing should take into account the requirements set forth in CS-ETSO, Subpart A, paragraph 2.1.

Textile Performance: See SAE Aerospace Information Report (AIR) 1490C, Environmental Degradation of Textiles, dated April 2019, for available data for textile performance when exposed to environmental factors. This data shall be taken into account for consideration of the effects of environmental degradation on nets commensurate with the expected storage and service life to satisfy SAE AS36100 Rev. C, paragraph 4.11.

Note: Environmental degradation data other than that documented in AIR1490C may be used if substantiated by the applicant and approved by EASA. A net must be able to meet the MPS of this ETSO at any time during its service life.

FRCs shall meet the additional environmental requirements set forth in AS8992, paragraphs 3.6 and 4.2.

The nominal weight of the article in kilograms and pounds in the format 'Weight: ... kg (... lb)' shall be included in the relevant Declaration of Design and Performances document.

3.1.3 Software

None.

3.1.4 Airborne Electronic Hardware

None.

3.2 Flammability Requirements

The materials used in the construction of ULDs must meet the applicable requirements set forth in CS-25, Appendix F, Part I:

- paragraph (a)(1)(ii): 12-second vertical test;
- paragraph (a)(2)(ii): 45-degree test;
- paragraph (a)(1)(iv): horizontal test with 2.5 inch-per-minute burn rate criterion.

These tests are applicable as prescribed in Table 1 below. ULDs additionally classified as FRCs shall meet the flammability requirements of AS8992, Section 4.

ULD pallets and nets used with Fire Containment Covers (FCCs) should be marked with 'FIRE CONTAINMENT COMPATIBLE' as per paragraph 4.2 of this ETSO if the article meets the performance and testing requirements of the latest version of AS6453, 'Fire Containment Cover – Design, Performance, and Testing Requirements'. Table 1 summarises these flammability requirements; however, refer to the most recent version of AS6453 for additional information and the order of testing required.

Note: The applicable requirements can also be found in Chapters 1, 2 and 3 of the FAA *Aircraft Materials Fire Test Handbook*, available at <https://www.fire.tca.faa.gov/Handbook>.

Table 1: Summary of Flammability Requirements for ULDs and FRCs

Article/Component:	Vertical Bunsen Burner Test (12-second test)	45-degree Bunsen Burner Test	Horizontal Bunsen Burner Test (2.5-inch/minute burn rate criteria)
ULD side panels, rigid doors, non-metallic pallets and ceilings	X	X	
ULD curtain-style doors	X		
ULD nets			X
ULD nets compatible with FCCs	X		
Non-metallic ULD pallets compatible with FCCs	X	X	

3.3 Failure Condition Classification

N/A

4 Marking

4.1 General

Marking is detailed in CS-ETSO Subpart A, paragraph 1.2. Marking shall be done in an area that will typically remain visible after the ULD is loaded with cargo.

4.2 Specific

The following list applies to all ULDs.

In addition, the following information shall be legibly and permanently marked on the ULD:

1. The identification of the article in the code system explained in
 - a. NAS 3610, Revision 10, paragraph 1.2.1, for Type 1 ULDs.
 - b. SAE AS36100, Revision C, paragraph 3.5, for Type 2 ULDs.
2. If the article is not omnidirectional, the words 'FORWARD', 'AFT', and 'SIDE' must be conspicuously and appropriately placed.
3. The manufacturer's serial number of the article, with the option to add the date of manufacture.
4. If applicable, the expiry date in the format 'EXP YYYY-MM' must be marked on the ULD.

ULDs additionally classified as FRCs: FRCs must also be marked as per the requirements in paragraphs 5.1.a, 5.1.c, and 5.2 to 5.4 of AS8992.

Nets and Pallets Compatible for Use with Fire Containment Covers: refer to AS6453, ‘Fire Containment Cover – Design, Performance, and Testing Requirements’, which describes testing requirements for pallets and nets that are operationally suited for use with an Fire Containment Cover (FCC) approved under ETSO-C203 A1 and SAE AS6453. If the pallet or net meets the testing requirements given in that standard, it may be marked under this ETSO as follows:

1. Net: ‘FIRE CONTAINMENT COMPATIBLE WITH SAE AS6453 CERTIFIED FIRE COVER’ in bold characters at least 40 mm (1.6 in) high;
Note: Include the revision number of SAE AS6453 in the marking.
2. Pallets (non-metallic): ‘FIRE CONTAINMENT COMPATIBLE’ in legible characters.

5 Availability of Referenced Document

See CS-ETSO, Subpart A, paragraph 3.

[Amdt ETSO/11]

[Amdt ETSO/18]

Appendix 1 to ETSO-C90e — CARGO PALLETS, NETS AND CONTAINERS (UNIT LOAD DEVICES)

Purpose: This Appendix prescribes the MPS for Type I ULDs. The applicable standard is AIA NAS 3610, Revision 10, 'Specifications for Cargo Unit Load Devices, dated 1 November 1990, as modified by this Appendix.

When reading NAS 3610, Revision 10 ...	Do the following
Paragraph 3.5	Replace with Section 4 of this ETSO for marking requirements
Paragraph 3.7	Replace with paragraph 3.2 of this ETSO
Sheet 87, Figure 31	Use the revised Figure 31 from sheet 88
Figure 32 (missing from NAS 3610, Revision 10)	Use Figure 32 of NAS 3610, Revision 9, dated November 1987, or NAS 3610, Revision 8, dated September 1987

[Amdt ETSO/18]

Appendix 2 to ETSO-C90e — CARGO PALLETS, NETS AND CONTAINERS (UNIT LOAD DEVICES)

Purpose: This Appendix prescribes the MPS for Type 2 ULDs. The applicable standard is SAE AS36100, 'Air Cargo Unit Load Devices – Performance Requirements and Test Parameters', Revision C, dated September 2020, as modified by this Appendix.

When reading AS36100C ...	Do the following
Paragraphs 1.1–1.2	Disregard
Paragraph 4.5	Replace with Section 4 of this ETSO for marking requirements
Paragraph 4.6	Disregard
Paragraph 4.7	Replace with paragraph 3.2 of this ETSO
Section 6	Disregard

[Amdt ETSO/18]

Appendix 3 to ETSO-C90e — CARGO PALLETS, NETS AND CONTAINERS (UNIT LOAD DEVICES)

Purpose: This Appendix prescribes the MPS for Type 1 and Type 2 ULDs, including those classified as FRCs. The applicable standard is SAE AS36102B, 'Air Cargo Unit Load Devices — Testing Methods', dated March 2017, as modified by this Appendix.

When reading AS36102B ...	Do the following
Paragraph 4.1.2	Replace the word 'should' with 'shall'
Paragraph 4.2.5	
Paragraph 4.3.5	
Paragraph 4.4.7	
Paragraph 6.2	
Paragraph 6.2.6	Replace the wording of the paragraph with the following: 6.2.6 Test results A description of the results of each of the tests performed, with actual load, the location of CG and how long the ULD was held clear of support, supported by exhaustive photographic and video proof, evidence of any deformations and damage, and references to any drawings and/or pictures of test arrangements.

[Amdt ETSO/18]

Appendix 4 to ETSO-C90e — CARGO PALLETS, NETS AND CONTAINERS (UNIT LOAD DEVICES)

Purpose: This Appendix prescribes the MPS for FRCs. The applicable standard is SAE AS8992, 'Fire Resistant Container Design, Performance, and Testing Requirements', dated October 2020, as modified by this Appendix.

When reading AS8992 ...	Do the following
Note to paragraph 3.1.2	Disregard
Paragraph 3.3.4	Disregard
Paragraph 3.3.5	Disregard
Paragraph 3.4	Disregard
Section 5	ULDs classified as FRCs must meet the marking requirements of this section in addition to those of paragraphs 4.1 and 4.2 of this ETSO. Disregard paragraph 5.1.b of AS8992, as it duplicates paragraphs 4.1 and 4.2 of this ETSO.

[Amdt ETSO/18]