



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

# Policy Statement

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**Subject:** Clarification for Non-TSO  
Functions in Seats

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**Initiated By:**  
AIR-100

## Summary

This policy clarifies how the non-TSO function (NTF) policy applies to TSO seating systems, and defines a non-TSO function as it relates to seats. Although this policy is directed towards seat TSO authorization (TSOA) and letter of design approval (LODA) applicants, it also addresses installation information associated with NTFs provided by seat TSO articles.

## Definition of Key Terms

- Appendix 1 explains the terms “must,” “should,” or “recommend.”
- For the purposes of this policy, two types of data are defined:
  - *Descriptive Data.* Descriptive data is information used to define the article, and includes—
    - The drawings (or equivalent) and specifications necessary to define the configuration and the design features;
    - Information on dimensions, materials, and processes;
    - Limitations (if applicable); and,
    - Required documents, such as maintenance instructions.
  - *Substantiation Data.* Substantiation data is information used to show that the descriptive data meets the applicable requirements. For example, substantiation data may include test plans, test reports, and analysis.

## Current Regulatory and Advisory Material

- Advisory Circular (AC) 21-46, *Technical Standard Order Program*
- AC 21-50, *Installation of TSOA Articles and LODA Appliances*

- AC 21-49, *Gaining Approval of Seats with Integrated Electronic Components*
- FAA Order 8110.4C, *Type Certification*
- FAA Order 8150.1C, *Technical Standard Order Program*

### **Relevant Past Practice**

The current seat TSOs were written primarily to cover the minimum performance standards (MPS) for structural, flammability, and occupant protection requirements. To support industry needs, seats commonly integrate additional features or capabilities beyond the scope of what is covered in the TSO.

On February 9, 2011, the FAA issued AC 21-49, *Gaining Approval of Seats with Integrated Electronic Components*. AC 21-49 addresses the roles and responsibilities between the TSOA/LODA holder and the installation design approval holder (e.g., the type certificate (TC) or supplemental type certificate (STC) holder). Frequently Asked Question (FAQ) 13 in AC 21-49 states that NTFs are not allowed for seats; however, this policy statement supersedes FAQ 13.

### **Policy Clarification**

This policy clarifies what is considered an NTF for seats, and includes the requirement to declare any NTFs integrated into the article. The current FAA NTF policy identifies and accepts the NTFs as integrated within a TSO article. The NTF is defined by the descriptive data for the TSO article. Acceptance of the NTFs is done on a “non-interference” basis relative to the compliance of the TSO requirements for a given article; meaning:

- The descriptive and substantiation data for the seat article with integrated NTF shows the article complies with all of the MPS of the seat TSO (e.g., structural, occupant injury, and flammability requirements).
- The descriptive and substantiation data from the TSO testing shows compliance with TSO requirements is also applicable to the NTF components. For example: A reading light provides non-TSO functionality for seats. The components making up a reading light are required to meet the structural and flammability MPS of the seat TSO. The substantiation data generated as part of the TSO MPS can be utilized by the installation design approval (e.g., TC/STC) applicant without retesting the components enabling the NTF. However, additional substantiation not required by the seat TSO MPS may be required by the installer to show compliance to the applicable aircraft airworthiness requirements.
- NTF descriptive or substantiation data not needed to show compliance to the TSO MPS is evaluated separately by the aircraft installation design approval applicant. Guidance for the approval of non-TSO functions relative to the aircraft airworthiness regulations is contained in paragraph 5.d of AC 21-50, *Installation of TSOA Articles and LODA Appliances*.

## Classification of TSO Functions and Non-TSO Functions (NTFs)

The FAA expects the TSO seating system to meet all TSO MPS. For example, if airbags are used to meet the TSO seating system function, then the airbag is a TSO function. If the TSO holder determines certain extra tests are necessary to show the airbag will function properly to meet the TSO MPS during the anticipated service life and operating conditions, then the TSO holder should conduct extra tests to demonstrate compliance. This extra test data is included as part of the substantiation data for the TSO and may be used by the installer in accordance with AC 21-50. The substantiating data collected under the TSO process may not be sufficient to show compliance for installation and may require additional substantiation, so coordination among the TSOA/LODA holder and installer is encouraged.

Table 1 clarifies common seat-related items into TSO functions and non-TSO functions. The classification presented in this policy may change in accordance with updates to the applicable seat TSO.

**Table 1. Classification of TSO Functions and NTFs**

<b>Item</b>	<b>Classification of the Function Provided by the Item</b>	<b>Explanation</b>
Seat Adjustable Features (such as recline, leg rests, and head rests)	TSO Function	The seat TSO discusses adjustable features in seats and the requirement to be able to return the seat to the taxi, takeoff, and landing position.
Airbags	TSO Function for dynamic seats (TSO-C127)	One of the primary functions of the dynamic seat TSO is to protect the occupant (i.e., head injury criteria (HIC) and lumbar load). For example, airbags can reduce head path or create a protective barrier to soften head strikes. Airbags are one means of achieving acceptable HIC values for TSO compliance. Airbags on static seats are considered a non-TSO function since the seat is evaluated statically where the airbag will not activate.
	Non-TSO function for static seats (TSO-C39)	
Passenger Convenience Items (such as reading lamps, in-flight entertainment (IFE), and heaters)	Non-TSO Function	The intended function of these types of items does not directly relate to the seat TSO functionality.
Medical Equipment (such as equipment used for emergency medical operations)	Non-TSO Function	The intended function of these types of items does not directly relate to the seat TSO functionality.

Item	Classification of the Function Provided by the Item	Explanation
Additional Data Collection (such as decompression loading, enhanced flammability, or environmental via DO-160)	Neither a TSO Function nor a Non-TSO Function	Substantiation data collection is not considered a function and therefore is not considered a TSO or non-TSO function. Substantiation data required to show compliance to the TSO requirements must be submitted to the FAA. Substantiation data that is not needed to show compliance to the TSO MPS is evaluated separately during the aircraft installation approval per paragraph 5.d of AC 21-50, <i>Installation of TSOA Articles and LODA Appliances</i> .

### Design Changes

TSO design changes involving adding, removing, or modifying a NTF will be handled the same as any other design change. The addition of a NTF may be classified as a minor or major design change and the design change must be substantiated for compliance to the TSO. For example, the addition of a NTF classified as a minor change may require updates to the descriptive data, substantiation data, NTF declaration, maintenance instructions, and installation limitations. In the case of minor design changes, the notification to the ACO should take place in accordance with the agreed upon notification schedule. Since design changes to features providing non-TSO functionality are evaluated based on continued compliance to the TSO performance standard, it is possible that design changes considered “minor” for the TSO article may impact continued compliance for the installation. AC 21-25, *Approval of Modified Seating Systems Initially Approved under a Technical Standard Order*, and policy memorandum, *Classification of Design Changes to TSO-C39b, TSO-C127, and TSO-C127a Articles*, provide additional guidance for design changes to the TSO seats.

### Effect of this policy statement on AC 21-49

This policy is intended to complement, not alter, the guidance defined in AC 21-49. AC 21-49 applies to all electronic components and does not distinguish for NTFs. Both AC 21-49 and this policy require the TSO holder to control all electronic components to the extent necessary to comply with the seat TSO requirements.

For example, the design of a TSO seat system may include an IFE system. Under this policy, the IFE is classified as a NTF and must be declared. The guidance in AC 21-49 remains unchanged as it provides guidance for how to evaluate the IFE for compliance to the seat TSO MPS and defines roles and responsibilities for design control.

## Frequently Asked Questions

The following are some common questions and answers for TSO-C127b as it relates to the compliance with paragraph 5.d of the TSO for non-TSO functions:

**Q1:** What is the intent of the requirement to identify functionality or performance contained in the article not evaluated under paragraph 3 of the TSO?

**A1:** The FAA requires the declaration of functions beyond the scope of the TSO required functions. For example, the capabilities provided by a reading light, seat heater, massager, power source, and IFE are considered NTFs. The declaration of NTFs must be made clear in the TSOA package. Labeling a function as a NTF helps alert the installer that the function is not covered by the MPS of the TSO and must be evaluated at installation. It is recommended that the seat manufacturer coordinate early with the installer to discuss any NTF such that they can be properly accounted for by the installer to show compliance for the installation.

**Q2:** Why does the FAA require the declaration of non-TSO functions?

**A2:** To make it clear to the installer and the FAA that the substantiation and design control for the added functionality or performance may need to be further addressed during installation. It is still the responsibility of the installer to verify that these non-TSO functions are addressed for compliance to the specific aircraft installation.

**Q3:** What is required to meet paragraph 5.d.(6) of TSO-C127b, which requires the applicant to include “test plans, analysis and results, as appropriate, to verify the function and performance of the non-TSO function(s)”?

**A3:** It is typically not appropriate for seats to include this type of substantiation data to *verify the functional performance of the NTF*; however, if the FAA requests this data, the TSO holder must supply it. Conversely, it is appropriate and necessary to include substantiation data as part of the TSOA/LODA application for the components that provide the NTF to *show compliance to the TSO MPS*. It should also be noted that the installer may also need to use (or develop) this data for compliance at the installation level.

**Q4:** Does TSO-C127b require that all attributes of the seat not explicitly covered in the TSO be evaluated by the TSOA/LODA applicant (seat manufacturer) for their potential to affect compliance to the aircraft airworthiness regulations?

**A4:** No. Non-TSO functions only need to be substantiated for compliance to the seat TSO MPS. The installer is still required to address all of the applicable aircraft airworthiness requirements for the installation of a seat with integrated non-TSO functionality. These airworthiness requirements may not be addressed by compliance to TSO-C127b alone.

**Q5:** The IFE integrated into a seat may only be a part of the overall IFE system. Is it a requirement to declare the functionality once installed in the aircraft? Furthermore, IFE systems may have multiple functions embedded into the IFE system. Do all of these embedded functions need to be declared?

**A5:** The FAA recognizes that IFE systems may contain multiple functions and may be integrated as an incomplete system in the TSO seat article. Therefore, the minimum requirement to meet TSO-C127b, paragraph 5.d, is to declare that the IFE system exists and include the descriptive data for the NTF integrated into the seat. Pursuant to AC 21-49, the seat TSO manufacturer must ensure the seat with integrated IFE will continue to meet the TSO MPS. Furthermore, the installer is still required to address all of the applicable airworthiness requirements for the installation of the seat with integrated IFE, including aspects that are not addressed by compliance to the seat TSO.

**Q6:** Are common non-powered features such as armrests, tray tables, cup holders, and coat hooks considered non-TSO functions?

**A6:** No. These are widely integrated common features of the seating system and are evaluated under the TSO MPS, but may require additional substantiation upon installation.

**Q7:** Table 1 indicates that seat adjustable features such as backrests, leg-rests, and headrests are TSO functions. What if these features are motor driven? Are they still TSO functions? Such motorized functions require additional data (e.g., DO-160 qualification data) for installation.

**A7:** The motors within adjustable features such as backrests, leg-rests, and headrests provide the seating system with the ability to be adjusted. The motor supports the performance requirement in TSO-C127b that states, "Adjustable features (seat swivel, back recline, and stowage of movable tables, armrests, footrests, etc.) shall be designed so that they can be returned by the occupant to the positions required for takeoff and landing without release of occupant restraints." Since the motorized components support the MPS of a TSO function, the TSO holder may conduct extra tests (e.g., tests defined in DO-160) in order to show compliance to the TSO MPS. This extra test data is included as part of the substantiation data for the TSO and may be used by the installer in accordance with AC 21-50.

The applicable tests conducted to obtain DO-160 data are considered TSO substantiation data since it is used to demonstrate compliance to a TSO requirement. Data generated but not used to show compliance to a TSO requirement is not considered TSO substantiation data, however, it may be accepted by the FAA for installation compliance, depending on its applicability.



Richard E. Jennings  
Acting Manager, Design, Manufacturing, &  
Airworthiness Division  
Aircraft Certification Service

## Terms

Table A-1 defines the use of key terms in this policy statement. The table describes the intended functional impact.

**Table A-1. Definition of Key Terms**

	<b>Regulatory Requirements</b>	<b>Acceptable Methods of Compliance (MOC)</b>	<b>Recommendations</b>
<b>Language</b>	Must	Should	Recommend
<b>Meaning</b>	Refers to a regulatory requirement that is mandatory for design approval	Refers to instructions for a particular MOC	Refers to a recommended practice that is optional
<b>Functional Impact</b>	No Design Approval if not met	Alternative MOC has to be approved.	None, because it is optional