

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE J689

**REV.
DEC89**

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Superseding J689 MAR60

(R) CURB CLEARANCE APPROACH, DEPARTURE, AND RAMP BREAKOVER ANGLES PASSENGER CAR AND LIGHT TRUCK

1. SCOPE:

This document applies to rigid structural points of cars and light trucks.

2. PURPOSE:

The purpose of this document is to provide guidelines for adequate curb clearance, departure, and ramp breakover angles for passenger cars and light trucks so that damage will be minimized in normal vehicle use conditions.

3. DEFINITIONS:

See SAE J1100.

3.1 Passenger Car: A vehicle with motive power, except a multipurpose passenger vehicle, motorcycle, or trailer, designed for carrying 10 persons or less.

3.1.1 Station Wagon: A passenger car with an extended upper to increase the cargo and/or passenger capacity.

3.1.2 Hatchback: A passenger car with the rear access door encompassing the back light.

3.2 Multipurpose Passenger Vehicle (MPV): A vehicle with motive power, except a trailer, designed to carry 10 persons or less, which is constructed either on a truck chassis or with special features for occasional off-road operation.

3.3 Light Truck: A self-propelled vehicle that is designed primarily to transport property or special purpose equipment and has a maximum gross vehicle weight rating (GVWR) of 10 000 lb (4536 kg) or less.

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- 3.4 Angle of Approach: The angle measured between a line tangent to the front tire static loaded radius arc and the initial point of structural interference forward of the front tire to ground. The limiting structural component shall be designated.
- 3.5 Angle of Departure: The angle measured between a line tangent to the rear tire static loaded radius arc and the initial point of structural interference rearward of the rear tire to ground. The limiting structural component shall be designated.
- 3.6 Ramp Breakover Angle: The angle measured between two lines tangent to the front and rear tire static loaded radius and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll.
- 3.7 Parking Curb Height Clearance: The minimum curb clearance to any structural, mechanical, fuel tank, or exhaust system component forward of the front tire or rearward of the rear tire.
4. MINIMUM ANGLES AND CLEARANCES:

Under any load within the manufacturer's design load condition, the minimum approach, departure, ramp breakover angles, and bumper-to-ground height, as indicated in Figure 1, shall be as follows:

A. APPROACH ANGLE	16 deg
B. RAMP BREAKOVER ANGLE	10 deg
C. DEPARTURE ANGLE	10 deg
D. CURB HEIGHT CLEARANCE	8 in (203 mm)

When measuring these dimensions, flexible bumper components such as air dams and lower valance panels should also be considered.

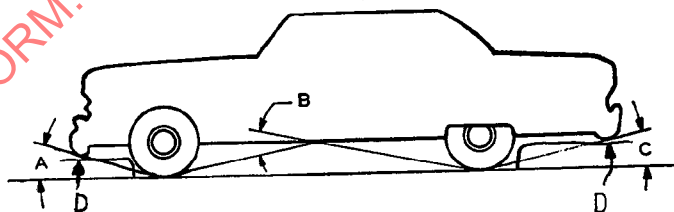


FIGURE 1

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.

RATIONALE:

The purpose of this document is to provide guidelines for adequate curb clearance, departure, and ramp breakover angles for passenger cars and light trucks so that damage will be minimized in normal vehicle use conditions. In developing this document, the Bumper Subcommittee considered current and past practice of automobile manufacturers as well as current paving guidelines.

Manufacturers have been using the specifications in this document for at least 25 years. The specifications are compatible with normal paving guidelines published by the American Association of State Highway and Transportation Officials (AASHTO). (See "An Informal Guide for Preparing Private Driveway Regulations for Major Highways," AASHTO.) Those specifications call for a maximum private driveway slope of approximately 8.5 deg (15%).

Guidelines published by the Michigan Department of Transportation are also referenced ("Driveway Openings, Driveways, and Concrete Sidewalks" - Drawing II-29C). Those specifications call for a maximum slope of 12% (approximately 7 deg), and a maximum ramp breakover angle of 10% (approximately 5.7 deg).

Considering that many conditions do exist that do not meet the (AASHTO) standard, we recommend the traditional 16 deg minimum approach and 10 deg departure and ramp breakover angles remain the suggested guidelines.

The loading condition was revised to allow any loading up to the design condition. This would cover the extreme such as three passengers in front seat and no other load that would give a worst case for a front air dam or similar located device. A fully loaded truck with a small person in the driver's seat could give a worst case for the rear bumper.

Towing is addressed in SAE J1142.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

SAE J1100 JUN84, Motor Vehicle Dimensions

SAE J1142 JUN78, Towability Design Criteria - Passenger Cars and Light Duty Trucks

APPLICATION:

This document applies to rigid structural points of cars and light trucks.

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