



Department of Transportation
Federal Aviation Administration
Aircraft Certification Service
Washington, D.C.

TSO-C172

04/13/2011

Technical Standard Order

Subject: *Cargo Restraint Strap Assemblies*

1. **PURPOSE.** This technical standard order (TSO) is for manufacturers applying for a TSO authorization (TSOA) or letter of design approval (LODA). In it, we (the Federal Aviation Administration, (FAA)) tell you what minimum performance standards (MPS) your cargo restraint strap assemblies must first meet for approval and identification with the applicable TSO marking.

2. **APPLICABILITY.** This TSO affects new applications submitted after its effective date.

a. All prior revisions to this TSO are no longer effective. Generally, we will not accept applications for the previous revision after the effective date of this TSO. We may do so, however, up to six months after it, if we know that you were working against the prior MPS before the new change became effective.

b. Cargo restraint strap assemblies approved under a previous TSOA may still be manufactured under the provisions of its original approval.

3. **REQUIREMENTS.** New models of cargo restraint strap assemblies identified and manufactured on or after the effective date of this TSO must meet the MPS qualification and documentation requirements in SAE International (SAE) document, Aerospace Standard (AS)5385C, *Cargo Restraint Straps – Design Criteria and Testing Methods*, dated January 2007, as modified by Appendix 1 of this TSO.

a. **Functionality.** This TSO's standards apply to equipment intended to be used to restrain cargo on board civil transport aircraft during flight.

b. **Deviations.** We have provisions for using alternate or equivalent means of compliance to the criteria in the MPS of this TSO. If you invoke these provisions, you must show that your equipment maintains an equivalent level of safety. Apply for a deviation under the provision of Title 14 of the Code of Federal Regulations (14 CFR) part 21, subpart O.

4. **MARKING.**

a. Mark at least one major component permanently and legibly with all the information in 14 CFR 21. subpart O.

b. Also, mark the following permanently and legibly, with at least the manufacturer's name, subassembly part number, and the TSO number:

(1) Each component that is easily removable (without hand tools), and

(2) Each subassembly of the article that you determined may be interchangeable.

c. Mark each cargo restraint assembly permanently and legibly in accordance with SAE AS5385C, Section 7.3, in addition to all the information required by 14 CFR 21 subpart O.

d. Mark dates of manufacture and expiration on each strap assembly per SAE AS5385C, section 4.5.2. Format the dates per SAE AS5385C, Section 7.2

e. Mark the rated ultimate load in daN and lbf on each strap assembly.

f. Mark a unique identifier on each strap assembly if required by SAE AS5385C, Section 4.5.2(b)

g. You may mark each cargo restraint strap assembly with any extra information listed in SAE AS5385C, Section 7, not specifically required in this paragraph.

NOTE: Compliance with this TSO does not necessarily indicate compliance with SAE AS5385C. To make the cargo strap assembly as complying with SAE AS5385C, you must determine that the cargo strap assembly meets the requirements of SAE AS5385C in conformance with SAE AS5385C, Para 7.1 and Note 8.

i. If the article includes a deviation per paragraph **3b** of this TSO, the marking should include a means to indicate a deviation was granted.

5. **APPLICATION DATA REQUIREMENTS.** You must give the FAA aircraft certification office (ACO) manager responsible for your facility a statement of conformance, as specified in 14 CFR 21 subpart O and one copy each of the following technical data to support your design and production approval. LODA applicants must submit the same data (excluding paragraph **5.g**) through their civil aviation authority.

a. A manual(s) containing the following:

(1) Operating instructions and equipment limitations sufficient to describe the equipment's operational capability.

(2) Storage instructions as directed by SAE AS5385C, Section 4.5.2(a).

(3) Describe in detail any deviations. As applicable, identify equipment by part number, version, revision, and criticality level of software/hardware, classification for use, and environmental categories.

(4) Procedures and limitations sufficient to ensure that the cargo restraint strap assemblies, when installed according to the installation or operational procedures, still meet this TSO's requirements. Limitations must identify any unique aspects of the installation. The limitations must include a note with the following statement:

“This article meets the minimum performance and quality control standards required by a technical standard order (TSO). Installation of this article requires separate approval.”

(5) List of line replaceable components, by part number, that makes up the cargo restraint strap assemblies. Include vendor part number cross-references, when applicable.

b. Instructions covering periodic maintenance, calibration, and repair, for the continued airworthiness of cargo restraint strap assemblies. Include recommended inspection intervals and service life, as appropriate.

c. Nameplate drawing with the information required by paragraph 4 of this TSO.

d. Identify functionality, features or performance contained in the article not evaluated under paragraph 3 of this TSO (that is, non-TSO functions). Non-TSO functions are accepted in parallel with the TSO authorization. For those non-TSO functions to be accepted, you must declare these functions and include the following information with your TSO application:

(1) Description of the non-TSO function(s), such as performance specifications and software, hardware, and environmental qualification levels. Include a statement confirming that the non-TSO function(s) don't interfere with the article's compliance with the requirements of paragraph 3.

(2) Procedures and limitations sufficient to ensure that the non-TSO function(s), when installed according to the installation procedures, still meets this TSO's requirements. Limitations must identify any unique aspects of the installation.

(3) Instructions for continued performance applicable to the non-TSO function(s) described in paragraph 5.d.(1).

(4) Interface requirements and applicable installation test procedures to ensure compliance with the performance data defined in paragraph 5.d.(1).

(5) Results of test/analysis, as appropriate, to verify that performance of the hosting TSO article is not affected by the non-TSO function(s).

(6) Results of test/analysis, as appropriate, to verify the function and performance of the non-TSO function(s) as described in paragraph **5.d.(1)**.

e. The quality system description required by 14 CFR 21 subpart O, including functional test specifications. The quality system should ensure that you will detect any change to the approved design that could adversely affect compliance with the TSO MPS, and reject the article accordingly. (Not required for LODA applicants.)

f. Material and process specifications list.

g. List of all drawings and processes (including revision level) that define the article's design.

6. MANUFACTURER DATA REQUIREMENTS. Besides the data given directly to the responsible ACO, have the following technical data available for review by the responsible ACO:

a. Functional qualification specifications for qualifying each production article to ensure compliance with this TSO.

b. Equipment calibration procedures.

c. Material and process specifications.

7. FURNISHED DATA REQUIREMENTS.

a. If furnishing one or more articles manufactured under this TSO to one entity (such as an operator or repair station), provide one copy or on-line access to the data in paragraphs **5.a through 5.d** of this TSO. Add any other data needed for the proper installation, certification, use, or for continued compliance with the TSO, of the cargo restraint strap assemblies.

b. If the article contains declared non-TSO function(s), include one copy of the data in paragraphs **5.d.(1)** through **5.d.(4)**.

8. HOW TO GET REFERENCED DOCUMENTS.

a. Order SAE documents from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Telephone (724) 776-4970, fax (724) 776-0790. You can also order copies online at www.sae.org.

b. Order copies of 14 CFR part 21, subpart O, from the Superintendent of Documents, Government Printing Office, P.O. Box 979050, St. Louis, MO 63197. Telephone (202) 512-1800, fax (202) 512-2250. You can also order copies online at www.access.gpo.gov. Select "Access," then "Online Bookstore." Select "Aviation," then "Code of Federal Regulations."

c. You can find a current list of technical standard orders and advisory circulars on the FAA Internet website Regulatory and Guidance Library at <http://rgl.faa.gov/>. You will also find the TSO Index of Articles at the same site.



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APPENDIX 1. MINIMUM PERFORMANCE STANDARD FOR CARGO RESTRAINT STRAP ASSEMBLIES

This appendix prescribes the MPS for cargo restraint strap assemblies. The applicable standard is SAE AS5385C, *Cargo Restraint Straps – Design Criteria and Testing Methods*, dated January 2007. We modified it as follows:

<i>When reading AS5385C...</i>	<i>Do the following:</i>
Section 1	Disregard
Section 2	Modify Paragraph 2., REFERENCES, by disregarding the last sentence.
Section 3	Disregard 3.14
Section 4	Disregard 4.5.4 and 4.9.1 Modify 4.5.1 by adding the following note: “NOTE: Environmental degradation data other than that documented in AIR1490B may be used if you substantiate the data and it’s approved by the FAA ACO manager responsible for administering your TSO authorization or letter of design approval.”
Section 5	Disregard 5.9, 5.10, and 5.11 Modify 5.1 by adding the following note: “NOTE: Equivalent alternate methods must be approved by the FAA ACO manager responsible for administering your TSO authorization or letter of design approval.”
Section 6	Disregard
Section 7	Apply per Paragraph. 4, this TSO
Section 8	Disregard
Section 9	Disregard
Section 10	Disregard