



U.S. Department
of Transportation

**Federal Aviation
Administration**

Memorandum

Subject: INFORMATION: Seat Technical Standard Order
Authorization and Installation Assessment

Date: **JUN 20 2001**

From: Manager, Transport Standards Staff, ANM-110

Reply to
Attn. of: 01-115-36

To: See Distribution

Regulatory §§ 25.561, 25.562
Reference: 25.785

The purpose of this memorandum is to discuss the relationship of part 25 and technical standard orders (TSO) C39b and 127a in the certification of seats installed in Transport Category airplanes. Sections 25.561, 25.562 and 25.785 contain the requirements for installing passenger, flight deck and flight attendant seats. The TSOs contain minimum performance standards (MPS) for approving these seats to specified aerospace standards as independent articles. TSO C39b contains standards for approving seats to static loading requirements (also contained in § 25.561), while TSO C127 contains standards for approving seats to dynamic loading standards (also contained in § 25.562).

The intent of any TSO is to provide a basic level of safety for any given article to ensure that it has the capability of acceptable performance when installed on an airplane. The criteria in TSO-C127a are intended to provide a level of safety that will protect an occupant from serious injury in the event of a survivable impact accident. The level of severity of the survivable impact accident has been represented by the emergency landing dynamic conditions of the applicable airworthiness standards for Normal and Utility airplanes, Transport airplanes, and Normal and Transport rotorcraft. That is, the criteria for the dynamic tests are the same in the regulations and the TSO.

There has been a great deal of discussion regarding those seat design items that are directly addressed by TSO C127a and C39b, and those items that must be addressed upon installation. In those cases where the requirements under part 25 and the TSO are the same, a seat that has a TSO authorization should not require another assessment of those items. Fundamentally, the seat technical standard order authorization (TSOA) indicates that the structural capability of the seat part numbers covered by the TSOA has been evaluated and found acceptable, and meets the regulations (although flight loads may exceed the static load requirements in the TSO, these are usually substantiated by the TSO holder and marked separately on the TSO label.)

Because articles for which a TSO has been established are not required to have a TSOA in order to be installed in an airplane, part 25 must contain requirements establishing a minimum

level of performance for those articles. For that reason there is a significant overlap in requirements between part 25 and the TSOs. In the case of seats, this has frequently led to reviews of parts of the seats under both the TSO and as part of a part 25 evaluation. On occasion this dual review has resulted in a disagreement over whether or not the seat complies with the requirements. Such disagreements tend to be extremely disruptive to the overall airplane certification process, since the evaluation of seat installations occur very late in the certification process, often just a few days before airplane delivery.

The Transport Airplane Directorate (TAD) and the Aircraft Engineering Division, working with Industry, have initiated a review of the seat certification process, vis a vis the TSO and part 25 approvals. One of the objectives of this review is to delineate as clearly as possible among those parts or configurations of seats that can be completely approved as part of the TSO process (and should not, therefore, be reassessed during installation); those that clearly need to be evaluated as part of the installation process; and those that may require evaluation during both the TSO and seat installation processes (which may require the TSO holder to obtain and forward data to the seat installer). In these latter cases, it is important to understand the TSO holder's approval and associated limitations, when assessing the installation.

As the review is still in process, we are not including a listing/categorization of items as part of this memo. Additionally, since seat designs vary so greatly, generating an all-inclusive list is impractical. It is more important to understand the boundaries, limitations and authority of the TSOA, in the context of the part 25 requirements, so that specific issues are dealt with appropriately as they arise. The TAD does, however, intend to discuss some specific items at the Cabin Safety Standardization Workshop which will be conducted later this summer, as well as make examples available to aircraft certification offices (ACO) for use in recurrent training for designated engineering representatives (DER).

In the interim, the TAD encourages all ACO engineers and DERs to remain cognizant of the status given to items that are approved as part of the TSO process.

Any questions may be directed to Jeff Gardlin, ANM-115, at (425) 227-2136.



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