The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

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(R) VEHICLE ROOF STRENGTH TEST PROCEDURE

1. Scope—This SAE Recommended Practice establishes a uniform laboratory test method to evaluate the strength characteristics of roof systems. The test procedure is intended to provide reliable and repeatable results and to permit numerical comparisons.

A test is conducted in which the vehicle roof system is loaded under controlled laboratory conditions. Structural strength measurements are obtained under load application angles chosen to concentrate forces on the forward portions of the roof panel and roof supporting structure.

2. References

2.1 Applicable Documents—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J211—Instrumentation for Impact Test

2.2 Related Publications

2.2.1 FEDERAL PUBLICATIONS—Available from Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

FMVSS 216—Roof Crush Resistance—Passenger Cars

3. Test Equipment

3.1 General—The test is conducted in a test laboratory on equipment suitable for applying and measuring required loads and deflections.

3.2 Loading Device—The test load is applied to the roof through a device having a flat rigid surface with minimal dimensions of 1800 × 750 mm (72 × 30 in). The loading device is guided so as to maintain the angles specified in Figure 1 throughout the test. The load application shall be at a rate of not more than 13 mm/s (0.5 in/s) and shall be completed within 120 s. The rate of travel of the loading device shall be essentially constant. Sufficient travel shall be provided to enable the load-deflection characteristics of the structure under test to be defined.

3.3 Instrumentation—The instrumentation data channels shall be adequate to allow the load and deflection to be determined within ±3% of actual load and deflections. For additional information on instrumentation, see SAE J211.

4. Test Procedure

4.1 Body or Vehicle to be Tested—This test may be conducted on a complete vehicle, on a body, or on a body mounted on a chassis frame. Components which may affect load or deformation (such

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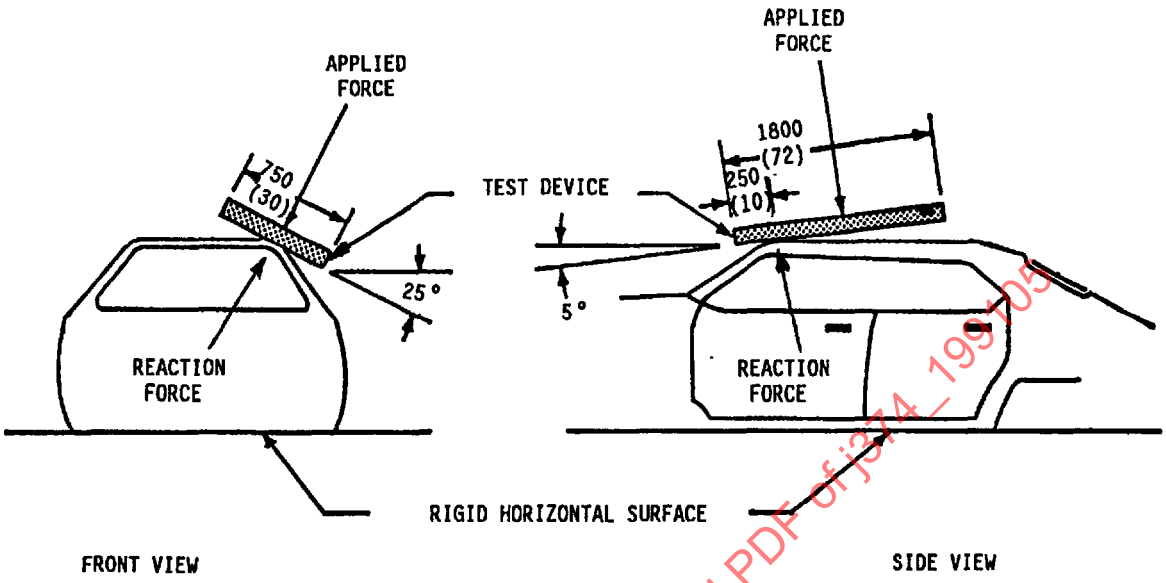

NOTE: DIMENSIONS ARE MM (IN)

FIGURE 1—TEST DEVICE LOCATION AND APPLICATION TO THE ROOF

as doors, roof panels, or fixed glass) may be installed. Movable glass shall be in its closed position. Doors are to be closed and locked.

4.2 Vehicle Support—To assure stability of the body during the test, the complete vehicle (or body) shall be rigidly mounted by placing supports directly beneath the chassis frame, or the body mounts or sills if a chassis frame is not used. The test vehicle need not necessarily be mounted in the horizontal position provided the orientation of the loading device described in 4.3 is maintained.

4.3 Orientation of Loading Device—The plane of the loading device shall be oriented to simulate a vehicle roll angle of 25 degrees ± 1 and a pitch angle of 5 degrees ± 1. (See Figure 1.) For purposes of this test, the bottom of the rocker panels defines the reference plane from which to measure the roll and pitch angles. With the vehicle or body supported as specified in 4.2, apply the test load to either the right or left side roof system normal to the contact surface plane of the loading device.

4.4 Test Measurements—The following measurements shall be recorded to obtain load deflection curves:

a. Load applied to the loading device.

b. Roof deflection as measured by displacement of the loading device relative to the undisturbed body structure in the direction of force application.

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5. Notes

5.1 **Marginal Indicia**—The (R) is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

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