SURFACE VEHICLE RECOMMENDED PRACTICE

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Superseding J3026 NOV2016

Ambulance Patient Compartment Seating Integrity and Occupant Restraint

RATIONALE

This revision updates the ATD requirements to clarify the option to use the Hybrid III ATD in place of the ES-2re for side impact testing. This revision also deletes a note previously found below paragraph 4.3.3.2 discussing this same issue.

1. SCOPE

This SAE Recommended Practice describes the testing procedures that may be used to evaluate the integrity of ground ambulance-based occupant seating and occupant restraint systems for workers and civilians transported in the patient compartment of an ambulance when exposed to a frontal or side impact. This recommended practice was based on ambulance patient compartment dynamics and is not applicable to other vehicle applications or seating positions. This recommended practice is structured to accommodate seating systems installed in multiple attitudes including, but not limited to, side-facing, rear-facing, and forward-facing. Its purpose is to provide ambulance seating manufacturers, ambulance occupant restraint manufacturers, ambulance builders, and end users with testing procedures and, where appropriate, acceptance criteria that, to a great extent, ensures the occupant seating and occupant restraint system meet similar performance criteria as FMVSS 208 requires for seat belted passengers in light vehicles. The test conditions utilized are standardized orientations that do not reflect potential conditions that may exist prior to impact such as braking and/or steering and their effects on the initial positions of the occupants and surfaces relative to the occupants. Descriptions of the test setup, test instrumentation, photographic/video coverage, text fixture, and performance metrics are included.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), www.sae.org.

SAE J211-1 Instrumentation for Impact Test - Part 1: Electronic Instrumentation

SAE J211-2 Instrumentation for Impact Test - Part 2: Photographic Instrumentation

SAE J2856 User's Manual for the 50th Percentile Hybrid III Test Dummy

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SAE J2917 Occupant Restraint and Equipment Mounting Integrity - Frontal Impact Ambulance Patient Compartment

SAE J2956 Occupant Restraint and Equipment Mounting Integrity - Side Impact Ambulance Patient Compartment

SAE J3044 Occupant Restraint and Equipment Mounting Integrity - Rear Impact Ambulance Patient Compartment

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Recommended Practice.

2.2.1 Code of Federal Regulations (CFR) Publications

Copies of these documents are available online at www.ecfr.gov.

Code of Federal Regulations, Title 49, Part 571.207

Code of Federal Regulations, Title 49, Part 571.208

Code of Federal Regulations, Title 49, Part 571.209

Code of Federal Regulations, Title 49, Part 571.210

Code of Federal Regulations, Title 49, Part 571.213

Code of Federal Regulations, Title 49, Part 571.214

Code of Federal Regulations, Title 49, Part 572

3. DEFINITIONS

3.1 DESIGNATED SEATING POSITION

As defined in 49 CFR 571.3 and 571.10, as applicable. This also includes any factory-installed built-in child restraint system as defined in 49 CFR 571.213.

3.2 PEDESTAL SEATING SYSTEM

A seating system that has restraint systems integrated into the seat's structure or attached to the seat's pedestal.

3.3 BENCH OR JUMP SEATING SYSTEM

A seating system that is built into, or integrated into, the patient compartment structure and may utilize portions of vehicle wall structure as the seat back. The restraint systems for these seats are attached to the vehicle wall or floor structure, seat base structure, or both, depending upon the restraint system utilized.

3.4 ANTHROPOMORPHIC TEST DEVICE (ATD)

A biofidelic test device which represents a variety of human forms and sizes including men, women, and children. For the purposes of this document, only 50th percentile male ATDs will be used, with a seated hip, to allow the ATD to be positioned properly on each seating system. Specific details regarding these ATDs are provided in 49 CFR Part 572. In the case of an integrated child seating position being tested, the instrumented ATD described in FMVSS 213 used should meet or exceed the maximum weight limits specified for that child seating position by the seat manufacturer for that designated child seating position.

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3.5 RESTRAINT SYSTEM

Any strap, webbing, or similar device designed to secure a person in the patient compartment with the intention of mitigating the results of a collision, including all buckles and other fasteners and all hardware designed for installing the assembly in the ambulance patient compartment. The entirety of the restraint system shall meet the definitions set forth as “Occupant Restraint System” in 49 CFR 571.209.

3.6 FRACTURE

To crack or tear.

3.7 SEAT ADJUSTER

As defined by 49 CFR 571.207, means the part of the seat that provides forward and rearward positioning of the seat bench and back, and/or rotation around a vertical axis, including any fixed portion, such as a seat track.

3.8 SEATING SYSTEM

Any unique combination of a bench, jump, or pedestal seat, restraint system, and seat adjuster which are used as a designated seating position.

3.9 SEAT

A structure that provides at least one designated seating position consisting of a minimum of a seat bench and may also include a back.

3.10 EXTENDED

The seat has been adjusted as far as possible on the seat base in the direction that the seated occupant is facing.

3.11 RETRACTED

The seat has been adjusted as far as possible on the seat base in the direction opposite that to which the seated occupant is facing.

4. REQUIREMENTS

Each patient compartment seating system shall meet the requirements set forth under this recommended practice when tested in accordance with test conditions and procedures outlined in SAE J2917, SAE J2956, and SAE J3044.

4.1 Each seating system shall be tested using one of the two following methods:

4.1.1 If the seat being tested is a pedestal style or single occupant seat unsupported by surrounding structure, it shall be mounted to a rigid sled device in the orientation it will be used in the ambulance utilizing the mounting hardware locations and type(s) (e.g., number and type of fastener) prescribed by its manufacturer. The sled test shall reproduce the crash pulse curves described in SAE J2917, SAE J2956, and SAE J3044.

4.1.2 If the seat being tested is integrated into the ambulance wall or other structural feature(s), the seating system shall be mounted to a rigid sled device in the orientation it will be used in the ambulance using a fixture that will simulate the supporting structure. This fixture shall also include representative structure sufficient to fully attenuate ATD driven loading during performance of the sled test. If the bench seat has multiple designated seating positions, as described in FMVS 210 S4.2.4 (a) and (b), an ATD must be placed in each designated seating position at the same time and tested as a complete seating system. The sled test shall reproduce the crash pulse curves described in SAE J2917, SAE J2956, and SAE J3044.

4.2 The seating system after performing the test may be fractured but must maintain a continuous load path from the ATD, through the restraint system and the seating system structure, to the seating system’s attachment to the sled during the performance of each dynamic test.

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Full document details: SAE J3026-2026 Ambulance Patient Compartment Seating Integrity and Occupant Restraint