

**Clearance Record  
DOCUMENT COMMENT LOG**

<b>Originating Office:</b> AIR-120	<b>Document Description:</b> TSO C-127 B	<b>Project Lead:</b>	<b>Reviewing Office:</b>	<b>Date of Review:</b>
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#	Company & Group	Page & Paragraph	Comment	Rationale for Comment	Recommendation	Disposition
1	Tom Knott (Structural DER)	Page 6 para. 7.a.	Furnished data should include ALL information required to show installation-level compliance to 14CFR25.562 (or 23.562 or 27.562 or 29.562), or identify which specific requirements the installer will have to develop on their own.	Most seat manufacturers collect data usable for the installation during the TSO program, but often this information is not passed along. The formats of the Installation Instructions and Limitations (IIL) document also varies greatly between manufacturer, leading to further inefficiencies at the installation level.	Format a section in the IIL in the same order as the regulation. Include positive statements leaving no ambiguity as to what data was collected. Hypothetical examples are: 14CFR25.562(b)(1): the downward load test reached a velocity of 37 fps at 0.076 sec, and a peak acceleration of 14.2g 14CFR25.562(b)(2): the forward load test reached a velocity of 46 fps at 0.088 sec, and a peak acceleration of 16.3g 14CFR25.562(c)(1): not applicable, passenger cabin seats 14CFR25.562(c)(2): the maximum compressive lumbar load applicable to this series of seats was 1216 lbs. 14CFR25.562(c)(3): not applicable, this series of seats does not have upper torso straps 14CFR25.562(c)(4): the lap belts remained on the occupant's pelvis during all tests applicable to this seat series. 14CFR25.562(c)(5): the maximum HIC recorded for row-to-row tests at 31 or 32 inch seat pitches was 1244. (Alternate) 14CFR25.562(c)(5): row-to-row testing was not performed. Head trajectory data indicates no contact will occur with seat pitches greater than 51 inches, and bulkhead offsets greater than 29 inches. 14CFR25.562(c)(6): knee trajectory data indicates no contact will occur with seat pitches greater than 29 inches. (Alternate) 14CFR25.562(c)(6): the maximum femur loads applicable to this series of seats was 203 lbs. 14CFR25.562(c)(7): the seats remained attached at all points of attachment during all tests applicable to this seat series. 14CFR25.562(c)(8): the maximum post-test deformations measured were (xx, yy, zz) [actually, many seat manufacturers do have relatively decent tables of deformation data usable to make findings of compliance to (c)(8)]	Partially Concur - The FAA does not require a specific format for installation instructions and limitations. However, the FAA has guidance for installation instructions and limitations content: <i>PS-AIR100-9/8/2003-127, Standard Content and Format for the Installation Instructions and Limitations Required by TSO-C127a.</i>  Furthermore, this comment led to the identification of an oversight in the furnished data requirements of the draft TSO. The previous draft TSO-C127b in 2006 required static and dynamic qualification test results to be part of the furnished data. This draft TSO-C127b did not explicitly require the qualification test results for static and dynamic tests that are requested by this comment. Historically qualification test results have been required as part of the furnished data requirements for TSO-C127a. TSO-C127b has been updated with paragraph 7.a to state: 7.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 and 5.b of this TSO; <i>as well as static and dynamic qualification test results on the seating system per AS8049B, section 5, as modified by appendix 1 of this TSO.</i> Add any other data needed for the proper installation, certification, use, or for continued compliance with the TSO, of the aircraft seating system.

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2	EASA	Page 3 Paragraph 4.a.(3)	The marking of an ETSO-approved seating system should be as simple as possible.	EASA finds that the reference to the document containing the applicable installation limitations is the most accurate way to provide a link to the data that must be taken into account to certify the installation of the seating system.	EASA recommends deleting the following text at the end of the paragraph:  Or “allowable seat pitch (insert number/range).”  If the above text is kept, at least, set-back for front row seat should be mentioned in the statement to be included in the marking.	Concur – the installation manual is the simplest way to document any required seat pitch or setback. Therefore paragraph 4.a.(3) will state:  <i>The document reference that contains installation instructions and limitations per the requirements of section 5.a.3</i>
3	EASA	Page 4 Paragraph 4.a.(6)	EASA finds sufficient to mandate that the marking includes a reference to the document containing all installation limitations, which in turn must provide all information related to applicable deviations.	According to FAA AC21-46, specifying the deviation in the marking is an option. Such policy should be applied consistently throughout all TSOs. Recently published TSO-C90d allows for optional marking of deviations. In general, the intent is to keep seat marking as simple as possible, thus minimizing the risk that it includes mistakes or misleading information. Furthermore, EASA does not require deviation marking and a difference in requirements would lead to issues in the context of the TSO/ETSO validation process.	EASA recommends deleting the paragraph.	Concur – Paragraph 4.a.(6) has been deleted.
4	EASA	Page 8 Appendix 1 Table 1 Section 3	Section 3.2.6 of SAE AS8049B should be modified for practical reasons to be in line with what is required and considered acceptable for compliance with part 25 regulations.	Occupant restraints have to be fastened during taxi, take-off, landing and turbulences. This is achieved through illumination of the required FSB signs as well as through PA/crew announcements. In	EASA recommends adding the following text to the table:  <i>Page 6, replace subsection 3.2.6 to read as follows:</i>  <i>3.2.6 Adjustable features (seat swivel, back recline, and stowage of movable tables, armrests, footrests, etc.) shall be designed so that they do not deploy under dynamic impact test conditions of this document in a manner that could significantly contribute to serious</i>	Non-Concur. This requirement in AS8049B supports Commercial Aviation Safety Team (CAST) efforts to reduce turbulence related injuries.

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				<p>addition the crew checks that all adjustable features are stowed and secured accordingly. EASA considers that many seating system that are not compliant with section 3.2.6 of AS8049B have been approved for installation through the TC/STC process. It should be possible to grant a TSO approval also to such seating systems.</p>	<p><i>occupant injury or impede rapid egress of any aircraft occupant.</i></p>	
5	EASA	<p>Page 8 Appendix 1 Table 1 Section 3</p>	<p>Section 3.2.7 of SAE AS8049B should be modified to be in line with the guidance provided in AC25-17A about under-seat baggage restraint systems.</p>	<p>Under-seat baggage restraint systems have been traditionally designed to withstand the load in forward and sideward direction only (ref. AC25-17A). Strictly speaking section 3.2.7 of SAE AS8049B would require an under-seat restraint system to withstand the baggage inertia load in all directions, including the aft direction.</p>	<p>EASA recommends adding the following text to the table:</p> <p><i>Page 6, replace subsection 3.2.7 to read as follows:</i></p> <p><i>When an under-seat baggage restraint is incorporated in a passenger seat, it shall be designed to restrain at least 9.1 kg (20 lb) of stowed items per passenger place under the dynamic and static (forward and sideward directions only) test conditions of this document in a manner that will not significantly impede rapid egress from the seat.</i></p>	<p>Concur –however the option to also design to the placarded weight will also be maintained per existing language in AS8049b.</p> <p><i>Page 6, replace subsection 3.2.7 to read as follows:</i></p> <p>When an under-seat baggage restraint is incorporated in a passenger seat, it shall be designed to restrain at least 9.1 kg (20 lb) or its placarded weight of stowed items per passenger place under the <i>dynamic and static (forward and sideward directions only)</i> test conditions of this document in a manner that will not significantly impede rapid egress from the seat.</p>
6	EASA	<p>Page 11 Appendix 1 Table 1 Section 5</p>	<p>In some cases, it's impossible to comply with the requirement to apply inertia loads on the c.g. of the item of mass.</p>	<p>Sometimes the CG is not located in a hard point or is hidden behind seat components.</p>	<p>EASA recommends deleting the following text:</p> <p><i>Page 21, replace subsection 5.1.9 to read as follows:</i></p> <p><i>5.1.9 The load due to any item of mass, including the seat that is not restrained by the occupant restraint system must be applied in a representative manner at the c.g. of the mass.</i></p> <p>And replacing it with the following text:</p> <p><i>The load due to any item of mass, including the seat that is not restrained by the occupant restraint system should be applied in a representative manner at the c.g. of the mass. When this is not achievable, a corrective factor for the load must be considered.</i></p>	<p>See disposition to comment # 44</p>

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7	EASA	Page 13 Appendix 1 Table 1 Section 5	The yaw angle determination criteria defined in the paragraph in question should be applicable also to type B and C seats.	Also Type B and Type C seating systems may be installed with an angle with respect to the aircraft longitudinal axis.	EASA recommends replacing the word “airplane” with “aircraft” in the second paragraph of the proposed section 5.3.1.2.	Concur and changed
8	EASA	Pages 14-15 Appendix 1 Table 1 Section 5	The TSO is supposed to identify the minimum performance standards that a seating system installed must meet with respect to retention of items of mass.	FAA AC 25.562-1B defines an acceptable means to show compliance with 25.562. In principle, the 25.562-related minimum performance standards required by TSO C127 should not exceed the performance standards identified in AC 25.562-1B. The TSO should not be more stringent than AC 25.562-1B (and other equivalent ACs, e.g. 29.562) for what concerns selection of test articles, test conditions, pass/fail criteria.	EASA recommends revising the text of the proposed section 5.3.5.1 to make it consistent with the content of Appendix 5 of FAA AC 25.562-1B.	Concur – Section 5.3 as modified by this TSO in Appendix 1 allows the use of equivalent procedures defined in AC 25.562-1b in lieu of the requirements defined in AS8049b for 5.3.1 through 5.3.9.2.
9	EASA	Pages 16 Appendix 1 Table 1 Section 5	The amendment of section 5.3.6.3 of AS8049B (single diagonal shoulder belt) creates a gap with FAA AC 25.562-1B which could be easily eliminated by adding the text of paragraph 3.b(3) of the AC, instead of referencing it for “additional guidance”.	The text of paragraph 3.b(3) of FAA AC 25.562-1B addresses a performance standard that should be in the scope of the TSO.	EASA recommends adding to the proposed section 5.3.6.3 the text of paragraph 3.b(3) of FAA AC 25.562-1B, instead of referencing it for “additional guidance”.	Concur in principle. Section 5.3.6.3 of AS 8049B has been modified accordingly:  Note: For a Type A seat, additional tests may be required with the single diagonal shoulder belt passing over the trailing shoulder in order to evaluate retention of the harness on the occupant shoulder. <i>As applicable, test per AC-25.562-1B, paragraph 3.b.(3).</i>
10	EASA	Pages 16 Appendix 1 Table 1 Section 5	In SAE AS8049B, the content of section 5.3.9.2(e) is not consistent with the content of Appendix A.	AC 25.562-1B perfectly reflects the content of Appendix A of AS8049B. Therefore assessing the pulse against section 5.3.9.2(e) may result in accepting test results that would	We suggest disregarding paragraph 5.3.9.2(e) of SAE AS8049B.	Concur: Revised 5.3.9.2 to state:  5.3.9.2 Impact Pulse Shape: Data for evaluating the impact pulse shape are obtained from an accelerometer that measures the acceleration in the direction parallel to the inertial response shown in Figures 6, 7A, and 7B. The impact pulses intended for the tests discussed in this document have an isosceles triangle shape. These ideal

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				not be considered valid if evaluation was done per the AC.		<p>pulses are considered minimum test conditions. Since the actual acquired test pulses will differ from the ideal, it is necessary to evaluate the acquired test pulses to insure the minimum requirements are satisfied.</p> <p>The five properties of the ideal pulse that must be satisfied by the acquired test pulse are (referring to Figures 6, 7A, and 7B, and as discussed in Appendix A):</p> <p>Pulse shape: isosceles triangle  Greq: peak deceleration required by test condition  Treq: rise time required by test condition  V: total velocity change required by test condition  Vtr: velocity change required during Treq (<math>V_{tr} = V/2</math>)</p> <p>A graphical technique can be used to evaluate pulse shapes that are not precise isosceles triangles. Appendix A presents the graphical method of evaluating the acquired pulse (the recorded test sled acceleration versus time).</p> <p>For the acquired pulse to be acceptable, <i>the requirements of Appendix A shall be met.</i></p>
11	EASA	Pages 18,19 and 20  Appendix 1 Table 2 Section 3	The applicability to seating systems other than Type A of some of the requirements included in section 3 of ARP5526Cs is questionable.	<p>The scope of ARP5526C reads as follows:</p> <p><i>This Aerospace Recommended Practice (ARP) documents a common understanding of terms, compliance issues and design criteria to facilitate certification of seat installations specific to Part 25 aircraft. This ARP provides general guidance for seats to be installed in Part 23 aircraft and Parts 27 and 29 rotorcraft and does not specify specific designs or design methods for such certification.</i></p>	Reconsider the applicability of section 3 of ARP5526C to Type B and C seating systems.	<p>Partially-Concur: A number of requirements that were previously contained in AS8049A and used in TSO-C127a were subsequently moved to ARP5526C, therefore TSO-C127b is referencing those same requirements. There are some new and enhanced requirements picked up in ARP5526C. Even though these may not be specific installation requirements of small aircraft and rotorcraft, these requirements are mostly good practices to increase the safety for the passenger of the seats. However, certain requirements have been adjusted for Type A seating systems and modified as follows:</p> <p>3.6.2 For Type A seats , apply as written  3.7.2 For Type A seats, apply as written  3.17.2 For Type A passenger seats , apply as written</p> <p>Furthermore, per comment 57 B.1.1.24 and B.1.1.25 have been removed.</p>

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				<p>The guidance provided by some paragraphs of the ARP, e.g. 3.13.2 and 3.20.2, apply to Type A seating systems only.</p>		
12	EASA	<p>Pages 18 and 19 Appendix 1 Table 2 Section 3</p>	<p>The requirements proposed as amendment of section 3.3.2 of SAE ARP 5526C exceed what required by the applicable FARs, e.g. 29.1411, in particular for under seat storage of life preservers.</p>	<p>Life preserver stowage provisions must be within easy reach of each occupant. Regardless of stowage location, the method of opening should be capable of being operated from all reasonably anticipated angles that would be used by a seated and belted occupant as limited by structure, cushions and seat pitch. For under seat storage of life preservers, it seems over-demanding to require that one motion of the occupant will result in complete retrieval of the life preserver. Moreover, specifying a range of angles for the application of the force to the opening means, does not allow flexibility in the design evaluation in cases in which some of the expected angles of operation are outside of the specified range.</p>	<p>EASA recommends applying the content of section 3.3.2 of SAE ARP 5526C.</p>	<p>See comment #52</p>

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13	<p>Andrew Diaz, Panasonic Avionics Corporation</p> <p>Jackson Lindsey, Thales Avionics</p> <p>Mo Khorsandi, Rockwell Collins</p> <p>Dick Boston, Astronics Corporation</p>	Page 9, Appendix 1, 3.4.1, paragraph one	The repeated flammability substantiation of common IFE electrical components used by multiple applicants across many seat models results in duplicated efforts by both Industry and FAA, creating an undue burden with no improvement to safety. Seat TSO applicants should have an option that allows seat installers or IFE STC holders to assume responsibility for showing compliance with IFE equipment flammability attributes.	Common IFE part numbers are installed in several different cabin locations including seats, monuments, furniture, and bulkheads. Flammability of an IFE component is demonstrated through a component level test plan / test report and is independent of the installed cabin location. In current practice, an IFE part number used in an aircraft monument and <i>multiple</i> aircraft seat manufacturers has several applicants submitting the same substantiation data to the FAA. This requirement increases FAA and industry workload and does not improve safety.	<p><b><u>Revise section to add italicized text:</u></b></p> <p>You may also demonstrate the material's fire protection properties using the methods provided in the FAA policy statement, PS-ANM-25.853-01, Flammability Testing of Interior Materials, which may permit substantiation based on previously tested materials.</p> <p><i>Additionally, you may defer the showing of flammability compliance for components listed in the ILL, thereby documenting an installation limitation requiring the TC/ATC/STC holder to show flammability compliance for the listed components.</i></p>	Non-Concur: Flammability requirements for TSO seats have historically been a requirement of the minimum performance standard. The proposed change would constitute a major shift in one of the historical requirements of the TSO. Therefore no change will be made. However, the rules of 14 CFR part 21 do not prohibit business arrangements that may mitigate the duplication of effort by using supplier generated data, provided the TSOA holder has sufficient control over the validity and quality of the data.
14	Boeing Commercial Airplane				<p>Dear Mr. Bouza:</p> <p>Boeing Commercial Airplanes appreciates the opportunity to review and provide comments on the subject proposed TSO-C127b. We were an active participant in the discussions of the ad hoc Industry group formed under the auspices of the SAE Seat Committee. Thus, we are in full support of the comments produced by that team and submitted in response to this proposed TSO.</p> <p>I would particularly like to draw your attention to the following comments from that team, which are listed here in order of priority:</p> <p><b>1. Heat release:</b> This topic continues to generate much work between seat suppliers and installers. Industry completed work on SAE ARP6199 (<i>Method to Evaluate Aircraft Passenger Seats for the Test Requirements of 14 CFR part 25 Appendix F, Parts IV &amp; V</i>) earlier this year and had the expectation of</p>	These comments will be addressed individually as responses to the similar Ad-Hoc committee comments. We also acknowledge the identification of areas to address in future TSO revisions. We intend to consider these identified areas for inclusion into future TSO revisions.

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					<p>seeing it called out in this revision of the TSO.</p> <p><b>2. Life vest storage and retrieval:</b> The FAA has introduced new requirements, without consultation or guidance, that will result in significant changes to current designs, as well as confusion in how to show compliance with them. Industry is willing to work with the FAA to define minimum performance standards (MPS) that achieve the FAA's goals. The recommended wording in the comment list is a compromise between the current state and what Industry perceives the FAA desires.</p> <p><b>3. TSO-C127 seats installed at angles greater than 18 degrees:</b> It is clear from the wording of the draft TSO and the FAA's response to the questions posed by the Industry group that the FAA intends to limit TSO-C127b approval to seats intended for installation at angles less than 18 degrees. Industry has recommended retaining the ability to obtain TSO approval for seats installed at angles greater than 18 degrees, provided that (1) they meet the MPS of this TSO at their installed angle, and (2) any data necessary to install the seat are provided to the installer.</p> <p><b>4. Crew seat approval under the TSO without floor warpage:</b> Industry has recommended the creation of a new category of seats qualified for installation on aircraft that are exempt from the floor warpage requirements.</p> <p><b>5. Non-TSO functions:</b> The use of the standard language from FAA Order 8150.1C (<i>Technical Standard Order Program</i>) caused significant confusion within the Industry group. The recommended change resolves this confusion, but leaves the wording required by the Order intact. Seats are becoming increasingly complex and the boundary between what is covered by the TSO MPS and what is not is continually questioned. A clear understanding of what is approved under the TSO is necessary to ensure compliant installations. Boeing has generated two separate comments in addition to those produced by the Industry team; they comprise the enclosure to this letter.</p> <p>Further, Boeing would like to place on record the following issues that we request the FAA to consider for inclusion in future TSO revisions, with a resultant reduction in the work required for seat installation:</p> <ul style="list-style-type: none"> <li>• <b>Delethalization of items on one's own seat</b> – A common understanding of the requirements for items on one's own seat that encroach into the 35-inch wedge defined in AC 25.17A (<i>Transport Airplane Cabin Interiors Crashworthiness</i></li> </ul>	

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					<p><i>Handbook</i>) needs to be developed.</p> <ul style="list-style-type: none"> <li>• <b>Use of seats incorporating magnesium alloys</b> – The latest research on magnesium alloys shows that their use on aircraft seats may be acceptable. The outright ban on the use of magnesium and its alloys should be removed.</li> <li>• <b>Baggage bar height clarification</b> – The effect of floor coverings on the baggage bar height requirements provided in AC 25-17A needs to be clarified.</li> <li>• <b>Range of occupants covered under the TSO when using lap restraints with four attachments (Y-belts) and shoulder harnesses</b> – The MPS of the TSO are unclear regarding the requirements for the mounting locations and the range of occupants covered when using restraints other than a single lap belt. This needs to be clarified, as such seats are becoming more prevalent.</li> <li>• <b>Tamper-evident life vest enclosures</b> – Provision needs to be made under the TSO for the approval of tamper-evident life vest enclosures.</li> </ul> <p>Boeing acknowledges the FAA's commitment to continue improving TSO-C127, as outlined in FAA's letter of May 27, 2011, following a meeting with some members of the Industry group on April 8, 2011. We encourage the FAA to identify any issues that obstruct the incorporation of the listed items into the TSO so that they can be worked on and resolved. Further, we also acknowledge the FAA's resolve to issue a second to this TSO in 2014, and we welcome the opportunity to work with your specialists in the creation, or revision, of industry documents that can be used as the basis of the TSO's minimum performance standards.</p> <p>Finally, I would like emphasize Boeing's commitment to work together with seat suppliers and with all other stakeholders to improve the process by which seats are produced and approved. I also urge you to make use of the Industry team's knowledge and experience to improve the requirements for the future.</p> <p>Again, we thank you for the opportunity to provide input on this proposal and trust that you will consider our comments prior to finalizing the document.</p> <p>Please direct any comments or questions you may have to Ms. Jill DeMarco of this office at (425) 237-3253 or e-mail <a href="mailto:jill.demarco@boeing.com">jill.demarco@boeing.com</a>.</p>	

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15	Boeing Commercial Airplane	Page 1, Section 3, Para 1	Add ARP 4101 dated July, 1988 (Reaffirmed: Feb 2003) and ARP 4101/1 dated Apr 1990 (Reaffirmed: Apr 1999, Jul 2007)	ARP 4101 and ARP 4101/1 are applicable to Flight Deck seating systems.	<p><b><u>Add new paragraph following list of requirements:</u></b></p> <p>References (1) SAE Aerospace Recommended Practice (ARP) 4101, <i>Flight Deck Layout and Facilities</i>, and (2) SAE Aerospace Recommended Practice (ARP) 4101-1, <i>Seats and Restraint Systems for the Flight Deck</i>, provide additional guidance regarding acceptable design practices for seats used on the flight deck.</p>	Non-Concur: Although these ARP documents address many important facets of flight deck seat design, this would be a major change to the TSO MPS and therefore should be considered for future revisions to TSO-C127.
16	Boeing Commercial Airplane	Page 21, Appendix 2	Generate elective requirement for EWIS compliant aircraft.	For aircraft incorporating 14CFR 25.1713 into their certification basis, the requirements for wire flammability have been changed. Clarification of the specific test from Appendix F required to meet these “new” requirements is needed to avoid confusion. Inclusion of this test under the elective section of the TSO will permit seat suppliers to perform this test when required for installation, leaving existing methods unaltered for aircraft without 14CFR 25.1713 in their certification basis. Ultimately, this test will become the only test acceptable for installation and can be moved to the main body of the TSO.	<p><b><u>Create new section in Appendix 2:</u></b></p> <p>f. <u>Flammability - Wiring:</u> For aircraft incorporating 14CFR 25.1713 in their certification basis, insulation on electrical wire and electrical cable, and materials used to provide additional protection for the wire and cable, installed in any area of the seat, must be self-extinguishing when tested in accordance with the applicable portions of 14CFR Part 25 Appendix F, part 1 (a)(3).</p>	<p>Partially-Concur: The proposed comment is already a requirement per section 3.4.1 of AS8049B as amended by TSO-C127b:</p> <p><i>Type A - Transport airplane insulation on electrical wire and electrical cable, and materials used to provide additional protection for the wire and cable, must be self-extinguishing when tested in accordance with the applicable portions of Appendix F, part 1, as defined per Amendment 25-111 of 14 CFR part 25.</i></p>

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17	Ad hoc Industry Group				<p><b>Dear Mr. Hempte,</b></p> <p>This letter is in response to your request for comments to the draft TSO-C127b published on faa.gov in August 2012 and informs you of the process adopted by an ad hoc Industry group to respond to the draft. It also identifies the priorities that this team considers necessary for the continued improvement of our segment of the industry.</p> <p>Under the auspices of the SAE SEAT Committee, an ad hoc group was formed to formulate comments to the draft TSO and present a consolidated list to the FAA. This group consisted of representatives from seat manufacturers and installers. A list of the participating companies is appended to this letter. The group would like to thank you for this opportunity to comment and requests that if you have any questions, or require clarifications, on our comments that you contact the undersigned. Following the publication of the draft TSO, comments from the individual members of this group were assembled together into one document. A meeting was held following the SAE SEAT Committee meeting in Orlando, FL in September 2012 to review these initial comments and to agree the method adopted to create the final comment list. Following this initial meeting, a series of working telecons were held that ultimately resulted in the enclosed comment list.</p> <p>The comment list produced by this group contains 42 entries listed in order of occurrence in the draft TSO. It also incorporates relevant input from the list created by a similar team to the prior draft of TSO-C127b published for comment in 2006 as well as input from the "Recommendations on TSO Approval for Mechanical Aspects of Seat Mounted Electrical Equipment Installation" produced by the Streamlining Team in response to the same draft.</p> <p>I would particularly like to draw your attention to the following comments that are listed in order of priority as agreed by the group:</p> <ol style="list-style-type: none"> <li><b>Heat release:</b> this topic continues to generate much work between seat suppliers and installers. Industry completed work on ARP6199 earlier this year and based on meetings held with you and your team at the FAA we had the expectation of it being called out in this revision of the TSO.</li> <li><b>Lifevest storage and retrieval:</b> the FAA has introduced new requirements, without consultation or guidance, that will potentially result in significant change to current designs and confusion in how</li> </ol>	<p>These comments will be addressed individually as responses to the each specific comment comments. We also acknowledge the request to develop a revision to TSO-C39 that parallels this revision to TSO-C127. We intend to consider the revision of TSO-C39.</p>

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					<p>to show compliance to them. Industry is willing to work with the FAA to define Minimum Performance Standards that achieve the FAA's goals. The recommended wording in the comment list is a compromise between the current state and what Industry perceives the FAA desires.</p> <p><b>3. TSO-C127 seats installed at angles greater than 18 degrees:</b> it is clear from the wording of the draft TSO and the FAA's response to the questions posed by this group that the FAA intends to limit TSO-C127b approval to seats intended for installation at angles less than 18 degrees.</p> <p>Industry has recommended retaining the ability to obtain TSO approval for seats installed at angles greater than 18 degrees, provided they meet the MPS of this TSO at their installed angle and any data necessary to install the seat is provided to the installer.</p> <p><b>4. Crew seat approval under the TSO without floor warpage:</b> Industry has recommended the creation of a new category of seats that are qualified for installation on aircraft that are exempt from the floor warpage requirements.</p> <p><b>5. Non-TSO functions:</b> the use of the standard language from FAA Order 8150-1c caused significant confusion within the group. The recommended change resolves this confusion, but leaves the wording required by the order intact. Seats are becoming increasing complex and the boundary between what is covered by the TSO MPS and what is not is continually questioned. A clear understanding of what is approved under the TSO is necessary to ensure compliant installations.</p> <p>Once the changes proposed in this draft revision to TSO-C127 are approved, it will no longer match with the requirements of TSO-C39c. It is important that the MPS of these TSOs match each other as much as possible because seat manufacturers often use a TSO-C39 approval (with additional data gathered under the control of the installer) when TSO-C127 is not available to be used. For an example, side facing seats cannot be approved under TSO-C127, but it is possible to obtain a TSO-C39 approval and then gather the additional data needed for installation under the installer's authority (TC/ATC/STC). This Industry group is willing to prepare a draft TSO-C39d for your consideration in return for your commitment to publish it in conjunction with TSO-C127b. A similar process was successfully used during the streamlining activity when Industry prepared a draft of TSO-C39c.</p> <p>Following a meeting with some members of this group on 08-Apr-</p>	

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					<p>2011, Industry acknowledges the FAA's commitment in your letter of 27-May-2011, to continue working on TSO-C127. We request the FAA identify any issues that obstruct the incorporation of the listed priorities into the TSO so that they can be worked on and resolved. Further, Industry also acknowledges the FAA's resolve to issue a second revision to this TSO in 2014 and welcomes the opportunity to work with your specialists in the creation, or revision, of industry documents that can be used as the basis of the TSO's Minimum Performance Standards.</p> <p>As previously requested, this group would like the opportunity to hold a face to face meeting with you to discuss this TSO and our high priority comments, listed above. Finally, I would like to emphasize Industry's commitment to working together with each other and with all other stakeholders to improve the process by which seats are produced and approved. I urge you to make use of this team's knowledge and experience to improve the requirements for the future.</p> <p>Participants in Industry ad hoc committee of TSO-C127b represented the following companies:</p> <ul style="list-style-type: none"> <li>Airbus</li> <li>BE Aerospace</li> <li>Boeing</li> <li>Bombardier</li> <li>Embraer</li> <li>Goodrich</li> <li>IPECO</li> <li>JAMCO US</li> <li>Lifepoint</li> <li>Martin-Baker</li> <li>Recaro</li> <li>Zodiac Seats California</li> <li>Zodiac Seats France</li> <li>Zodiac Seats UK</li> <li>Zodiac Seats USA</li> </ul> <p>Please do not hesitate to contact the undersigned for any further information or clarification you might require.</p> <p>Sincerely,  Raki Islam  On behalf of Industry Ad hoc Group</p>	

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					<b>Zodiac Seats</b> (940) 736-7718	
18	Ad hoc Industry Group	Page 1, Section 1, 4 <sup>th</sup> line	Extraneous word “first” should be deleted.	The word “first” should be deleted unless there are second and third, etc. to follow.	<b>Revise to read:</b> “...and small airplane seating systems must <del>first</del> meet for approval and identification with the applicable TSO marking.”	Non-Concur – Although changes to the text could be modified for additional clarity, the current wording is as required in the TSO Template in FAA Order 8150.1C. Therefore, the wording will stay as is, however, this clarification request will be considered for future revisions of 8150.1().
19	Ad hoc Industry Group	Page 1, Section 2.b	There are no provisions in the draft (“...still be manufactured...”)	The regulations under 14 CFR 21.619 allow for the incorporation of minor changes to an existing TSOA product	<b>Revise to read:</b> “b. Rotorcraft, transport airplane, and small airplane seating systems approved under a previous TSOA or LODA may still be manufactured under the provisions of its original approval. <b><i>This includes minor design changes to the previously approved TSO articles.</i></b> ”	Partially- Concur – Although the proposed wording is correct for manufacturers holding a TSO authorization, as indicated, 14 CFR 21.619 addresses this subject in the rule and does not need to be addressed again in the TSO.
20	Ad hoc Industry Group	Page 2, Section 3.a.(3)	The note following paragraph 3.a(3)(b) prevents seats with TSO-C127b authorization from being installed at angles greater than 18 degrees from the aircraft centerline. It should be acceptable to install a seat with TSO-C127b authorization at angles greater than 18 degrees provided the seat still meets the MPS of the standard and the additional data necessary to substantiate such an installation is provided.	TSO-C127b authorization of a seat provides significant benefit to both the seat supplier and the seat installer with regard to design, certification and manufacture of the seat. While TSO-C127b does not provide MPS for a seat intended to be installed at an angle greater than 18 degrees, installing a seat with TSO-C127b authorization at such an angle should be acceptable provided that in doing so the seat will still meet the MPS of the standard and the additional data required to substantiate the installation is provided under the TC/ATC/STC.	<b>Revise the note following section 3.a.(3)(b) to read:</b> <b>Note:</b> This standard does not provide MPS for seats intended to be installed at angles greater than 18 degrees from the aircraft centerline. TSO-C127b authorization will not be granted to seats with an installation limitation that permits installation at angles greater than 18 degrees. However, it is not required to provide an installation limitation restricting the installed angle of the seat to 18 degrees, or less, unless such a limitation is required for the seat to meet the MPS of this standard. See paragraph 5.a(3) for additional information regarding installation limitations on this subject.  <b>Add the following to section 5.a.(3):</b> It is acceptable to include the following statement with an installation limitation limiting the angle from the aircraft centerline at which the seat can be installed: “The seat may be installed at angles other than those specified in this limitation provided 1) the seat still meets the MPS of this standard when installed at that angle and 2) the additional data required for installing the seat at that angle is provided by the installer under their TC/ATC/STC.  <b>Revise Appendix 1, Section 5 as follows:</b> Page 37, delete subsection 5.3.3.5i.	Partially-Concur: This requirement does not prevent the installation of the seat at angles greater than 18 degrees, but it does make clear to the installer that the applicability and validity of the data is in question when the article is installed at angles greater than 18 degrees.  The FAA continues to work towards establishing standards for dynamic seats that are installed at angles greater than 18 degrees. FAA Policy Statement PS-ANM-25-03-R2 provides criteria for side facing seats, and the FAA is continuing research for oblique oriented seats.

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				This provides significant cost savings to all parties while maintaining the required level of safety. The proposed changes provide the clarification necessary to allow seats with TSO-C127b authorization to be installed at angles greater than 18 degrees.		
21	Ad hoc Industry Group	Page 2, Section 3.b.	The wording used in this section does not constitute a requirement.	It is the responsibility of the installer to identify possible failure conditions and take appropriate action. AC21-46 provides guidance regarding the TSO holder's responsibilities in this regard.	<b>Add to the end of section 3.b.:</b> "...It is the installer's responsibility to identify possible failure conditions and take action as necessary to mitigate the identified condition. The responsibilities of the TSO holder are identified in AC21-46.	Partial Concur. The paragraph 3.b language is per FAA Order 8150.1c. While it is ultimately the installer's responsibility to identify failure condition, TSO-C127b allows for the TSOA holder to do some work on this assessment that may in turn be used by the installer. However, TSO-C127b does not require a failure condition classification from the TSOA holder.  Paragraph 3.b has been modified to add the sentence: <i>You may</i> document the loss of function and malfunction failure condition classification for which the equipment is designed.
22	Ad hoc Industry Group	Page 2, Section 3	In TSO-C127a, there is a statement indicating that no environmental test procedures are referenced in this TSO.	The removal of the statement that there are no environmental test procedures referenced in the TSO is a boundary that the industry team find useful when dealing with customers not familiar with the TSO and would consequently prefer to maintain.	<b>Create new section "3. e.:</b> <b>"Environmental Qualification.</b> There are no environmental test procedures referenced in the Minimum Performance Standards of this TSO."	Non-concur: This is a true statement. However, adding such a statement is outside the allowed language per the TSO Template in FAA Order 8150.1C Appendix G.
23	Ad hoc Industry Group	Page 3, section 4.a.(1)  Page 4, section 4.a.	Exemptions for flight deck seats not having to comply with the track misalignment requirements under 14 CFR 25.562(b)(2) have been granted on model airplanes	In granting exemptions to the track misalignment requirement, the FAA has concluded that the service history of flight	<b>Add the following to the end of paragraph 4.a.(1)(e):</b> ..., "f" for Aircraft Floor Deformation – Flight Deck Seat Dynamic Testing.  <b>Add new paragraph to TSO, 4.a.(7) as follows:</b> (7) For seats marked as Type A, Subtype 3 or Subtype 4, if the	Non-Concur – A TSO is a minimum standard and does not account for exemptions that may have been granted for specific aircraft. Furthermore the industry standard of AS 8049B does not make this distinction.

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		<p>Page 13, Appendix 1, Table 1, Section 5</p> <p>Page 21, Appendix 2</p>	<p>with 40 inches of frangible structure between the flight deck floor and the lower fuselage contour. However, TSO-C127b requires that these seats meet the track misalignment requirement as part of the minimum performance standards for the TSO. Flight deck seats designed for installation on model airplanes with this exemption will not be able to obtain TSO-C127b authorization unless they are designed to meet the track misalignment requirement.</p>	<p>deck seats on larger airplanes supports exempting flight deck seats from the 10 degrees of track misalignment requirement. The FAA also recognized that, although some cockpit floor distortions have been observed after accidents, there has not been a problem with flight deck seat separations due to floor buckling on narrow body and larger airplanes which have a minimum of 40 inches of frangible structure between the flight deck floor and the lower fuselage contour. The proposed changes would allow for Type A flight deck seats designed for model airplanes with an exemption for track misalignment to obtain TSO-C127b authorization. The proposed changes also provide for track misalignment as an elective MPS for Type A flight deck seats if a seat manufacturer were to choose to include it as a standard the seat has been shown to meet.</p>	<p>marking does not include “f” as described in paragraph 4.a.(1)(e) mark as “FOR USE ONLY ON AIRCRAFT WHERE FLIGHT DECK SEATS ARE EXEMPTED FROM COMPLIANCE WITH THE 10 DEGREES OF TRACK MISALIGNMENT REQUIRED UNDER 14 CFR 25.562(b)(2).”</p> <p><b>Add the following to Appendix 1, Table 1, Section 5:</b>  Page 23, replace subsection 5.3.1.3 to read as follows:  <i>Test 2 for Type A and C seats (except for Type A flight deck seats) and Tests 1 and 2 for Type B seats require simulating aircraft floor deformation by deforming the test fixture, as prescribed in Figures 6, 7A, and 7B, prior to applying the dynamic impact test conditions. The purpose of providing floor deformation for the test is to demonstrate that the seat/restraint system will remain attached to the airframe and perform properly even though the aircraft and/or seat may be severely deformed by the forces associated with a crash.</i>  <i>Elective: For Type A flight deck seats, simulate aircraft floor deformation as prescribed in Figure 6 prior to applying the dynamic impact load conditions. (See Appendix 2 of TSO-C127b.)</i></p> <p><b>Add new section to Appendix 2:</b>  <i>f. Aircraft Floor Deformation – Flight Deck Seat Dynamic Testing: For Type A, Transport, Subtype 3 and Subtype 4 seats (Observer and Pilot/Copilot seats), simulate aircraft floor deformation as prescribed in Figure 6 prior to applying the dynamic impact load conditions per AS8049B subsection 5.3.1.3.</i></p>	

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24	Ad hoc Industry Group	Page 3, Section 4.a.(2)	There are many components on seats that can be referred to as "cushions". The cushions in the primary load paths should be the only ones controlled by this marking. Additionally the only reason to add any such marking should be that they are removable without tools in service, and the marking would aid the operator in placing the proper cushion P/N on a particular seat.	The only reason to list component part numbers in seat marking is to avoid inadvertent substitution of these components while in service, which could be possible if they were removable without tools. Any concern for inadequate coverage for maintaining SRP is satisfied with the inclusion of the procedures for SRP determination as part of the MPS.	<b>Replace:</b> "seat cushion part numbers", <b>with</b> "seat bottom cushion part numbers for forward facing seats and seat headrest, back and bottom cushion part numbers for aft facing seats if they are removable without tools."	Non-concur, cushion marking is important for flammability compliance as well.
25	Ad hoc Industry Group	Page 3, Section 4.a.(2)	Change "safety belt" to "restraint system".	Safety belt implies lap belts only. Seats may well be equipped with shoulder restraints as well.	<b>Replace:</b> "safety belt", <b>with</b> "restraint system"	Partially-Concur: The term restraint system could also imply inflatable restraint systems. The intent of this comment is to address both lap and torso safety belt restraint systems. The term "safety belt restraint system" will be used identify both lap and/or torso belt restraint systems.
26	Ad hoc Industry Group	Page 3, Section 4.a.(3)	The introduction of Installation Manual (IM) is confusing. It could be mistaken as a requirement for a new document.	The generally accepted terminology within the aircraft seating industry for the document described in this section is the Installation Instructions and Limitations Manual (IIL). The FAA has issued policy (PS-AIR100-9/8/2003-127) regarding its content and usage and also reference to Installation Instructions, Limitations and Maintenance Instructions in AC21-46. Changing the name of	<b>Revise section 4.a.(3) to read:</b> "See installation limitations in [installation <i>instructions and limitations</i> manual ( <i>IIL</i> ) or drawing number (insert number)],..."  <b>Revise section 4.a.(6) to read:</b> "See installation <i>instructions and limitations manual (IIL)</i> " after the TSO number. You can abbreviate the marking to "(Dev. See <i>IIL</i> )."  <b>Revise section 5.a. to read:</b> " <i>An Installation Instructions and Limitations</i> Manual(s) containing the following:"  <b>Revise Appendix 1, Table 1, 5.3.9.9 (first paragraph) to read:</b> "However, appropriate limitations must be included in the	Partially-concur. The FAA is moving towards not enforcing a standard name for this type of document, instead per paragraph 5.a we just require a "manual" that must contain certain types of information. Paragraphs 4.a.(3) and 4.a.(6) have modified per comments #2 & 3.  Appendix 1, Table 1, 5.3.9.9 has been modified as proposed.

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				this document creates confusion and a perceived gap in guidance coverage. The change also appears unnecessary.	installation instructions <b>and limitations</b> required in TSO, paragraph <b>5.a.</b> "	
27	Ad hoc Industry Group	Page 3, Section 4.a.(3)	The marking requirement given in paragraph 4.a(3) for approved seat pitch or setback from other interior items is only based on maintaining clearance to ensure effective emergency evacuation based on post-test seat permanent deformations. However, seat pitch and setback from other interior items are installation limitations developed by other MPS, such as HIC/femur load and life preserver retrieval. Having a generic marking on the seat based on only one of the MPS criteria will be misleading to the installer as to what the marking represents. The marking should refer to the Installation Instructions and Limitations required by paragraph 5.a(3) for these pitches and setbacks. Passenger seats are classified as Subtype 1 per paragraph 3.a(2)(a). This classification should be utilized in the paragraph instead of "passenger."	The allowed seat pitch and setback from other interior items needs to be determined based on all the MPS that affect seat pitch and setback. Standardizing the marking to see the Installation Instructions and Limitations simplifies the marking while still providing these pitches and setbacks.	<b>Replace existing text with:</b> "For Type A, Subtype 1 seating systems, mark the seat with "See installation limitations in Installation Instructions and Limitations (IIL) document/drawing (insert number) for allowable seat pitch and/or setback from other interior items."	Concur in principle– Comment 2 also had a very similar comment. See comment resolution of comment #2.

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28	Ad hoc Industry Group	Page 3, Paragraph 4.a.(4)	The proposed wording of this section now require a TSO holder to evaluate the installation limitation restrictions and determine applicability to specific aircraft.	As stated in AC21-50, Section 4a, the data generated within a TSO only satisfies the MPS for a part and does not necessarily satisfy all airworthiness requirements. By requiring the TSO holder to put these additional marking's on the seat, the separation between the TSO holder and installer responsibilities are no longer clear, nor appear to exist. It is solely the responsibility of the installer to evaluate and utilize the installation limitations as published. Additionally, by requiring such marking, the installer may be mislead into believing that the applicable airworthiness requirements have already been met (i.e...TSO marking states Seat ABC for use on 737-900 aircraft only).	<b>Replace complete section with wording used in TSO-C127a:</b> "Optional marking is permitted to allow the use of aircraft-specific installation limitations, such as follows: <b>"FOR USE ON</b> (insert aircraft type or serial number) <b>ONLY."</b> or <b>"FOR USE ON AIRCRAFT USED IN PART 91 OPERATIONS ONLY."</b>	Concur in principle. Paragraph 4.a.(4). Will be removed. Optional marking with limitations is allowed and therefore is not required to be stated in the TSO.
29	Ad hoc Industry Group	Page 4, Section 4.a.(5)	The marking <b>"Meets provisions of 14 CFR Part 25, Appendix F, Part II, effective March 25, 1998."</b> is different than the part marking requirements of TSO-C127a and TSO-C39c: <b>"Complies with 14 CFR 25.853(c), effective March 6, 1995"</b>	As the requirements of TSO-C127a and TSO-C39c require different wording, this will have an unnecessary burden on suppliers to create different labels and confusion in the level of safety for cushions marked with the previous wording, while	<b>Replace existing text with:</b> <b>(5)</b> For Type A and Type B-Transport passenger, flight attendant and observer seating systems, mark each seat cushion to be qualified with <b>one of the following:</b> <b>"Complies with 14 CFR 25.853(c), effective March 6, 1995"</b> <b>OR:</b> "Meets provisions of 14 CFR Part 25, Appendix F, Part II, effective March 25, 1998."	Non-concur. The new wording is intentional as it only attests to meeting a test requirement. The older terminology that implies compliance to 25.853 has created significant confusion as to the level of approval. Under the rules of 14 CFR, Part 21 the TSO holder is only able to obtain an article level approval for applicable MPS. 14 CFR 25.853 is a product level requirement that only the TC/STC holder can show compliance to. Therefore, the TSO holder cannot show compliance to a part 25 regulation.

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				<p>not adding any benefit to safety. Indeed, the test requirements have not changed since the inception of TSO C127a in August of 1998, the difference being to simply specify the test method rather than the CFR section that they comply to.</p> <p>Alternatively, if the marking requirement to Appendix F is maintained rather than allowing the 25.853(c) marking, an update to the 2005 marking memorandum allowing a "Backward Compatible Parts Labeling" for TSO-C127a, TSO-C39c and TSO-C39b articles can address this issue.</p> <p>Industry recommendation is to allow either marking as long as they refer to either the 14 CFR 25.853(c) effective March 6, 1995 or 14 CFR part 25, Appendix F, Part II, effective March 25, 1998.</p>		
30	Ad hoc Industry Group	Page 4, Section 5.a.(3)	The required statement to be included with the IIL is too general. It refers to a generic TSO.	TSO-C127b should be specifically referenced.	<p><b>Replace the statement with:</b></p> <p>"This article meets the minimum performance and quality control standards required by <del>a technical standard order</del> <b>TSO-C127b</b>. Installation of this article requires separate approval."</p>	<p>Non-Concur:</p> <p>The language is per Order 8150.1C. Adding such proposed language would be too restrictive if the article has more than one TSOA (i.e TSO-C39c &amp; TSO-C127b). However, this requirement is a minimum, and there is nothing prohibiting providing additional statements for clarity.</p>

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31	Ad hoc Industry Group	Page 4, Section 5.a.(5)	The FAA's intent in requiring only a list of "replaceable" components does not appear compatible with complete definition of type design.	Complete definition of the seating system should be declared in the applicant's submittal to the FAA. In the previous version, it was "the list of components that make up the seating system complying with the standards prescribed in this TSO."	<b>Replace proposed text with wording used in TSO-C127a:</b> <b>"(5) List of the components, by part number, that make up the seating system complying with the standards prescribed in this TSO."</b>	Concur and modified as proposed.
32	Ad hoc Industry Group	Page 5, Section 5.d.	The current language is ambiguous as to whether declaration of non-TSO functions is optional or required. A large number of people in the industry have interpreted the intent to be that it is a requirement. This would impose a large burden on the seat manufacturer. If non-TSO functions had to be declared, it could only mean that all attributes of the seat not explicitly covered in the TSO would have to be evaluated by the seat manufacturer for their potential to affect airworthiness. This would have to be done for every airplane model that the seat was intended to be installed on. However, the seat manufacturer does not have access to the information regarding the target airplanes that would be needed in order to do this. Another consideration is that in the case of IFE, what	Clarity and understanding	<b>Insert the following text at the beginning of section 5.d.:</b> <b>"Non-TSO functions may optionally be identified in the TSO application and accepted by the FAA. To utilize this option, the applicant must identify functionality 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:"</b>	Partially-Concur: We agree with the intent of the proposed revision, however the current language of the TSO does not require declaration of Non-TSO functions. For Non-TSO functions to be accepted and recognized in the TSOA letter, they must be declared and the requirements of paragraph 5.d must be met.

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			is usually installed in the seat is only a portion of the entire system. Defining a performance standard for part of a system that would cover all airworthiness issues that could apply to that part would not make sense. Clearly, this was not the FAA's intention.			
33	Ad hoc Industry Group	Page 5, Section 5.i.	The required test results are not defined	The test results are supplied under 5.h and do not need to be listed in this sub-section.	<b>Revise text to read:</b> "Detailed seat cushion drawings <del>and test results</del> used to establish approval as follows:"	Concur and adopted
34	Ad hoc Industry Group	Page 6, Section 5.j.	The notification method to the FAA and the installer of the elective requirements, selected by the applicant, needs to be clearly identified.	Without clear election in high level documents, confusion will occur.	<b>Replace the proposed text with:</b> "j. In the TSO application letter and the Installation Instructions and Limitations required by section 5.a.(3) of this TSO, list the specific elective MPS from Appendix 2 selected and complied with by the applicant."	Concur in principle. The requirement in paragraph 5.j "List the specific elective MPS complied with under Appendix 2 of this TSO." Will be moved to paragraph 5.a.(6)  Moving the requirement to 5.a.(6) will require high level notification to the FAA and to the installer as to which(if any) elective MPS are complied with.
35	Ad hoc Industry Group	Page 6, Section 6	This paragraph is not valid for LODA applicants.	Under a LODA, the requirements for manufacturing data are handled by the foreign authority with oversight of the manufacturer's location and accepted by the FAA under the terms of the bilateral agreement between the US and the foreign authority. Other paragraphs within this draft identify differences between TSO and LODA applicants and for consistency it is recommended that this paragraph be revised to identify this difference.	<b>Add after the first sentence:</b> "Manufacturing data for LODA applicants is made available for review by the foreign civil aviation authority with oversight over the applicant's facility."	Partial-Concur: No change to the TSO at this time. Each applicable bilateral agreement contains the requirements and processes for access to applicable data. However, this will be reviewed during the next revision of the TSO template in Order 8150.1c.

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36	Ad hoc Industry Group	Page 8, Appendix 1, 1.0	The last sentence is unclear.	Grammar and wording unclear.	<p><b>Replace:</b>            "In addition, we modified it as follows:",</p> <p><b>With</b>            "We have also modified AS8049B as follows:"</p>	Concur
37	Ad hoc Industry Group	Page 8, Appendix 1, Table 1, 3.2.15	<p>The requirement for the 2" distance from SRP to pelvic restraint anchorage point was removed from AS 8049 Rev B by general industry consensus.</p> <p>However, with the exception of flight deck and attendant seats, industry has been complying with this requirement with no apparent issues.</p>	<p>Industry's position is that the source for and validity of the design constraint has not been published so its effect on some safety performance cannot be gauged. Consequently, there is no way of applying for a deviation because the information necessary for demonstrating equivalent safety is not available.</p> <p>"Figure 1A" referenced here does not show the pelvic restraint anchorage point and the term is not defined adequately. For example, where is the anchorage point for a "Y-belt"? Is there the same requirement for a three point restraint? etc.</p> <p>However, as the requirement has not caused significant burden, Industry would like to propose that this requirement be levied on passenger seats only.</p>	<p><b>Revise proposed text to:</b>            "In addition, <i>for Subtype 1 seats</i>, the pelvic restraint anchorage point(s) must be located no further than 2.0 inches forward of the SRP (ref Figure 1A)."</p>	See Comment # 69.

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38	Ad hoc Industry Group	Page 8, Appendix 1, Table 1, 3.2.16	Requirement does not address encroachment into minimum aisle	The recommended addition adds words from the 2006 task team regarding aisle width encroachment.	<b>Add the following to the proposed text:</b> "Additionally, hinged aisle-side armrest caps used on seats that may be installed in a manner that, when the armrest cap is deployed, causes encroachment into the minimum aisle width defined in 14 CFR 25.815 shall incorporate a self-closing feature, e.g restricted degree of hinge rotation to ensure the armrest cap falls shut due to gravity, spring-loaded closure."	Non-concur: This is new requirement that is not in AS8049B and seeks compliance at the article level to a part 25 installation requirement. The TSO holder may provide installation instructions and limitations that mitigate this concern.
39	Ad hoc Industry Group	Page 9, Appendix 1, Table 1 3.2.19	Modify to allow other SRP methods, i.e., ...must be determined using one of the methods described in Figure 1B or any other method deemed acceptable by the TSO issuing ACO."  Use of the term "should" in the second sentence is inconsistent with the other verbiage in the subsection (should vs. shall/must).	Industry has not been able to determine one acceptable SRP measurement method. AS 8049 Table 1B serves as guidance for several acceptable methods but is not meant to restrict the use of other methods.	<b>Replace proposed text with:</b> The seat reference point (SRP) must be determined. The methods described in Figure 1B are acceptable. The selected method shall be documented, and must be used consistently when evaluating all variations of the seat TSOA model or future changes to the seat TSOA model design. Other methods to determine the SRP must be approved by the TSO issuing ACO.	Partially Concur.  "Should" will be changed to "Shall". However, the ACO will not be granted authority to allow a method that is different than one of those defined in AS8049B. If new methods are developed in the future, they can be evaluated on a case by case basis for a deviation.
40	Ad hoc Industry Group	Page 9, Appendix 1, 3.4.1  Page 10, Appendix 1, 3.4.2	The categorization of Type A and Type B seats is confusing.	Clarity	<b>Replace:</b> "Type A and Type B Transport Rotorcraft...",  <b>with</b> "Type A and Type B Transport Rotorcraft..."	Concur: Changed 3.4.1 and 3.4.2 to : " <i>Type A Transport and Type B Transport</i> "
41	Ad hoc Industry Group	Page 9, Appendix 1, 3.4.1, paragraph two	This paragraph references AC 23-2A, paragraph 8.b., which in turn references paragraphs 7a(1) through 7a(6) of the same AC.	Paragraphs 7a(1) through 7a(6) are incorrectly referenced in the AC.	<b>Revise AC23-2A</b> to replace 7a(1) through 7a(6) with 8a(1) through 8a(6).	Concur – AC 23-2A has been revised to AC 23-2A Change 1 to address this issue. TSO-C127b will reference the updated AC.
42	Ad hoc Industry Group	Page 10 Appendix 1 AS8049B, Section 4, Table 4 Note 2	Permit the use of load cases with resultant vectors not orthogonally aligned with the seat.  Only 5.a is listed. 5.h defines the qualification reports and should also listed.	Acceptance of load cases at angles other than those defined in the TSO MPS varies regionally.	<b>Revise Note 2 to read:</b>  "(2) Elective: Increase these load factors as necessary for reduced weight gust/flight loads or landing requirements. <b>Testing at angles other than those prescribed by the MPS may be presented.</b> All seat adjustment positions and occupancy variations, including those used in flight, must be evaluated when using these increased load factors. <i>Document the increased load factors and report them in accordance with paragraph 5.a and 5.h of this TSO. You must also mark them on</i>	Concur: The intent is maintained but the language of Note 2 is slightly adjusted as seen below. Appendix 2, section c is revised as proposed.  (2) Elective: Increase these load factors as necessary for reduced weight gust/flight loads or landing requirements. <i>Loads at angles other than those prescribed by Table 4 may be tested.</i> All seat adjustment positions and occupancy variations, including those used in flight,

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					<p><i>the TSO placard. (See Appendix 2 of TSO-C127b.)</i></p> <p>Revise Appendix 2, Section c. to read:</p> <p><i>“Testing to Higher Static Loads: To substantiate the seat to load factors higher than those specified in Table 4 of AS8049B or to combined load factors (<b>including at angles other than those prescribed by the TSO MPS</b>), you must report the higher load factors along with paragraph <b>5.a and 5.h</b> requirements. You must mark the higher load factors on the TSO placard.”</i></p>	<p>must be evaluated when using these increased load factors. Document the increased load factors and report them in accordance with paragraphs <i>5.a and 5.h</i> of this TSO. You must also mark them on the TSO placard. (See Appendix 2 of TSO-C127b.)</p>
43	Ad hoc Industry Group	Page 10, Appendix 1, Table 1, 3.5.7	<p>The term “normal passenger movement” has a different meaning when considering typical in-flight conditions and post emergency landing/emergency evacuation conditions. Its use in AS8049B subsection 3.5.7 applies to post emergency landing/emergency evacuation conditions and it needs to be better defined as to its meaning in this situation.</p> <p>Seat back tray table deployment as a result of ATD head contact during a row-to-row HIC test have unique evaluation requirements that have been allowed in Part 25 installation showings of compliance. AS8049B subsection 3.5.7 should include those evaluation requirements.</p>	<p>The proposed change to provide what is considered normal passenger movement when evaluating post-test deployments will align the TSO MPS with the CFR requirements. The proposed change to add the requirements for evaluating seat back food tray deployment as a result of ATD head contact will align the TSO MPS with the CFR guidance on this subject. Both proposed changes have been accepted by the SAE Aircraft Seat Committee for the next revision of AS8049.</p>	<p><b>Replace complete text of AS8049 section 3.5.7 with the following:</b></p> <p><b>“Deployable Items:</b> Certain items on the seat, such as food trays, legrests, arm caps over in-arm tray tables, etc., are used by passengers in flight and are required to be stowed for taxi, takeoff and landing. Deployment of such items should be treated as “permanent deformation” if the item deploys into an area that must be used by multiple passengers (in addition to the occupant of the seat) for egress. The location of the measuring point used for determining the deformation of the deployed item shall be either at the point of full deployment or at the point of the actual deployment if a partially deployed item resists further deployment upon application of a static load of 45 N (10 lb) along the direction of the inertial load path. Such deployments can be considered acceptable, even if they exceed the provisions of 3.5 and its subparagraphs, if they are readily pushed out of the way by normal passenger movement, and remain in a position that does not affect egress (<i>i.e., when pushed out of the way it remains in that position</i>). <b>Normal passenger movement is the act of the seated occupant getting up out of the seat and moving to egress the airplane (i.e., unbuckling their restraint, standing, turning towards the aisle and moving into the aisle). It does not include additional movements to lift or stow items, or latching an item in place.</b> Any items that remain in a position that would affect egress shall be reported as permanent deformation.</p> <p><b><i>If the food tray table deploys as a result of being struck by the ATD head during a row-to-row HIC test and the food tray table is easily pushed out of the way, the deployment is acceptable and does not need to be considered as permanent deformation (except for seats installed forward of a required exit path – see below). It is not required for the food tray table to remain in a position that does not affect egress. “Easily pushed out of the way” is not required to be by normal passenger movement. Determination of the food tray</i></b></p>	<p>Concur, and incorporate accordingly as modification to 3.5.7. Except replaced phrase “forward of a required exit path” to “where deployment may affect egress through a required exit path.”</p>

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					<p><i>deploying as a result of being struck by the ATD head during the test shall be made by evaluation of the high speed film/video.</i></p> <p><i>If the food tray table deploys as a result of being struck by the ATD head during the test and the food tray table is not easily pushed out of the way, the deployment shall be treated as permanent deformation.</i></p> <p><i>Any food tray deployment on a seat that will be installed forward of a required exit path, regardless of being struck by the ATD head, shall be treated as permanent deformation."</i></p>	
44	Ad hoc Industry Group	Page 11, Appendix 1, Table 1, 5.1.9	Static loads <u>must</u> be applied in a <u>representative</u> manner at the CG of the mass. "must" – is completely impractical to apply each load at mass CG.	Traditionally, the total system load (sum of seat, occupant and all items of mass) has been applied in a conservative manner through the static resultant load application points (Table 5). This new wording would prevent this approach.	<b>Add the following to the end of section 5.1.9:</b> " <i>... representative manner at the c.g. of the mass, or in a conservative location relative to the c.g.</i> "	Concur – However while this requirement adequately addresses the overall seating systems ability to react the static loading, additional substantiation may be required for installation approval for the retention of items of mass.  Section 5.1.9 is modified as: The load due to any item of mass, including the seat that is not restrained by the occupant restraint system <i>must</i> be applied in a representative manner at the c.g. of the mass, <i>or with a corrective factor applied in a conservative manner relative to the c.g. of the item of mass.</i>
45	Ad hoc Industry Group	Pages 11 and 12, Appendix 1, Table 1, 5.1.9 and 5.2.2	The note added to subsections 5.1.9 and 5.2.2 allows dynamic tests to demonstrate retention of items of mass for static load conditions.	The note added to subsections 5.1.9 and 5.2.2 allows dynamic tests to demonstrate retention of items of mass for static load conditions. Dynamic testing has not been the method of compliance for showing compliance to the static load conditions under 14 CFR 25.305(b), 25.561(b)(3) and 25.789(a). In this regard the requirements of Part 25 and the TSO may not be the same, and additional data may be required to show	<b>Delete the note that has been added to subsections 5.1.9 and 5.2.2.</b> <del>Note: If you demonstrate retention of an item of mass attached to the seat (by the dynamic qualification tests of subsection 5.3), you don't need to further demonstrate static retention for the forward and down static conditions. However, you must still demonstrate retention of items of mass for the side and aft static conditions.</del>	Partially concur: While there may not be any specific guidance for this question, the FAA believes that demonstrating retention of items of mass per the dynamic test is an acceptable method of compliance for that static retention of items of mass for the load cases tested dynamically. The FAA will consider incorporating this MOC in future guidance.

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				<p>compliance to the Part 25 requirements for retention of items of mass on the seat under static load conditions.</p> <p>If this note remains, additional guidance would be required for installers to use the data gathered under the TSO.</p>		
46	Ad hoc Industry Group	Page 12 Appendix 1, Table 1, 5.3	AS8049B section 5.3 has punctuation problems that make it hard to read. In two places there are “:” that should be removed.	Readability would be improved.	<b>Revise text to read:</b> “...and documentation of <b>subsections</b> 5.3.1 Dynamic Impact Test Parameters through subsection 5.3.9.2 Impact Pulse Shape of SAE...”	Concur and changed accordingly.
47	Ad hoc Industry Group	Page 13, Appendix 1, Table 1 5.3.3.6 c	<p>The content of this section would be better phrased if the wording from AC25.562-1b (Appendix 4, section 2.a.(1), p92) is paraphrased.</p> <p>The description of the yaw is unclear whether this is a seat (i.e. passenger place) yaw vs. aircraft longitudinal axis yaw and more than one team member has misread the definition of the test specimen.</p>	Use of AC wording promotes better understanding of requirement.	<b>Revise proposed text as follows:</b> “c. Test 2 (Figures 6, 7A, & 7B) conducted solely to collect head/knee path data should be conducted with <b>no</b> yaw and without floor deformation. The test must be conducted on the seat <b>selected for the horizontal structural dynamic test. If more than one seat is identified for the structural testing, then test the seat with the greatest overhang to collect head/knee path data</b> with the greatest overhang among the seats selected for the applicable forward longitudinal dynamic structural test. It is acceptable to use the <b>opposite hand</b> part for this seat. The occupancy used in the applicable forward longitudinal dynamic structural test must be used for this test. For consistency, a floor should be used for tests used to gather head/ <b>knee</b> path data. It is acceptable to collect ATD head/ <b>knee</b> path data in the applicable forward longitudinal dynamic structural test.”	Partially Concur, per section 5.3 you may use the procedures defined in AC 25.562-1b. However, for additional clarity, the following paragraph 5.3 has been modified accordingly:  <i>For Type A Seats: You may demonstrate compliance with the dynamic test procedures and documentation of subsections 5.3.1 Dynamic Impact Test Parameters: through subsection 5.3.9.2 Impact Pulse Shape: of SAE AS 8049B by the equivalent procedures of AC 25.562-1B. The equivalent method <u>shall</u> be documented in the document that contains installation instructions and limitations per the requirements of section 5.a.3 of this TSO, and must be used consistently when evaluating all variations of the seat or future changes to the seat design.</i>
48	Ad hoc Industry Group	Page, 14, Appendix 1, Table 1, 5.3.5 and 5.3.6	The test article selection criteria for structural dynamic tests for TSO-C127b is different from that given in AC 25.562-1B with regard to critical occupancy	The proposed changes will make the critical occupancy for the structural dynamic tests to meet the TSO MPS the same as the	<b>Replace the proposed wording with the following:</b> 5.3.5 Selection of Test Articles: Many seat designs comprise a family of seats that have the same basic structural design but differ in detail. For example, a basic seat frame configuration can allow for several different seat leg locations to permit installation in different aircraft. If these differences are of a nature that their effect can be	Partially-Concur: It seems that the intent of the comment is to align the TSO with the requirements in AC 25.562-1B. Although the article selection criteria does vary slightly between the procedures defined in AS8049B and AC 25.562-1b, for Type A seats the applicant can elect to follow and document using the procedures in AC 25.562-1B per Section 5.3 of AS8049B as modified by TSO-

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			<p>for the test. The critical structural tests conducted to meet the MPS of the TSO to potentially may not be those required to show compliance to 14 CFR 25.562. This can result in additional structural dynamic tests needing to be conducted in order to install the seats in an aircraft.</p>	<p>guidance given in AC 25.562-1B and eliminate the potential for additional structural dynamic tests having to be conducted to show compliance to 14 CFR 25.562.</p> <p>Harmonize with industry agreed wording from AS8049c (draft)</p>	<p>determined by rational analysis, then the analysis can determine the most critical configuration. As a minimum, the most critically (highly) stressed configuration shall be selected for the dynamic tests so that the other configurations could be accepted by comparison with that configuration.</p> <p>There are two factors that must be considered in selecting the critical structural test configurations. First, the seat to aircraft interface loads (undeformed seat) can be determined by rational analysis for the seat design and load configurations. The rational analysis can be based on static or dynamic seat/occupant analytical methods. The rational analysis can form the basis for selecting the most highly stressed critical configuration based on load.</p> <p>For 16g longitudinal structural conditions, the occupancy that produced the highest calculated seat leg resultant tension reaction in the aft fitting is used for the test, unless the load of the fully occupied seat is within 10 percent of the highest seat leg load. Due to the statically indeterminate nature of seat structure, there are assumptions used to calculate interface loads, which will result in some uncertainty. Data indicate that calculated reactions within 10 percent of one another are effectively equivalent. In such cases, a fully occupied seat will impart an overall greater load than a partially occupied seat. Therefore, if the fully occupied seat leg load is within 10 percent of the highest loaded seat leg, test the seat fully occupied.</p> <p>For 14g vertical structural conditions, full occupancy shall be used for these tests. This is to ensure that the maximum compressive load is put on the structure.</p> <p>Second, the effects of seat deformation should be considered. As noted, a family of seats typically includes seat models with varied seat leg locations. The effects of floor deformation are more critical for narrowly spaced legs. Thus, a test or rational analysis of the seat model with the minimum seat leg spacing must be conducted to evaluate the most highly stressed critical configuration based on deformation.</p> <p><b>Add the following to Table 1:</b> Page 45, add subsections 5.3.6.1.1 and 5.3.6.1.2, to read as follows:</p>	<p>C127b. . However, for additional clarity, the following paragraph 5.3 has been modified accordingly by comment # 47.</p>

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					<p>5.3.6.1.1 For 16g longitudinal structural conditions, the occupancy that produced the highest calculated seat leg resultant tension reaction in the aft fitting is used for the test, unless the load of the fully occupied seat is within 10 percent of the highest seat leg load. In such cases, test the fully occupied seat.</p> <p>5.3.6.1.2 For 14g vertical structural conditions, full occupancy shall be used for these tests. This is to ensure that the maximum compressive load is put on the structure.</p>	
49	Ad hoc Industry Group	Page 15 Appendix 1, Table 1 5.3.5.1	Second to the last paragraph states: If an item of mass that does not affect the dynamic performance of the seat fails during a test that is otherwise acceptable, then you may validate the design by a 24g static test. Apply the load for the 24g test in the same direction as the load vector in the dynamic test where the failure occurred. Does it not require a redesign first? Also, if floor warpage affects the performance of the part as well as the direction of the applied load, should it not be incorporated into the 24g static test?	The way the paragraph is presented, it might be interpreted that it is allowable to rerun a test statically at 24g without a design change. The testing at 24g static without design change should only be acceptable if there was a failure due to test setup or non-representative test article. Additionally, if floor warpage affects the preloading of the failed part, the 24g static test should represent those conditions. Gross weight of the test article must be adjusted to account for any separation of mass due to the failure.	<p><b>Revise second to last paragraph to read:</b>            “If an item of mass that does <b>not</b> affect the dynamic performance of the seat fails during a test that is otherwise acceptable, then you may validate the design by a 24g static test. <b>The failed test article must be redesigned unless the failure is attributable to test setup or non-representative test article. The certified gross weight of the test article must be adjusted to account for any separation of mass due to failure.</b> Apply the load for the 24g test in the same direction as the load vector in the dynamic test where the failure occurred. <b>Any preload, such as due to floor warpage, of the failed article must be represented in the static 24g test.</b>”</p>	Concur and revised accordingly
50	Ad hoc Industry Group	Page 18 Appendix 1, 2.0	The last sentence is unclear.	Grammar and wording unclear.	<p><b>Replace:</b>            “In addition, we modified it as follows:”,  <b>With</b>            “We have also modified ARP5526C as follows:”</p>	Concur and revised accordingly
51	Ad hoc Industry Group	Page 18 Appendix 1, Table 2, 3.0	The wording of Table 2 states “Disregard all subsections in Section 3 not listed below.” Section 3.2, which deals with seat belt	FAA policy memo PS-AIR100-2003-ARP5526 permits the use of the ARP to show compliance.	<p><b>Revise Table 2, Section 3, to include:</b>            “3.2 Apply as written.”</p> <p><b>Add to 3.2.2 (proposed words from Page 20 B.1.1.11):</b>            Restraint system anchorages should provide self-aligning features. If</p>	<p>Concur. Removed B.1.1.1 and added modified section 3.2.2 to state:</p> <p>“Definition and Criteria: Seatbelt misalignment is a condition where the seatbelt and/or shackle is positioned to</p>

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			misalignment, is not listed and is therefore excluded.	The location of the FAA's additional text on page 20 under ARP5526 Appendix B, B.1.1.11 is awkward as the text of this paragraph has been moved to section 3.2 of the main body.	self-aligning features are not provided, the static and dynamic tests in this document should be conducted with the restraints and anchorages positioned in the most adverse configuration allowed by the design. The anchorage system should minimize the possibility of incorrect installation or inadvertent disconnection of the restraints. <del>Evaluate per ARP 5526C subsection 3.2.2."</del>  <b><u>Remove from Table 2, Appendix B, the above wording that is under B.1.1.11.</u></b>	give the impression that the belt has been properly tightened, when in fact there is slack in the system or the shackle is positioned so that it will not carry the force generated in an emergency landing or turbulence condition.  <i>Restraint system anchorages should provide self-aligning features. If self-aligning features are not provided, the static and dynamic tests in this document should be conducted with the restraints and anchorages positioned in the most adverse configuration allowed by the design. The anchorage system should minimize the possibility of incorrect installation or inadvertent disconnection of the restraints.</i>  The seat belt installation should not appear to the belted occupant to be properly adjusted (snug) while there is significant [2.54 cm (one inch) or more] slack in the system which may pay out in an emergency landing situation..."
52	Ad hoc Industry Group	Page 18, Appendix 1, Table 2, 3.3.2	This section introduces new requirements without a clear understanding or guidance regarding the means of compliance to be used.  Many current designs use life preserver storage compartments that require two operations by the occupant to retrieve the life preserver. The proposed wording would prevent these being used in the future.  Further flight deck seats and flight attendant seats have not been separated from passenger seats. These	The proposed changes clarify that the MPS is for the life preserver storage provisions on the seat, the load conditions under which the life preserver is to be restrained, replaces ambiguous statements with clear requirements, and better defines the retrieval requirements for passenger seats.	<b><u>Replace complete section to read:</u></b>  "3.3.2 Definition and Criteria: The term life preserver, life vest and life jacket may be used interchangeably. When life preserver stowage provisions are included as part of the seat design, the stowage provisions shall provide access to a life preserver for each seating position. The life preserver stowage shall be designed and located such that the following minimum requirements are met:  a. The life preserver shall be restrained under all applicable loading conditions; i.e., the retention device shall not allow the preserver to come free during emergency landing static and dynamic conditions, taxi, takeoff, landing, turbulence, and during stowage and removal of under seat baggage.	The primary intent of the changes to the life preserver donning requirement is to address difficulties identified as a result of the US Airways flight 1549 accident on January 15, 2009. The subsequent NTSB recommendation, A-10-84, proposed changes to improve the ability of passengers to retrieve life preservers.  Most comments center around removing the single motion retrieval requirement and to clarify the MOC. The FAA concurs with the intent of these comments. Accordingly the FAA also enhanced and clarified the retrieval demonstration test requirement in order to better reflect the anticipated user population.  Section 3.3.2 will read as:  <i>3.3.2 Definition and Criteria: The term life preserver, life vest and life jacket may be used interchangeably. When life preserver stowage provisions are included as part of the seat design, the stowage provisions shall provide access to a life preserver for each seating position. The life preserver stowage shall be designed and located such that the requirements of this section are met. Per</i>

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			seats typically have to meet a different set of criteria for installation.		<p>b. Any life preserver locating placard installed on the seat shall accurately state the location of the life preserver and be adequately marked per 3.8.2 of this ARP5526 Revision C document (e.g. "Life preserver under center armrest"). For life preserver locations other than under the seat or under a console between the seats, mark "Life preserver" or "Life preserver inside" on the container or compartment, unless the location is identified with a pull strap. Pull straps shall be red or labeled "PULL" or "PULL FOR LIFE PRESERVER" in contrasting color. A symbolic placard may be used in lieu of text.</p> <p>For seats intended to be installed in sequential rows, a placard may be on the seat back stating the location of the life preserver for the occupant seated behind.</p> <p>c. The retrieval path of the life preserver shall be free of obstructions due to life preserver container movement and/or seat or aircraft components (e.g., seat legs, cushions, baggage bars, shrouds, etc.) when the seat is in the configuration for taxi, takeoff and landing.</p> <p>d. The life preserver stowage shall not present any sharp edges or points that could damage the life preserver or cause injury.</p> <p>e. For under seat storage on passenger seats:</p> <ol style="list-style-type: none"> <li>1) A pull strap shall be connected to the life preserver, or a pull strap or latch shall be on the compartment opening, such that when the strap or latch is pulled, the preserver is presented on the strap or the occupant can reach into the compartment to retrieve the preserver (i.e., one or two motions of the occupant result in retrieval of the life preserver).</li> <li>2) Pull straps shall be located no more than 3 inches aft of the front edge of the seat bottom, i.e., the seat frame or cushion, whichever is further forward.</li> <li>3) Unless limited by seat cushions or structure, the pull strap shall permit life preserver retrieval when pulled from any angle between <ol style="list-style-type: none"> <li>a) 45 degrees up and 50 degrees down from the horizontal.</li> <li>b) 45 degrees left and 45 degrees right from the container centerline.</li> </ol> </li> <li>4) Normal seat operation or under seat baggage storage activities shall not sweep the pull strap into an unreachable location.</li> <li>5) Pull straps shall be red or labeled "PULL" or "PULL FOR LIFE</li> </ol>	<p><i>paragraph 5.a of this TSO, the installation, operating and maintenance instructions shall also reflect the requirements of this section. For example, installation instructions shall account for the allowable life preserver weight and size, marking requirements, as well as the required unobstructed area to remove the life preserver from the container. Furthermore, the operating instructions must report the detailed content of the simulated preflight briefing and any special instructions for unique aspects of the design operation that should be considered for operational use and continued performance.</i></p> <p><i>a. The life preserver shall be restrained under all applicable loading conditions; i.e., the retention device shall not allow the preserver to come free during emergency landing static and dynamic conditions, taxi, takeoff, landing, turbulence, and during stowage and removal of under seat baggage.</i></p> <p><i>b. Any life preserver locating placard installed on the seat shall accurately state the location of the life preserver and be adequately marked per 3.8.2 of this ARP5526 Revision C document (e.g. "Life preserver under center armrest"). For life preserver locations other than under the seat or under a console between the seats, mark "Life preserver" or "Life preserver inside" on the container or compartment, unless the location is identified with a pull strap. Pull straps shall be red or labeled "PULL" or "PULL FOR LIFE PRESERVER" in contrasting color. A symbolic placard may be used in lieu of text.</i></p> <p><i>For seats intended to be installed in sequential rows, a placard may be on the seat back stating the location of the life preserver for the occupant seated behind.</i></p> <p><i>c. The retrieval path of the life preserver shall be free of obstructions due to life preserver container movement and/or seat or aircraft components (e.g., seat legs, cushions, baggage bars, shrouds, etc.) when the seat is in the configuration for taxi, takeoff and landing.</i></p> <p><i>d. The life preserver stowage shall not present any sharp edges or points that could damage the life preserver or cause injury.</i></p> <p><i>e. For under seat pan storage on passenger</i></p>

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					<p>PRESERVER" in contrasting color.</p> <p>6) The life preserver container, or compartment, shall be protected from inadvertent damage from normal passenger movement such as the stowage and removal of underseat baggage.</p> <p>f. The life preserver shall be within easy reach of, and shall be readily removed by a seated and loosely belted occupant (shoulder strap(s) may be removed), for all seat orientations and installations that are intended for use during taxi, takeoff and landing. The life preserver shall be quickly retrieved (typically, within 10 seconds) on the first attempt by both large and small occupants when seated and belted in a seat that is configured for takeoff and landing (including surrounding seats and structure).</p> <p>For flight deck seats, the range of occupant stature to be considered is 5'-2" to 6'-3" standing stature.</p> <p>For all other seats, the range of occupant stature to be considered is 5<sup>th</sup> percentile size female to 95<sup>th</sup> percentile size male.</p> <p>The evaluation to quickly retrieve the preserver is to begin with the occupant moving their hand(s) from the seated position to reach for the preserver and to end with the occupant having the preserver in their hand(s). It does not include the time for the occupant to return to the upright position, to remove a pull strap from the preserver (if used) or to open the preserver package provided by the preserver manufacturer."</p>	<p><i>seats(excluding center console storage):</i></p> <p>1) <i>A pull strap shall be connected to the life preserver, or a pull strap or latch shall be on the compartment opening, such that when the strap or latch is pulled, the preserver is presented on the strap or the occupant can reach into the compartment to retrieve the preserver (i.e., one or two motions of the occupant result in retrieval of the life preserver).</i></p> <p>2) <i>The life preserver shall be located no more than 3 inches aft of the front edge of the seat bottom, i.e., the seat frame or cushion, whichever is further forward.</i></p> <p>3) <i>Unless limited by seat cushions or structure (e.g. seat leg, floor, etc.), designs utilizing a pull strap shall permit life preserver retrieval when pulled from any angle between</i></p> <p style="padding-left: 40px;"><i>a) 45 degrees up and 50 degrees down from the horizontal.</i></p> <p style="padding-left: 40px;"><i>b) 45 degrees left and 45 degrees right from the container centerline.</i></p> <p>4) <i>For designs utilizing a pull strap, normal seat operation or under seat baggage storage activities shall not sweep the pull strap into an unreachable location.</i></p> <p>5) <i>The life preserver container, or compartment, as installed on the seat shall protect the life preserver from inadvertent damage from normal passenger movement such as the stowage and removal of underseat baggage.</i></p> <p><i>f. Demonstrate that the life preserver shall be within easy reach of, and shall be readily removed by a seated and belted occupant (shoulder strap(s) may be removed prior to demonstration), for all seat orientations and installations that are intended for use during taxi, takeoff and landing. In lieu of an actual life preserver, a representative object (e.g. size and weight) may be utilized for testing. The evaluation to quickly retrieve the preserver is to begin with the occupant moving their hand(s) from the seated position to reach for the preserver and to end with the occupant having the preserver in their</i></p>

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						<p><i>hand(s) and fully removed from the stowage container. It does not include the time for the occupant to return to the upright position, to remove a pull strap from the preserver (if used) or to open the preserver package provided by the preserver manufacturer. Test the critical configuration(s) to demonstrate retrieval in less than 10 seconds by a minimum of 5 test subjects with a success rate of no less than 75 percent. The test shall evaluate three anticipated occupant test subject size categories: 5<sup>th</sup>, 50<sup>th</sup> and 95<sup>th</sup> percentile. At least one occupant from each size category shall demonstrate successful retrieval within 10 seconds. Test subjects for either the 5<sup>th</sup> or 95<sup>th</sup> percentile occupant category shall not exceed 40% of the overall test subject population.</i></p> <ol style="list-style-type: none"> <li>1) <i>For passenger seats the test subjects shall be naïve. For the purpose of this test naïve test subjects shall be defined as: they shall have had no experience within the prior 24 months in retrieving a life preserver. Subjects must receive no retrieval information other than a typical preflight briefing. The occupant size categories to be evaluated shall be defined as:</i> <ol style="list-style-type: none"> <li>a. <i>A 5<sup>th</sup> percentile is no more than 60 in (1.5 m) tall</i></li> <li>b. <i>A 50<sup>th</sup> percentile is at least 63 in (1.6m) tall but no more than 70 in (1.8 m) tall.</i></li> <li>c. <i>A 95<sup>th</sup> percentile weighs at least 244 lb (110.7 kg).</i></li> </ol> </li> <li>2) <i>For flight attendant and observer seats the test subjects do not need to be naïve. The occupant size categories to be evaluated shall be defined as:</i> <ol style="list-style-type: none"> <li>a. <i>A 5<sup>th</sup> percentile is no more than 60 in (1.5 m) tall</i></li> <li>b. <i>A 50<sup>th</sup> percentile is at least 63 in (1.6m) tall but no more than 70 in (1.8 m) tall.</i></li> <li>c. <i>A 95<sup>th</sup> percentile weighs at least 244 lb (110.7 kg).</i></li> </ol> </li> <li>3) <i>For pilot/copilot seats the test subjects do not need to be naïve. The occupant size categories to be evaluated shall be defined</i></li> </ol>

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						<p>as:</p> <ul style="list-style-type: none"> <li>a. A 5<sup>th</sup> percentile is no more than 62 in (1.57 m) tall</li> <li>b. A 50<sup>th</sup> percentile is at least 63 in (1.6m) tall but no more than 70 in (1.8 m) tall.</li> <li>c. A 95<sup>th</sup> percentile weighs at least 244 lb (110.7 kg).</li> </ul>
52-A	Ad hoc Industry Group	Page 18, Appendix 1, Table 2, 3.3.2	Follow on clarification at the request of the FAA.		<p>Definition and Criteria:  <i>The term life preserver, life vest and life jacket may be used interchangeably. [Rationale: The definition of all terms for lifevest clarifies the intent of the TSO. We consider that all the above terms are synonymous and will only use lifevest in these comments.]</i></p> <p><i>When life preserver stowage provisions are included as part of the seat design, the stowage provisions shall provide access to a life preserver for each seating position. [Rationale: Under the seat TSO, Industry supplies and approves lifevest provisions. The lifevest call out is not currently part of the TSO bill of materials. The supply, installation and installation approval of the lifevest is currently not part of the TSO. Industry considers our wording to clarify these circumstances and want to ensure that the FAA is not trying to get a specific lifevest part number approved for a specific seat part number under the TSO.]</i></p> <p><i>The life preserver stowage shall be designed and located such that the following minimum requirements are met:</i></p> <ul style="list-style-type: none"> <li><i>a. The life preserver shall be restrained under all applicable loading conditions; i.e., the retention device shall not allow the preserver to come free during emergency landing static and dynamic conditions, taxi, takeoff, landing, turbulence, and during stowage and removal of under seat baggage. [Rationale: Clarification that the restraint is required under both static and dynamic loading conditions as well as during the “taxi” phase of flight. Better defined the “normal under-seat activity”.]</i></li> <li><i>b. Any life preserver locating placard installed on the seat shall accurately state the location of the life preserver and be adequately marked per 3.8.2 of this ARP5526 Revision C document (e.g. “Life preserver under center armrest”). For life preserver locations other than under the seat or under a console between the seats, mark “Life preserver” or “Life preserver inside” on the container or compartment, unless the location is identified with a pull strap. Pull</i></li> </ul>	<p>In reviewing the written comments provided to the FAA by the AD-Hoc Industry Group the FAA determined that additional clarification and rational for the proposed changes by the AD-Hoc group was required to adequately address the comment. On January 17<sup>th</sup>, 2014 members of the FAA met with representatives of the AD-Hoc Industry Group to obtain clarification to specific questions that the FAA had on this particular recommendation. The additional rational in the recommendation column reflects the content of the discussion and the overall clarification that the FAA received at this meeting. The clarification was considered in conjunction with the original comment and the final disposition is documented in comment # 52.</p>

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					<p><i>straps shall be red or labeled "PULL" or "PULL FOR LIFE PRESERVER" in contrasting color. A symbolic placard may be used in lieu of text.</i></p> <p><i>For seats intended to be installed in sequential rows, a placard may be on the seat back stating the location of the life preserver for the occupant seated behind. [Rationale: Industry proposes the use of an Industry agreed standard for use as TSO MPS. Our intention is to make sure that each passenger can see a lifevest placard. Installation limitations shall be applied to ensure continued compliance to the requirements of this section. ]</i></p> <p><i>c. The retrieval path of the life preserver shall be free of obstructions due to life preserver container movement and/or seat or aircraft components (e.g., seat legs, cushions, baggage bars, shrouds, etc.) when the seat is in the configuration for taxi, takeoff and landing. [Rationale: To clarify the seat positions to be evaluated for retrieval evaluation.]</i></p> <p><i>d. The life preserver stowage shall not present any sharp edges or points that could damage the life preserver or cause injury.</i></p> <p><i>e. For under seat storage on passenger seats: [Rationale: Flight crew and attendant seats have separate requirements for under seat stowage. Flight crew members receive specific training in lifevest retrieval and therefore do not need to be included in the 10 second rule.]</i></p> <p><i>1) A pull strap shall be connected to the life preserver, or a pull strap or latch shall be on the compartment opening, such that when the strap or latch is pulled, the preserver is presented on the strap or the occupant can reach into the compartment to retrieve the preserver (i.e., one or two motions of the occupant result in retrieval of the life preserver). [Rationale: Industry considers the two motion operation capable of being completed within the 10 second time limit and to be equivalently safe to a one motion retrieval. Industry considers the single pull requirement difficult to achieve and control since most seats only provide a provision for life preservers and do not actually include the life preserver. Furthermore there are concerns for how the new single pull requirement would impact the reliability and functionality of retrieval, TSA seals and airline difficulty]</i></p> <p><i>2) Pull straps shall be located no more than 3 inches aft of the front edge of the seat bottom, i.e., the seat frame or cushion, whichever is further forward.</i></p>	

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					<p>3) Unless limited by seat cushions or structure, the pull strap shall permit life preserver retrieval when pulled from any angle between</p> <p>a) 45 degrees up and 50 degrees down from the horizontal.</p> <p>b) 45 degrees left and 45 degrees right from the container centerline. <b>[Rationale: Industry proposes clearer definition.]</b></p> <p>4) Normal seat operation or under seat baggage storage activities shall not sweep the pull strap into an unreachable location.</p> <p>5) Pull straps shall be red or labeled "PULL" or "PULL FOR LIFE PRESERVER" in contrasting color. <b>[Rationale: Industry considers the guidance in ARP5526 valid for all seats and has located it appropriately (paragraph (b) above rather than limiting it to lifevests under seats.)</b></p> <p>6) The life preserver pouch, or compartment, shall be protected from inadvertent damage from the stowage and removal of underseat baggage and from normal passenger movement. <b>[Rationale: Missing requirement the stowage provision should protect the life preserver.]</b></p> <p>f. The life preserver shall be within easy reach of, and shall be readily removed by a seated and loosely <b>[Rationale: "loosely" was required to obtain consensus within the ad-hoc group.]</b> belted occupant (shoulder strap(s) may be removed), for all seat orientations and installations that are intended for use during taxi, takeoff and landing. The life preserver shall be quickly retrieved (typically, within 10 seconds) on the first attempt by both large and small occupants when seated and belted in a seat that is configured for takeoff and landing (including surrounding seats and structure).</p> <p>For flight deck seats, the range of occupant stature to be considered is 5'-2" to 6'-3" standing stature.</p> <p>For all other seats, the range of occupant stature to be considered is 5<sup>th</sup> percentile size female to 95<sup>th</sup> percentile size male.</p> <p>The evaluation to quickly retrieve the preserver is to begin with the occupant moving their hand(s) from the seated position to reach for the preserver and to end with the occupant having the preserver in their hand(s). It does not include the time for the occupant to return to the upright position, to remove a pull strap from the preserver (if used) or to open the preserver package provided by the preserver manufacturer. <b>[Rationale: Industry decided to separate the proposed text into individual requirements rather than one comprehensive requirement. Industry considers the requirements as originally worded to be too vague to be reliably implemented. Industry</b></p>	

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					<i>proposes clear start and finish positions to define what is included and excluded in the 10 second period. Industry proposes the use of “typically” against the 10 second requirement in order to account for population variations. Industry expects most people, most of the time to meet 10 seconds, but cannot expect everyone to achieve this standard unless the requirement is defined using a standardized test. Most industry members agree that a definition to “typically” in terms of a success rate for a given human subject population would create a clearer method of compliance. Furthermore industry contends that crew seats should also be tested for the 10s requirement however test subjects should not need to be naïve since crew are trained for emergency equipment use.]</i>	
53	Ad hoc Industry Group	Page 20, Appendix 1, Table 2	Evaluation of underseat stowage has been omitted.	FAA policy memo PS-AIR100-2003-ARP5526 permits the use of ARP5526 to show compliance	<b>Revise Table 2, Section 3, to include:</b> “3.7.2 Apply as written.”  <b>Remove elective a. from Appendix 2.</b>	Concur and revised accordingly.
54	Ad hoc Industry Group	Page 20 Appendix 1, Table 2, 3.12.2.	Clarification needed that the edge must be both accessible and capable of cutting skin before they need to be evaluated.  Adding “non-injurious” better aligns the TSO with the regulations.  The use of “potential” could be a source of confusion.	Improve understanding	<b>Revise first paragraph to read:</b> “Definition and Criteria: Edges that could cut skin during normal use <b>(including in edges on electrical equipment)</b> should be eliminated and for maintenance should be minimized. <del>Edges that are accessible (as defined in section 3.11.2.1) during normal use shall meet:</del> <b>To be considered non-injurious, edges that are accessible (as defined in section 3.11.2.1) and could cut skin during normal use shall meet either of the standards listed below:</b> ”  <b>Revise last paragraph to read:</b> “In addition, the seat should not have any feature whose edges or corners are exposed when deployed, that presents a <del>potential to impede</del> <b>an impediment</b> to an occupant’s egress (e.g., cocktail table, seat back and in-arm video, flipout PCU, ashtray, etc.)”	Concur and modified as proposed.
55	Ad hoc Industry Group	Page 20, Appendix 1, Table 2, 3.13.2	Figure 14 in the ARP shows the 35 inch arc projected from the centreline of the armrests, FAA policy memo ANM-02-115-15 changes this to the inside face of the armrest – the figure should be revised to match the policy memo wording.	Policy memo defines a more recent standard to the ARP.	<b>Revise figure to match policy memo definitions.</b>	The ARP reflects the current guidance that is in AC 25-17A. For the specific case of offset armrests delethalization, AC 25-17A has incorporated policy memo ANM-02-115-15. The headstrike sideward limits of arm rest centerline is current and correct with the exception of evaluating offset armrests per the AC method, where the limit is defined as the inside of the armrest. Also, if in the §25.562 test the arm rest is contacted then the HIC must still be addressed. No change will be made.

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56	Ad hoc Industry Group	Page 20, Appendix 1, Table 2, 3.20.2	Clarification is required that a restraint system found compliant under this TSO MPS for the range of occupants specified in this section also meets the requirements for aircraft installation.		<p><b>Revise to add the following text to the end of 3.20.2:</b>            For Type A seats incorporating non-symmetrical upper torso restraint systems (e.g. a single diagonal shoulder belt) shall use the guidance presented in AC25.785-1b and in AC21-34 to position the shoulder harness upper attachment.</p>	The installation policy and guidance for Type A seats with upper torso restraints are more specific and detailed than the general statement made in the ARP. To add the recommended new TSO requirement would be a significant change and would require another opportunity for the public to comment. We will consider the recommendation for future revisions of the TSO. Currently, the TSO does not address in detail the 14 CFR part 25 installation requirements for unique restraint installations such as the diagonal shoulder harness, or the 'Y-belt'. No change will be made.
57		Page 20, Appendix 1, Table 2, B.1.1.24 & B.1.1.25	The inclusion of these sections from ARP5526 introduce poorly defined requirements into the TSO MPS.	Better definition can be obtained by using the wording proposed by the Streamlining Team in 2006 in response to the original draft of TSO-C127b. The relevant recommendations from "Recommendations on TSO Approval for Mechanical Aspects of Seat Mounted Electrical Equipment Installation" are included here. They have been updated to reflect the latest release of the referenced documents.	<p><i>For ease of presentation, this comment is split into multiple lines 40(a) through (e) as well as this line.</i></p> <p><b>Replace text of B.1.1.24 and B.1.1.25 with the following text:</b></p> <p>This section prescribes MPS for ARINC Specification 628, Part 5, Supplement 1 &amp; 2, "Cabin Electrical Equipment and Wiring Installation Guidelines" dated June 2011.</p> <p>When the referenced ARINC Specification uses "should", or makes a recommendation, it shall be read as a requirement so that it becomes a MPS of this TSO.</p> <p>When a section of the ARINC Specification is listed, its subsections are included unless specifically excluded (e.g. 4.1.3 includes 4.1.3.3).</p> <p>Items contained within the "Commentary" sections of the ARINC Specification do not define MPS of this TSO.</p> <p><i>See comments 40 (a) through (e) below for more recommended text under this comment.</i></p>	<p>Partially Concur: Although these requirements address many important facets of electrical equipment and wiring design, these requirements are not defined in the current version of ARP5526C and would be a major change to the TSO MPS. Therefore the proposed design standard definition should be evaluated for future revisions to TSO-C127.</p> <p>The comment indicated that requirements B.1.1.24 and B.1.1.25 are poorly defined criteria. The intent of the TSO is to have clearly defined performance standards. Therefore B.1.1.24 and B.1.1.25 shall be removed from TSO-C127b.</p>
58		Page 20, Appendix 1, Table 2, B.1.1.24 & B.1.1.25	See comment 40 above	See comment 40 above	<p><b>Electronic Equipment Protection</b>            Seat installations shall be designed to protect susceptible electrical equipment from liquid contaminates by the use of drip shields, drip loops or other design features as appropriate. All seat areas above the seat pan shall be considered spillage zones where liquid could be spilled on a seat. Any path the liquid could be spilled on or flow to shall be considered when protecting susceptible equipment – including the area around each seat cushion, gaps between seats, gaps created during seat transition, arm rest areas that open for video monitors, etc. Seat cushions may be used as a drip shield if they prevent moisture from flowing through the cushion. The drip</p>	See disposition to comment #57

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					<p>loops shall prevent liquid from tracking into connectors via wire cable path by having the lowest part of the loop a minimum of one cable width below the lowest part of the connector. Designs shall meet the guidelines of ARINC Specification 628, Part 5, Supplement 1 &amp; 2, Sections 4.4.1.2, 4.4.1.5, 4.4.1.9 and 4.4.1.11 (a, b &amp; c).</p> <p>Note: Compliance to the above design requirements may be shown on the applicable electrical installation drawing. No testing is necessary.</p>	
59		Page 20, Appendix 1, Table 2, B.1.1.24 & B.1.1.25	See comment 40 above	See comment 40 above	<p><b><u>Wire Routing and Equipment Installation Design</u></b>  Wiring and equipment installations, e.g. equipment mounting, minimum bend radius for cable/wire, wire separation, stowage of extra cable length, cable/wire routing, connector pre-load, protection of equipment and cable/wire, cable/wire clamping, cable/wire slack, cable tie spacing, etc. shall be designed to meet the requirements of the following Sections of ARINC 628, Part 5, Supplement 1 &amp; 2:</p> <p>4.1.2 Minimum Cable Bend Radius  Cable bend radius shall meet the requirement of ARINC 628 Part 5, Supplement 1 &amp; 2, section 4.1.2</p> <p>4.1.3 Wiring and Cable Installation Guidelines  Exclude 4.1.3.1 Bundling</p> <p>4.1.3.2 Bundle to Bundle Separation</p> <p>4.1.3.3 Protection from Hazards and Damage (Wiring)</p> <p>4.4.1.1 Mounting  Mounting of equipment shall meet the requirement of ARINC 628 Part 5, Supplement 1 &amp; 2, section 4.4.1.1. Method of equipment attachment shall be shown on the supplier's electrical installation drawing. Seat supplier shall coordinate with equipment manufacturer/supplier to ensure that equipment specific installation requirements are met.</p> <p>4.4.1.6 Protection From Hazards and Damage</p> <p>4.4.1.7 Cables Subject to Flexing</p> <p>4.4.1.8 Wire Bundle Routing</p> <p>4.4.1.8.1 Routing</p> <p>4.4.1.8.2 Configuration Repeatability</p> <p>4.4.1.9 Slack</p> <p>4.4.1.10 Stowage of Extra Length</p> <p>4.4.1.11 Connector Retention and Protection</p>	See disposition to comment #57

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					<p>Shall meet the requirements of ARINC 628 Part 5, Supplement 1 &amp; 2, 4.4.1.11 (d) except excludes: Alternatively...or when equipment is installed as provisions. Add: For high voltage applications, a dummy receptacle or a protective cap that is mechanically retained must be used for all uncoupled or unused connectors. For other applications, snug fitting protective caps/covers shall be used.</p> <p>4.4.1.11.1 Connector Attachments With the following exceptions: Under Section 4.4.1.11.1 of ARINC 628, Part 5, Supplement 1 &amp; 2, replace the first sentence with the following: "One half of a mated connector shall be positively secured to seat structure wherever possible."</p> <p>Also add: Method of connector attachment to structure shall be shown on the electrical installation drawing. Seat supplier shall coordinate with equipment manufacturer/supplier to ensure that connector specific installation requirements are met. Connectors shall not be in direct contact with structure. Connectors shall be secured using spacers, standoffs or brackets.</p> <p>4.4.1.12 Clamps and Supports ...Shall meet the requirements of ARINC 628 Part 5, Supplement 1 &amp; 2, 4.4.1.12 with the following exceptions:</p> <p>4.4.1.12 Change the last paragraph (use of adhesives) to read as follows: Glue-on supports should use glues or adhesives which will perform their intended function for the life of the installation under typical foreseeable operating conditions <del>and have been designated as acceptable for such use by the intended airframer/seat installer.</del></p> <p>Cables shall be secured to structure via clamps per ARINC 628 Part 5, Supplement 1 &amp; 2, section 4.4.1.12 Method of attachment to structure shall be shown on the electrical installation drawing. Clamps shall be secured to seat structure at interval of eight inches (200mm) maximum except at bends, breakouts, or locations where cables are adjacent to moving parts. For cushion clamp applications, only fully enclosed loop cushions are acceptable. Split-backed cushion clamps are not allowed.</p>	

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					<p>4.4.1.13 Cable Ties Shall meet the requirements as described in ARINC 628 Part 5, Supplement 1 &amp; 2, 4.4.1.13 with following exceptions: Add: "Hook and loop fasteners shall not be used for wire retention".</p> <p>Note: Compliance to the above design requirements may be shown on the applicable electrical installation drawing. No testing is necessary.</p>	
60		Page 20, Appendix 1, Table 2, B.1.1.24 & B.1.1.25	See comment 40 above	See comment 40 above	<p><b><u>Prevention of Access to Electrical Components</u></b> Accessibility to electrical items not intended for direct passenger use (e.g., an underseat electrical box) shall be limited by enclosure in shrouds. Any shroud hole size shall be limited to a maximum of ¼ inch diameter or a slot which is a maximum of ¼ inch wide. <del>Any variation from these requirements shall require coordination with the airframe manufacturer / installer.</del> Any access limitations shall incorporate a design which takes into consideration moveable parts (e.g. a leg rest which moves shall not provide access to electrical components). Protective shrouds shall require use of a tool to open. Hook and loop fasteners are prohibited as the sole means of shroud retention. Designs shall meet the guidelines of ARINC Specification 628, Part 5, Supplement 1 &amp; 2, Sections 4.4.1.2 and 4.4.1.8.1 (a), (b), (c) and (d).</p>	See disposition to comment #57
61		Page 20, Appendix 1, Table 2, B.1.1.24 & B.1.1.25	See comment 40 above	See comment 40 above	<p><b><u>Electrical Component Ventilation</u></b> For heat dissipation of electrical components, designs shall meet, or <del>if dictated by electrical component OEM requirements,</del> exceed the guidelines in ARINC Specification 628, Part 5, Supplement 1 &amp; 2, Section 4.4.1.3</p>	See disposition to comment #57
62		Page 20, Appendix 1, Table 2, B.1.1.24 & B.1.1.25	See comment 40 above	See comment 40 above	<p><b><u>Bonding and Grounding</u></b> All conductive housings (not LRUs) in proximity to wiring or equipment containing potentially hazardous voltages (see note below) shall be grounded to a ground connection located on the seat or use an acceptable alternate protective scheme (such as isolation or sleeving).</p> <p>Note: Installers may have varying standards for "potentially hazardous voltages" and means of grounding. Seat manufacturers may choose the most conservative approach to maximize observance of a range of such standards. Means of compliance to this minimum performance standard shall be stated in the seat TSO Installation and Limitations document.</p>	See disposition to comment #57

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63	Ad hoc Industry Group	Page 20, Appendix 1, Table 2, B.1.1.28	The force required to right seat back is not compatible with other requirements.	<p>This paragraph of the ARP5526C (B.1.1.28) is worded specifically to address installation specific issues for seats located near emergency routes in the airplane, <i>"Where seat recline could adversely effect emergency evacuation [...]"</i>. It is highly impractical to force such a requirement on all seats when it only needs to apply only to a small number of seats designed for specific interior configuration locations and remain the responsibility of the installer.</p> <p>This 15 lbs value also conflicts with the elective MPS listed in Appendix 2, section d. It is impossible to meet, the handhold for the back to withstand <b>25 lbs</b> of force before moving (<i>"[...] A seat back used as a handhold should not break over when a force of 111 N (25 pounds) in a direction perpendicular to the seat back is applied at the top center of the seat back."</i>).</p> <p>Requiring a force of <b>35 lbs</b> is more appropriate and will not conflict with the "Handhold elective requirement. This 35 lbs</p>	<p><b>Revise text of B1.1.28 as follows:</b>  <i>"...exerting a force not greater than <del>67N (15lb)</del> 155 N (35lb) near the top of the seat back."</i></p>	<p>Partially-Concur: Changing from 15 to 35 lbs is not conservative in an egress situation. However we understand the concern in applying the 15 pound requirement to all seats. Therefore the TSO will require an override feature, but not specify a required force. The override force requirements will need to be evaluated at installation for compliance to the airworthiness regulations. B.1.1.28 will be revised to state:</p> <p><i>Where seat recline could adversely affect emergency evacuation, passenger seat recline and control mechanisms should have an override feature so that the reclined seat back may be moved to the upright position without releasing the recline control button.</i></p>

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				value is already a force deemed “non-excessive” in dealing with seat features such as the force acceptable to restore a back post test before measuring C/B (dynamic testing – Ref. AC25.562-1B), or the force acceptable to restore a video monitor after an abuse load (per ARP5475, this method has been deemed acceptable by the FAA for IVS testing).		
64	Ad hoc Industry Group	Page 21, Appendix 2, e.	The minimum performance standards should be listed and must at least be as stringent as the Special Conditions currently in place for Heat Release and Smoke Density so that seat TSO approval can be used by installers to show compliance to the Special Conditions currently imposed on seats. Leaving the wording as currently written means that the installer must review all of the heat release and smoke density data for applicability to the existing Special Conditions. Therefore the approval of the Heat Release and Smoke density testing required to install a seat will still be the responsibility of the installer.	Aligning the proposed wording with the language used in the Special Conditions for Seats with Non-Traditional Large, Non-Metallic Panels would enhance the clarity and understanding of this section and limit the potential for confusion regarding how to show compliance to this section.  Confusion may exist regarding whether or not compliance to this section under the TSO satisfies the installation requirement for the seat to meet Appendix F, parts IV and V as prescribed by the Special Conditions for Seats. Adding wording that	<b><u>Replace proposed wording with:</u></b>  “ <b>Flammability – Non-traditional, large, exposed, Non-metallic Panels:</b> For Type A seats incorporating large non-metallic panels in their design, test and meet the fire protection provisions of Appendix F, parts IV and part V (heat release and smoke emission) of 14 CFR part 25, effective September 26, 1988. <del>In addition, you must report which parts were tested and meet the requirements of Appendix F, parts IV and part V as part of your Furnished Data Requirements in paragraph 7 of this TSO.</del> A seat may consist of non-traditional, traditional, and exempted exposed panels. Only non-traditional exposed panels need to be evaluated to Appendix F, parts IV and V. SAE ARP 6199 rev. New shall be utilized to determine which parts are non-traditional. TSO Applicant may designate up to and including 1.5 square feet of non-traditional, non-metallic panel material per seat place that does not have to comply with these requirements. For instance, a triple seat assembly may have a total of 4.5 square feet excluded on any portion of the assembly (e.g., outboard seat place 1 square foot, middle 1 square foot, and inboard 2.5 square feet).  This showing of compliance to Appendix F, parts IV and part V (heat release and smoke emission) of 14 CFR part 25 under this elective MPS satisfies the installation requirement of the OEM or Installer as applied by Special Conditions for Seats With Non-Traditional, Large, Non-Metallic Panels.	Partially-Concur. The TSO-C127b language balances current requirements with future rulemaking. The heat release and smoke emission part 25 requirements are evaluated at the aircraft level for each interior configuration and not at the individual article level. The TSO-C127b standard is written in a way that allows for the collection of TSO approved data that the installer may utilize to support finding compliance for a particular installation. It is anticipated that the installer and TSO holder may communicate expectations for installation compliance such that the appropriate parts are tested and approved under the TSO/LODA Authorization. Furthermore, TSO-C127b has the flexibility that will permit better alignment with future rulemaking requirements per the ARAC Recommendation from the Materials Flammability Working Group.  We agree that this information must be identified in the installation instructions and limitations, and we believe that this is already accomplished by requiring for it to be submitted as part of the required Furnished Data Requirements of paragraph 7 which in turn references sections 5.a for the installation instructions and limitations. Furthermore, we do agree that the use of PS-ANM-25.853-01-R2 should be allowed to simplify substantiation. The requirement is revised accordingly:  e. Flammability –Large Exposed Non-metallic

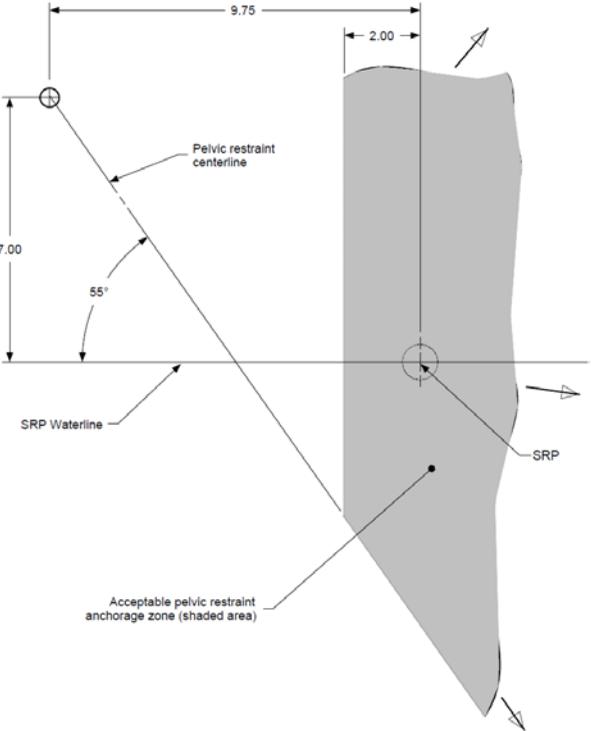
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				<p>clearly indicates the applicant's showing of compliance for heat release and smoke density with Appendix F, parts IV and V satisfies all the applicable installation requirements of OEM or Installer as defined by Special Conditions for Seats With Non-Traditional, Large, Non-Metallic Panels would eliminate any such confusion.</p> <p>No clear process is defined in this draft TSO by which the TSO applicant is to notify the installer that they have elected to show compliance with Appendix 2 paragraph e under the TSO. Further, the draft wording does not require the TSO requester to identify which method was used to find compliance to Appendix F, parts IV and part V (heat release and smoke emission) of 14 CFR part 25.</p> <p>Finally, the draft wording makes no reference to ARP6199 and FAA Policy Memo PS-ANM-25.853-01 as being applicable to this</p>	<p>If electing to comply with this section of the TSO, the TSO application letter shall clearly indicate that the compliance to Appendix F, parts IV and part V (heat release and smoke emission) of 14 CFR part 25, effective September 26, 1988 has been demonstrated under the TSO. The method used to comply with Appendix F, parts IV and part V (heat release and smoke emission) of 14 CFR part 25, effective September 26, 1988 shall be identified on the TSO application letter.</p> <p>FAA Policy Memo PS-ANM-25.853-01 may be utilized when showing compliance with Appendix F, parts IV and part V (heat release and smoke emission) of 14 CFR part 25, effective September 26, 1988.</p> <p>In addition, you must note in the Installation Instructions and Limitations that the seat meets this elective requirement."</p>	<p>Parts: For Type A seats incorporating large non-metallic panels in their design, test and meet the fire protection provisions of Appendix F, parts IV and part V (heat release and smoke emission) of 14 CFR part 25, effective September 26, 1988. You may demonstrate the material's fire protection properties using the methods provided in the FAA policy statement, PS-ANM-25.853-01-R2, Flammability Testing of Interior Materials, which may permit substantiation based on previously tested materials. In addition, you must report which parts meet the requirements of Appendix F, parts IV and part V as part of your Furnished Data Requirements in paragraph 7 of this TSO.</p>

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				elective requirement.		
65	Martin-Baker Aircraft Company Ltd (MBA)	Pg.2 Para 3.a.2 (Seat Subtype)	"Seat Subtype" not defined for <u>each</u> Seat Type <u>and</u> Applicable Aircraft Category.	<p>Seat subtype classification seems to be aimed at Commercial Airliner seating and does not fully consider other uses.</p> <p>Certifying a seat to a particular sub type could cause issues with the proposed TSO-C127b labeling method. Situations could arise where seats installed in aircraft could be desired to be used in roles that their qualification allows but labeling does not as it is restricted by a 'sub type'. E.g. A utility seat installed in a coast guard helicopter could be used in an observer, passenger or even a flight attendant 'role'. How does the sub-type classification allow for this?</p>	<p>Provide definitions of each seat Subtype.</p> <p>Confirm how seats that can be used across multiple subtypes can be dealt with.</p> <p>E.g. Through labeling?</p>	Partially-Concur. No definition will be given to each subtype. In general the classification categories are tied to specific MPS defined within the standard. Therefore, if the MPS are fully met for multiple "seat subtype" classifications, then they may accordingly be marked as such (see the disposition to comment # 66). It is the responsibility of the installer to evaluate what MPS were complied with under the TSO and evaluate the applicability of the MPS for the specific installation in which the seat is intended to be used.
66	MBA	Pg.3 Para 4.a.1.d	The marking guidance only allows for a seat to face forward or rearward. Wording does not allow for both options.	A seat can be qualified to face in both forward and rearward facing directions.	<p>Amend wording to add and define convention for marking a seat that can face forward and rearward i.e.</p> <p><i>"The subtype shall be followed by the appropriate seat facing designation, use: "FF" for Forward Facing, "RF" for Rearward Facing" or "FF/RF" for Forward and Rearward Facing."</i></p>	<p>Concur – The wording in the TSO already allows for this scenario. The example in paragraph 4 (a)(1) shall be revised to show explicitly document this scenario to state:</p> <p><i>For example a transport airplane passenger seat that is forward facing, rearward facing, meets the step load on the baggage bar standard, and meets higher static loads shall be marked as: Type A-T-1-FF-RF-a-c.</i></p>

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67	MBA	Pg. 9 Appendix 1, table 1, "Page 10 subsection 3.4.1"	<p>The TSO LODA application process needs to be considered.</p>	<p>Current LODA applications are submitted to the FAA at the end of the work phase.</p> <p>For LODA applications, would ACO Boston have to be consulted upfront in the application process, either directly with the applicant or through EASA? If so, the potential impact this would cause on processing time has to be considered so LODA applicants are not unfairly affected in terms of processing time.</p>	<p>For LODA applications, delegate advance approval to EASA or appropriate CAA.</p>	<p>Partial-Concur:</p> <p>The FAA is currently considering policy and changes to bilateral agreements to streamline LODA processing. All interactions requiring ACO approval shall be handled in accordance with the applicable bilateral agreements.</p>
68	PAC Seating Systems		<p>We Urge you to incorporate the comment that was corrected under SAE 8049C into the TSO127b, to alleviate a tremendous industry hassle that have been going through since 2007 because of the interpretation of paragraph. 3.2.6 of the SAE 8049 A/B.</p> <p>I am sure all seat vendors will second my request.</p> <p>Use wording from ARD 6481:</p> <p>"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</p>			<p>Non-Concur. See comment resolution to comment #4.</p>

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			<p>occupant to the positions required for taxi, takeoff and landing without release of occupant restraints. For seats with a conversion feature (e.g., berthable divans, full lie-flat seats, etc.) that require the release of the occupant restraints to return the seat to the taxi, takeoff and landing position, restraints may be released to use these features to return the seat to the taxi, takeoff and landing configuration.”</p>			
69	BAE Systems, Phoenix, AZ	Pg 8, paragraph 3.2.15	<p>Issue 1. This is a design requirement, as opposed to a performance requirement. The pelvic restraint performance is defined elsewhere.</p>	<p>The stated requirement is a design requirement rather than a performance requirement and as a design requirement it is not complete. For example, the draft requirement would allow an angle of 0 degrees or even less between the SRP waterline and the lap belt centerline. This design would meet the requirement as written, but not the intent because it would place the load path through the abdomen rather than through the pelvic bone structure. Furthermore, design requirements can limit innovation. There may be superior restraint systems that do not meet the specified anchorage zone limitation.</p>	<p>Remove the requirement and replace with a performance based requirement.</p>	<p>Partially-Concur. While the FAA does not intend to limit innovation, the design criteria defined in this standard is a simplification over a broader performance requirement. To support innovation in design, the intent of the design criteria is summarized here such that it can be used as a basis for an equivalent level of safety justification for a deviation. The original purpose of defining belt geometry was to increase the likelihood that during an impact the belt system will bear on the portions of the occupant’s body that is supported by the skeleton, thus reducing the chance of injury for a range of occupants. Specifically, the lap belt should bear on the ilium (pelvis) below the iliospinale point, and shoulder strap(s) should bear on the clavicle. The original source of the proposed requirements is the Army Aircraft Crash Survival Design Guide. The guidance in that document reflects the conclusions reached concerning the effect of belt geometry on restraint effectiveness observed during many crash investigations and impact tests. Following these design requirements can significantly improve the chance that the belts will be effective. A performance based requirement that provided the same likelihood of restraint effectiveness, may require impact tests with a variety of occupant sizes.</p> <p>Existing FAA guidance concerning belt anchor geometry is also contained in AC 21-34. This AC provides the reasoning behind the specified geometry guidance which could be referenced as a basis for demonstrating an</p>

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						<p>equivalent level of safety if an applicant requests a deviation to the specific requirements.</p> <hr/> <p>Furthermore, we do agree that a 0 degree belt angle does not meet the intent of this requirement and is not consistent with FAA guidance, such as AC 21-34 and AC 25-17A. Therefore the 3.2.15 will be modified accordingly:</p> <p>Except for rearward facing seats <i>and seats equipped with multiple anchorage point pelvic restraints (e.g. Y-belts)</i>, the pelvic restraint system shall be designed such that the vertical angle between the pelvic restraint centerline and the seat reference point (SRP) waterline shall range from 35° to 55°. The SRP water line is a line/plane passing through the SRP parallel to the floor waterline. The pelvic restraint centerline is formed by a line from the pelvic restraint anchorage to a point located 250 mm (9.75 in) forward of the SRP and 180 mm (7.0 in) above the SRP water line. <i>In addition, the pelvic restraint anchorage point(s) must be located no further than 2.0 inches forward of the SRP (ref Figure 1A). See AC 21-34 for additional guidance for acceptable seat belt geometry.</i></p>
70	BAE Systems, Phoenix, AZ	Pg 8, paragraph 3.2.15	Issue 2. The definition of the acceptable pelvic restraint anchorage zone is unclear	Term “vertical angle subtended..” is unclear	Show figure, plus change wording to something more common, such as “the angle between the pelvic restraint centerline and the SRP waterline shall...”	Partially concur. The proposed language has been added to 3.2.15 per comment #69 to make the requirement more clear.
71	BAE Systems, Phoenix, AZ	Pg 8, paragraph 3.2.15	Issue 3. Unclear how to evaluate pelvic restraints with multiple anchorage points.	Dual anchorage point pelvic restraints are commonly used. Is the intent to disallow multiple anchorage point pelvic restraints?	Remove requirement	Concur - pelvic restraints with multiple anchorage points are not adequately addressed by this requirement and therefore have been excluded from this requirement. While this does not preclude the use of such a restraint type in a TSO, additional substantiation may be required for installation acceptability. See disposition to comment #69.

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72	BAE Systems, Phoenix, AZ	Pg 8, paragraph 3.2.15	Issue 4. The pelvic anchorage zone as we understand the definition is quite large, and therefore not meaningful. See figure to the right which shows the acceptable anchorage zone as we interpret it.			<p>Non-concur: The restraint zone pictured is not the intended restraint geometry. The pelvic restrain centerline is not intended to have a negative(down) angle.</p> <p>See comment #69 for clarification</p>
73	BAE Systems, Phoenix, AZ	SAE 8049B pg 10, paragraph 3.3.3	Requirement precludes use of magnesium alloys	New magnesium alloys are being developed which address past issues.	Delete requirement, or add specific performance limitations on magnesium alloys	Non-Concur. The FAA is continuing research into the potential use of magnesium alloys in seats. If you would like to use magnesium alloys in seats you may demonstrate an equivalent level of safety to the TSO MPS and request a TSO deviation.
74	Embraer	Page 9, Appendix 1, Table 1, Section 3	<p>3.2.18 <i>Design seat stowage compartments to prevent the contents becoming..</i></p> <p>Embraer believes this subsection should provide additional information as MPS.</p> <p>Correlation to 14 CFR 25.787, AC 25.17A and AC 25.785B would direct dual latching solution.</p>			Non-Concur. This is a general requirement and should be applicable to all aircraft types.

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75	Embraer	Page 9, Appendix 1, Table 1. Section 3	<p><i>3.4.1 Test the materials in Type A and Type B Transport Rotorcraft seating systems..</i></p> <p><u>First paragraph:</u></p> <p>Embraer would like to comment that in first paragraph, first sentence is mentioning the following sentence: "<i>Test the materials in Type A and Type B Transport Rotorcraft seating systems..</i>" This sentence shall be changed to: "<i>Test the materials in Type A Transport Airplane and Type B Transport Rotorcraft seating systems...</i>"</p>			Concur. See comment # 40
76	Embraer	Page 9, Appendix 1, Table 1. Section 3	Embraer also believes the reference to 14 CFR part 25 Appendix F, Part 1, paragraph (a)(1) shall be completed with " <b>(ii)</b> " that is related to the vertical 12 seconds test.			Non-concur. This recommendation would be over and above the intended requirements of Appendix F. As certain materials, such as seat belts, are subject to horizontal burn requirements as defined in paragraph (a)(1)(iv).
77	Embraer	Page 9, Appendix 1, Table 1. Section 3	<p><i>3.4.1 Test the materials in Type A and Type B Transport Rotorcraft seating systems..</i></p> <p><u>Second Paragraph:</u></p> <p>The TSO states that "<i>Materials in Normal, Utility and Acrobatic category Type C seating systems must have</i></p>			<p>Non-Concur</p> <p>The definition of "flame resistant" is defined in 14 CFR, Part 1.1 <i>General definitions.</i></p>

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			<p><i>flame-resistant properties as defined in 14 CFR part 1".</i></p> <p>Embraer recommends FAA should revise the sentence to say: "<i>Materials in Normal, Utility and Acrobatic category Type C seating systems must have flame-resistant properties as defined in 14 CFR part 23".</i></p>			
78	Embraer	Page 9, Appendix 1, Table 1. Section 3	<p><i>3.4.1 Test the materials in Type A and Type B Transport Rotorcraft seating systems.. .</i></p> <p><u>Second Paragraph:</u></p> <p>Embraer also believes the reference to 14 CFR § 23.853 (d)(3) shall be completed with "<b>(ii)</b>"th at is related to the vertical 12 seconds test.</p>			Non-Concur. The same rational applies as described for a similar comment to Part 25 Appendix F in Comment #76.
79	Embraer	Page 9, Appendix 1, Table 1. Section 3	<p><i>3.4.1 Test the materials in Type A and Type B Transport Rotorcraft seating systems.. .</i></p> <p><u>Third Paragraph:</u></p> <p>The TSO states that "<i>Materials in Type B Normal Rotorcraft seating systems must have flame-resistant properties as defined in 14 CFR part</i></p>			Non-concur. The definition of "flame resistant" is defined in 14 CFR, Part 1.1 <i>General definitions</i> .

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			<p>1". Embraer recommends FAA should revise the sentence to say:  <i>"Materials in Type B Normal Rotorcraft seating systems must have flame-resistant properties as defined in 14 CFR part 27".</i></p>			
80	Embraer	Page 9, Appendix 1, Table 1. Section 3	<p><i>3.4.1 Test the materials in Type A and Type B Transport Rotorcraft seating systems.. .</i></p> <p><u>Third Paragraph:</u></p> <p>Embraer also believes the last sentence of this paragraph shall be changed to use the same wording referring to the FAA Police Memo - PS-ANM 25.853-01 (same sentence used on 3.4.1 - first paragraph).</p>			Non-Concur. Type B <u>Normal</u> Rotorcraft seat requirements are intended to align with Part 27 requirements. Policy Statement PS-ANM 25.853-01 is intended to clarify requirements for meeting 14CFR, part 25 Appendix F, and hence is not applicable to this type of seat.
81	Embraer	<b>Page 10, Appendix 1, Table 1, Section 3</b>	<p>Embraer recommends the item provided below be included in <i>"Table 1- SAE AS8049B"</i> as exception.</p> <p><i>3.5.7 Deployable Items</i></p> <p>This subsection should provide additional information regarding acceptance criteria for food tray deployment as result of ATD head contact during a row-to-row dynamic</p>			See Comment #43.

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			<p>testing. In addition, it is unclear how to evaluate deployable items latch condition after testing. How would food tray latch be evaluated if broken as a result of ATD head contact during a row-to-row dynamic testing but food tray remains undeployed?</p>			
82	Embraer	Page 10, Appendix 1, Table 1, Section 3	<p>Page 10, replace subsection 3.4.2 to read as follows:</p> <p>Embraer would like to comment that the sentence is mentioning "<i>Type A and Type B Transport Rotorcraft</i>". Embraer recommends this sentence should be revised to say: "<i>Type A Transport Airplane and Type 13 Transport Rotorcraft</i>..."</p>			Partially concur – see comment #40
83	Embraer	Page 18, Appendix 1, Table 2, Section 3	<p>3.3.2 <i>Definition and Criteria</i> . . .</p> <p>Embraer would like to comment this subsection should also provide correlation with 14 CFR 25.795(c)(3)(iii) regarding life preservers or their storage locations be designed so that tampering is evident.</p>			Partially concur – although it would be beneficial to include a requirement for life preserver tamper evidence to the TSO. However, at this time there is no accepted standard criteria for meeting this requirement.

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84	Embraer	Page 18, Appendix 1, Table 2, Section 3	<p>3.3.2 <i>Definition and Criteria</i>. . .</p> <p>Embraer also believes that for under seat storage, life preserver retrieval should also be evaluated considering it is limited by passenger carry-on baggage for under seat stowage. The maximum baggage size that fits under the seat should be used to evaluate life preserver retrieval.</p>			Partially Concur – However, this would be a new requirement and will be considered for future revisions.
85	Embraer		In addition, Embraer would like to say there is no acceptance criteria for a restraint system deformation (buckle deformation) after Dynamic Testing.			<p>Concur – In section 5.3.9.11 Seat Deformation added requirement:</p> <p><i>Safety belt restraint systems must not yield to the extent they would impede rapid evacuation of the occupant.</i></p>