



SURFACE VEHICLE RECOMMENDED PRACTICE

J3057™

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Superseding J3057 FEB2017

Ambulance Modular Body Evaluation - Quasi-Static Loading
for Type I and Type III Modular Ambulance Bodies

RATIONALE

This SAE Recommended Practice was developed by members of the SAE Truck Crashworthiness Committee in support of the ambulance industry's need to apply science to the design and testing of the ambulance Modular Body for Type I, Type I-AD, Type III, and Type III-AD bodies. The Recommended Practice was validated collaboratively by industry and government partners through extensive testing funded and managed by the National Institute for Occupational Safety and Health, the Department of Homeland Security and the Ambulance Manufacturers Division of the NTEA. An independent analysis of the testing methodology and resulting data was performed by government and private members of the automotive and commercial vehicle testing community.

SAE J3057 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

This SAE Recommended Practice describes the test procedures for conducting quasi-static modular body strength tests for ambulance applications. Its purpose is to establish recommended test practices which standardize the procedure for Type I and Type III bodies, provide ambulance builders and end-users with testing procedures and, where appropriate, provide acceptance criteria that, to a great extent, ensures the ambulance structure meets the same performance criteria across the industry. Descriptions of the test set-up, test instrumentation, photographic/video coverage, and the test fixtures 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: 877-806-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), 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 J1727 Calculation Guidelines for Impact Testing

SAE J1733 Sign Convention for Vehicle Crash Testing

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For more information on this standard, visit
https://www.sae.org/standards/content/J3057_202302/

Documents

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2.2 Other Publications

ECE R66 Uniform Technical Prescriptions Concerning the Approval of Large Passenger Vehicles with Regard to the Strength of their Superstructure

3. DEFINITIONS

RIGID MOVING BARRIER: A non-deformable barrier in the form of a platen attached to a rolling carriage intended to impart kinetic energy into the Modular Body during the dynamic pre-load test.

DYNAMIC TEST PLATEN: A structurally stiff, flat plate attached to the rigid moving barrier or other device used as a dynamic load input device.

BODY MOUNT: The production component or components used to connect the modular body to OEM chassis frame rails.

MODULAR BODY: A second-unit body installed by a final stage ambulance manufacturer as a patient compartment.

QUASI-STATIC PLATEN: A structurally stiff flat plate, with a length, width and, therefore, overall surface area that exceeds that of the roof and is used to evenly transfer the static test loading to the Modular Body.

CURB WEIGHT: The weight of the complete ambulance; chassis, cab, and body, including full complement of fuel, lubricants, and coolant.

QUASI-STATIC TEST: The quasi-static test applies a uniform force to the roof of the modular body using the quasi-static platen.

SIMULATED FRAME RAILS: A rigid test fixture to which the body mounts are used to attach the modular body.

4. REQUIREMENTS

The modular body strength testing is designed to evaluate the crush resistance, operation of doors, and body mount-to-frame connections in a 90-to-180° rollover accident. The loading is divided into two phases:

1. a dynamic pre-load that simulates the side loading on the roof rail of a modular body as it impacts the ground during a vehicle roll beyond 90°; and
2. a quasi-static roof strength test that simulates the loading on the modular body when the vehicle is inverted.

Both phases are conducted on a modular body attached to the same simulated frame rails using the ambulance manufacturer's body mounts.

To assist with the description of the modular body orientation and direction of motion, an SAE J1733 reference system is shown for the modular body relative to its original orientation on the vehicle. This is illustrated in Figure 1.

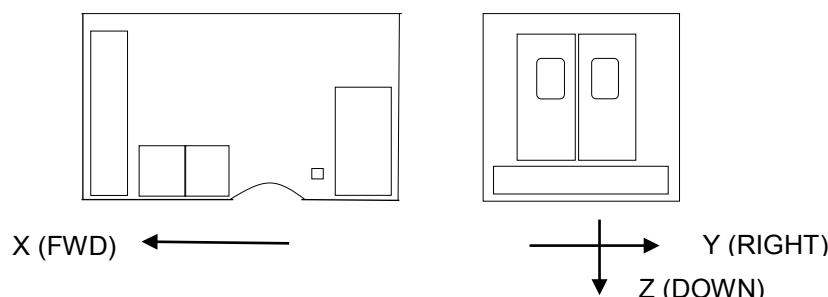


Figure 1 - Reference frame

- 4.1 The dynamic test platen attached to the rigid moving barrier shall be sufficiently rigid to meet the limits described in 7.4.
- 4.2 When under quasi-static loading during the roof crush test, the vertical displacement of the modular body shall not exceed the limits described in 7.5 when measured from ceiling-to-floor along the 4 locations of the body reference points, located at positions representing $25\% \pm 1\%$, and $75\% \pm 1\%$ of the overall length (OAL) and overall width (OAW) of the modular body, as illustrated in Figure 2.

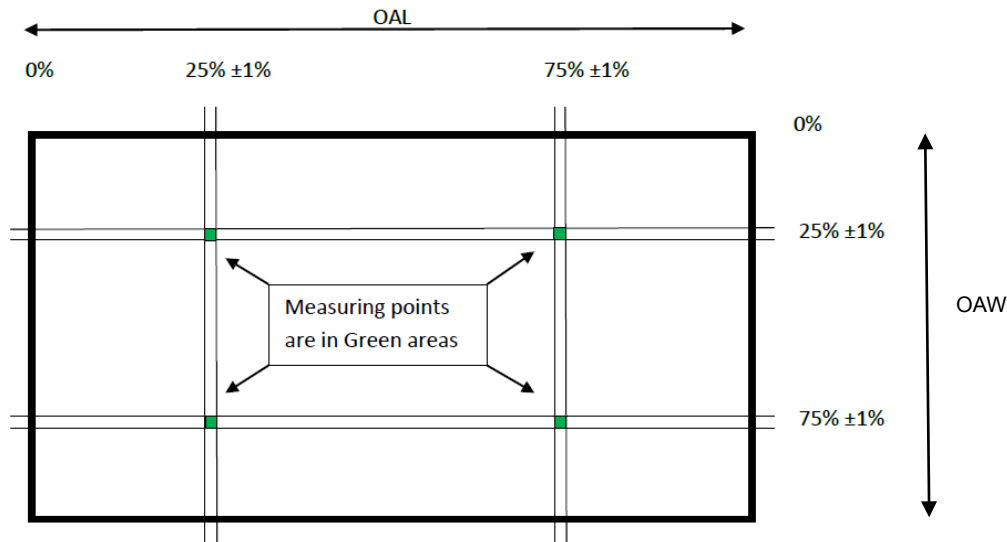


Figure 2 - Location of vertical displacement measurements

5. DYNAMIC PRE-LOAD TEST PROCEDURES

In the dynamic pre-load, the dynamic test platen attached to the rigid moving barrier impacts one side of the modular body, with the modular body mounted at an angle so that the dynamic test platen initially contacts the roof rail of the modular body. This test simulates roof edge impact to ground in a vehicle rollover.

Either side of the modular body may be loaded, depending on whether a driver side or passenger side leading rollover is to be simulated. However, if the modular body or its mounting is not symmetric, such that it may result in a strong or weak side, the weak side of the assembly should be evaluated.

- 5.1 The modular body shall be affixed to the simulated frame rails using the ambulance manufacturer's body mount system.
- 5.2 The simulated frame rails of the test modular body shall be affixed to the ground at a roll angle of $20^\circ \pm 1^\circ$.
- 5.3 The longitudinal axis of the modular body shall be perpendicular to the direction of travel of the dynamic test platen.
- 5.4 The dynamic test platen is oriented vertically.
- 5.5 The pre-load configuration is shown in Figure 3.