



# Technical Report Preprint

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SOCIETY OF AUTOMOTIVE ENGINEERS, INC.,

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# J921a

## INSTRUMENT PANEL LABORATORY IMPACT TEST PROCEDURE—HEAD AREA—SAE J921a SAE Recommended Practice

Report of Body Engineering Committee approved June 1965 and last revised November 1967.

**1. Scope**—This SAE Recommended Practice describes a laboratory test procedure for evaluating the head impact characteristics of such areas of an automotive instrument panel as may be required to meet impact performance established for the protection of lap-belted front seat occupants.

### 2. References

2.1 Applicable instrument panel performance requirements include their associated definition of "head impact area."

2.2 SAE J984 and SAE J977.

### 3. Items To Be Measured

3.1 The following items shall be measured:

3.1.1 **IMPACT VELOCITY**—The velocity of the headform at the moment of contact with the test specimen.

3.1.2 **ACCELERATION—TIME HISTORY OF THE HEADFORM**—The tangential acceleration-time curve of the axis of symmetry of the headform during the period of contact with the test specimen.

3.1.3 **START OF IMPACT**—An electrical contact shall be placed on the sample such that an indicating mark will register on the record when the headform initially contacts the test specimen.

3.2 Measurement of the following items is optional:

3.2.1 **REBOUND VELOCITY**—The maximum velocity of the headform after it breaks contact with the test specimen.

3.2.2 **DYNAMIC HEADFORM DISPLACEMENT**—The maximum penetration of the headform after initial contact with the test specimen.

**4. Location and Direction of Impact (Fig. 1)**—Within the head impact area, all impacts shall be conducted in accordance with the following procedure:

4.1 *Impact points and headform positioning at these impact points shall be determined considering the applicable instrument panel performance requirements.*

4.2 At impact, the direction of travel of the leading point of the headform shall be:

4.2.1 In side view, perpendicular to a line drawn through the impact point and through a point which is 5 in. horizontally forward and 0.75 in. vertically above the "H" point. (The "H" point is taken from the vehicle package drawing and represents the hip pivot point of the SAE J826 two-dimensional manikin, with the seat in its rearmost design driving or riding position.)

4.2.2 In plan view, in a vertical plane perpendicular to the panel contour,  $\pm 10$  deg.

4.3 If, due to the characteristics of the test equipment, the headform would strike another part of the instrument panel assembly prior to contacting the desired impact point, the direction of impact may be adjusted only enough to prevent such prior contact.

### 5. Test Equipment and Instrumentation

5.1 The test equipment shall consist of a 15 lb effective weight impact device capable of being accelerated to the desired velocity. The instrument panel assembly shall be mounted in the actual vehicle or on a fixture that is at least as rigid as the actual vehicle mounting. If actual vehicle components are used the header and/or windshield need not be in place.

5.2 The metal headform specified in SAE J984 or its equivalent shall be used.

5.3 The headform shall have sufficient offset with respect to its supporting structure to preclude contact of the structure with the instrument panel assembly during the impact.

5.4 Any system of instrumentation that will measure the items in paragraph 3 and meet the performance requirements of SAE J977 is acceptable.

### 6. Test Procedure

6.1 Full width instrument panel assemblies will be used.

6.2 Any substructures, braces, instruments, etc. located between the instrument panel and firewall which could significantly influence the impact performance of the installed panel assembly shall be included in the specimens tested.

6.3 All samples shall be maintained at an ambient temperature ranging between 70-85 F for 12 hr prior to testing.

6.4 Impact the samples.

6.5 Record the test data, post-impact condition of the sample, and any unusual conditions on the data sheet.

### 7. Appendix

7.1 Although any impacting device is acceptable providing it will

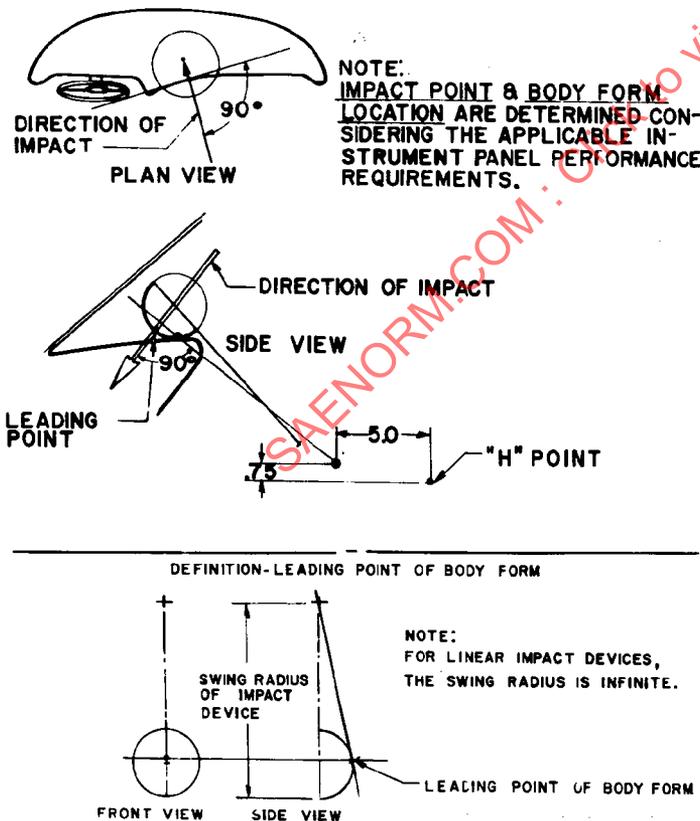


FIG. 1—LOCATION AND DIRECTION OF IMPACT