English Translation Version for Reference Only

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China Civil Aviation Technical Standard Order

This China Civil Aviation Technical Standard Order (CTSO) is issued according to Part 37 of the China Civil Aviation Regulations (CCAR-37). Each CTSO is a criterion which the concerned aeronautical materials, parts or appliances used on civil aircraft must comply with when it is presented for airworthiness certification.

Aircraft Clamps

1. Purpose.

This China Civil Aviation Technical Standard Order (CTSO) is for manufacturers applying for aircraft clamps CTSO authorization (CTSOA). This CTSO prescribes the minimum performance standards (MPS) that aircraft clamps must first meet for approval and identification with the applicable CTSO marking.

2. Applicability.

This CTSO affects new applications submitted after its effective date. Major design changes to article approved under this CTSO will require a new authorization in accordance with section 21.353 of CCAR-21-R4 to apply for new CTSOA.

3. Requirements.

Aircraft clamps identified with this CTSO and manufactured on or

after the date of this CTSO must meet the MPS specified in the manufacturer's part drawing(s) and applicable part specification(s) submitted with the clamp manufacturer's application for CTSO authorization.

a. Test Requirements

Demonstrate the required performance by testing each property in the part drawing and applicable part specification(s), and in the derived material and process specifications under the test procedures in appendix 1.

b. Deviations

Alternative test procedures or analytical data that produce an equivalent level of safety may be used if specified at the time of CTSO application and approved in accordance with 21.368(a) in CCAR-21-R4.

4. Marking.

a. Mark at least one major component permanently and legibly with all the information in section 21.423(b) of CCAR-21R4. The marking must include the serial number.

b. Mark the following permanently and legibly, with at least the manufacturer's name, subassembly part number, and the CTSO number:

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

(2) Each subassembly of the article that applicant determined may be Interchangeable.

5. Application data Requirements.

The applicant must submit the relevant technical information to the person in charge of the project review to support the design and production approval Submissions include the Declaration of Conformity specified in Article 21.353(1)1 of CCAR-21-R4 and a copy of the following information.

a. A manual(s) containing the following:

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

(2) A description in detail of any deviations

(3) Installation procedures and limitations sufficient to ensure that the aircraft seals, when installed according to the installation procedures, still meets this CTSO'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 (CTSO). Installation of this article requires separate approval."

b. Instructions covering periodic maintenance and repair, for the

continued airworthiness of aircraft seals. Include recommended inspection intervals and service life, as appropriate.

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

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

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

(2) Installation procedures and limitations sufficient to ensure that the non-CTSO function(s) meets the declared functions and performance specification(s) described in paragraph 5.d.(1).

(3) Instructions for continued performance applicable to the non-C CTSO 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) Test plans, analysis and results, as appropriate, to verify that performance of the hosting CTSO article is not affected by the non-CTSO function(s).

(6) (If applicable) Test plans, analysis and results, as appropriate, to verify the function and performance of the non-CTSO function(s) as described in paragraph 5.d.(1).

e. The quality system description required by the section 21.358 of CCAR-21-R4, 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 CTSO MPS, and reject the article accordingly.

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 Administrator, have the following technical data available for review by the responsible Administrator:

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

b. Dimensional drawings.

c. Material and process specifications.

7. Furnished data Requirements.

a. If furnishing one or more articles manufactured under this CTSO 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.b of this CTSO. Add any other data needed for the proper installation, certification, use, or for continued compliance with the CTSO, of the aircraft seals.

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

8. Inspection Lot of Clamps.

An inspection lot is a quantity of clamps with one part number, produced consecutively from a single batch of material, finished in one continuous process, and submitted for final inspection at one time.

9. Availability of Reference Documents.

a. Order copies of American Society for Testing and Materials (ASTM) documents from:

ASTM, 100 Barr Harbor Drive, West Conshohocken PA 19428-2959.

You can also order copies online at www.astm.org.

b. Order copies of Society of Automotive Engineers (SAE)

documents from:

Society of Automotive Engineers, Inc.

400 Commonwealth Drive, Warrendale PA 15096-0001.

You can also order copies online from the SAE website at www.sae.org.

Appendix 1

AIRCRAFT CLAMP PROPERTY TEST REQUIREMENTS

1. CLAMP PROPERTIES. The specific material and values for dimensions and configuration, defined on the manufacturers drawing(s) or specification(s), form the basis of the clamp's design. The specific material, meeting the material test property requirements of Table 1 forms the basis of the clamp's minimum performance.

2. CLAMP APPLICATIONS. This CTSO applies to loop, saddle, center mount, hinged and block clamp configurations. Clamps typically mechanically fasten or support equipment, such as electrical wire or fluid carrying lines, to the structure of the aircraft.

3. CLAMP SERIES TEST SAMPLE. A clamp series (model) of a particular design and type, with a range defined in the clamp manufacturer's application for CTSOA, may be qualified by submitting test data for the series.

Table 1 - Aircraft Clamp Property Test Requirements for Materials

For: Loop, Saddle, Center mount, Hinged and Block clamps	**Metal Clamp Strap (if present)**	**Applicable Test Documents**
	Material	Per part Drawing, Part Specification and Drawing Specification
	Dimensions & Configuration	Per part Drawing, Part Specification and Drawing Specification
	Heat Treat	Per Part Drawing, AMS-H-6875, AMS-H-6088, and AMS2770
	Finish	Per part Drawing, Part Specification and Drawing Specification

For: Loop, Saddle, Center mount, Hinged and Block clamps	**Elastomeric Cushion (if present)**	**Applicable Test Documents**
	Dimensions & Configuration	Per Part Drawing
	Hardness	ASTM D2240
	Tensile	ASTM D412
	Elongation	ASTM D412
	Specific Gravity	ASTM D297, D792
	Compression Set	ASTM D395
	Dry Heat Resistance	ASTM D573
	Fluid Resistance	ASTM D471

4. APPLICABLE DOCUMENTS. The documents (or successor documents) listed below in effect on the date of CTSO application are acceptable to the Administrator. You may use them to set up procedures for test and evaluation of aircraft clamps as shown in the part drawing and procurement or product specification(s). When you apply for CTSO authorization, list all extra specifications governing test and evaluation of a clamp covered by this CTSO.

Document No.	**Title**
ASTM D 297	Standard Test Methods for Rubber Products - Chemical Analysis
ASTM D 395	Standard Test Method for Rubber Property - Compression Set
ASTM D 412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers – Tension
ASTM D 471	Standard Test Method for Rubber Property - Effect of Liquids
ASTM D 573	Standard Test Method for Rubber - Deterioration in an Air Oven
ASTM D 792	Standard Test Methods for Density and Specific Gravity of Plastics by Displacement
ASTM D 2240	Standard Test Method for Rubber Property - Durometer Hardness
(SAE) AMS-H-6088	Heat Treatment of Aluminum Alloys
(SAE) AMS 2770	Heat Treatment of Wrought Aluminum Alloy Parts
(SAE) AMS-H-6875	Heat Treatment of Steel Raw Materials