SURFACE VEHICLE INFORMATION REPORT

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Terminology and Measurement Methodology for Determining Vehicle Overlap in Offset-Frontal Crashes

RATIONALE

This SAE Information Report is intended to establish uniform methodology and consistent terminology for determining and reporting the extent of vehicle overlap (VOL) in real-world offset-frontal crashes.

SAE J3227 has been reaffirmed to comply with the SAE Five-Year Review policy.

A reaffirmed status is given to technical reports that have been reviewed by the technical committee and deemed to be current with no need for immediate revision. No changes have been made to this document as a result of this review.

FOREWORD

In recent years, there has been significant interest in both the investigation and the staging of offset-frontal crashes, where less than 100% of the case vehicle's front end is engaged by the object or vehicle struck. An important parameter that characterizes these types of crashes is the extent of overlap or engagement of the case vehicle with the struck object or vehicle. Because different crash investigation teams and crash test facilities have used different methods and terminology to establish, report, and reconstruct the amount of frontal engagement, it is difficult to compare and interpret results from different sources. Early offset-frontal crash testing calculated the percent overlap based on end engagement (using the undeformed end width and direct contact length). This procedure works reasonably well since the undeformed end width is measured directly on the vehicle before and after the test. However, field investigations of real world crashes rarely, if ever, have pre-crash documentation of the undeformed end width and since the undeformed end width is not a published specification, the accuracy of field undeformed end widths and corresponding percent overlap calculations using only the undeformed end width can provide questionable results. Therefore, a methodology has been developed to calculate and report percent overlap in an attempt to reduce the potential for error that can be introduced by using less accurate field measurements only (e.g., undeformed end width and direct contact length only). This SAE Information Report has been developed in order to establish uniform methodology and consistent terminology for determining and reporting the extent of vehicle overlap (VOL) in real-world offset-frontal crashes. It should be noted that this SAE Information Report provides a method for calculating and reporting percent vehicle overlap; it does not address other issues inherent with offset-frontal crashes, such as angle of impact, principle direction of force (PDOF), or vertical overlap. End users must assess these data elements by examining the associated collision deformation classification (CDC) and the scene diagram or test setup configuration.

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Documents
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Full document details: SAE J3227-2026 Terminology and Measurement Methodology for Determining Vehicle Overlap in Offset-Frontal Crashes

1. SCOPE

This SAE Information Report establishes procedures and terminology for measuring, calculating, and referencing the percent vehicle overlap for a case vehicle in real-world or staged end plane collisions where the end plane of the case vehicle is engaged at one of the two bumper corners but not both. This SAE Information Report may be applied to rear or front plane impacts.

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: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J1100 Motor Vehicle Dimensions

2.2 Related Publications

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

2.2.1 ISO Publications

Copies of these documents are available online at http://webstore.ansi.org/.

ISO 6813 Road Vehicles - Collision Classification - Terminology

ISO 15828 Road Vehicles - Offset Frontal Impact

3. DEFINITIONS AND ABBREVIATIONS

For the purposes of this SAE Information Report, the following definitions apply (see also Figure 1):

BUMPER CORNER: The structural left and right ends of the vehicle bumper. The location of the bumper corner is generally estimated by constructing a 45-degree line that bisects the right angle formed by the two lines that are parallel to the vehicle side and end planes and tangent to the front and sides of the bumper cover, respectively. The bumper corner is taken as the intersection of this line with the curvature of the bumper cover.

NOTE: The locations of the left and right bumper corners define the undeformed end width.

CONTACT DAMAGE LENGTH (CDL): The length of vehicle damage measured along the damaged frontal plane of a vehicle that is due to direct engagement with the vehicle or object struck during primary impact loading. The CDL is also known as direct damage length (DDL) in some crash investigation programs (such as NASS, CIREN, SCI, etc.).

NOTE: This length does not include induced damage.

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