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Superseding J689 JUN1996

Curbstone Clearance, Approach, Departure, and Ramp Breakover Angles— Passenger Car and Light Truck

1. Scope—This SAE Recommended Practice applies to rigid bumper or rigid structure points and flexible components of passenger cars, multipurpose passenger vehicles, and light trucks. This document is intended as a guide toward standard practice and is subject to change to keep pace with experience and technical advances.

1.1 Purpose—The purpose of this document is to provide minimum static design guidelines for curbstone clearance, approach, departure, and ramp breakover angles. This is to minimize damage, if any, in normal vehicle use conditions. This document also encompasses all current worldwide regulations and requirements.

1.2 Field of Application

1.2.1 PASSENGER CAR, MULTIPURPOSE PASSENGER VEHICLE (MPV), AND LIGHT TRUCK

1.2.2 MINIMUM ANGLES AND CLEARANCES—Under the manufacturer's most severe vehicle design load for each particular load condition, the minimum approach, departure, ramp breakover angles, and bumper-to-ground height, as indicated in Figure 1, shall be as follows:

When measuring these dimensions, flexible bumper components such as air dams, lower valance panels, and fascias should be considered. The allowable approach angle to flexible components that are allowed nonstructural damage should be 13 degrees.

1.3 Rationale—This Recommended Practice provides minimum static design guidelines for curbstone clearance, approach, departure, and ramp breakover angles at a manufacturer's most severe vehicle design load. This is to minimize the potential for any damage in normal vehicle use conditions. SAE J689 also defines front and rear bumper heights for two different vehicle loading conditions, but does not provide any design guidance.

The document was last revised in 1996 by the Bumper Standards committee (no longer active). It was confirmed that all dimensions save "3.8 Parking Curbstone Height Clearance" are in the current SAE J1100 with illustrations. Curbstone heights are typically a function of road classification (source: AASHTO). HADD agreed to adopt SAE J689, incorporating curbstone definition into SAE J1100, then to CANCEL it once SAE J1100 was published.

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The dimension minimum values given in SAE J689 are:

Approach Angle (H106)	16 degrees
Departure Angle (H107)	13 degrees
Curbstone Height Clearance	203 mm (8 in)
Ramp Breakover Angle (H147)	12 degrees

These target dimensions in SAE J689 will be lost, but the HADD committee determined that these values were not very useful for current vehicle designs. Manufacturers typically establish design minimums that differ according to vehicle type or market segment. A single minimum value that applies to all vehicles (such as provided in SAE J689) for curbstone clearance, approach, departure, and ramp breakover angles is no longer sufficient.

The following table maps the SAE J689 dimension codes to their SAE J1100 equivalents:

SAE J689 Dimension	SAE J689 Definition	SAE J1100 Dimension	SAE J1100 Definition
H102	Front Bumper to Ground	H103-1-GVM ⁽¹⁾	Fascia to Ground – Front
H103	Front Bumper to Ground — Curb Weight	H103-1	Fascia to Ground – Front
H104	Rear Bumper to Ground	H103-2-GVM1	Fascia to Ground – Rear
H105	Rear Bumper to Ground — Curb Weight	H103-2	Fascia to Ground – Rear
H106	Approach Angle	A116-1	Approach Angle at Maximum Load
H107	Departure Angle	A116-2	Departure Angle at Maximum Load
H147	Ramp Breakover Angle	A117	Ramp Breakover Angle at Maximum Load

1. Unless otherwise specified, ground related dimensions in SAE J1100 are defined for the base curb loading condition. The ‘-GVM’ suffix is new for the 2009 revision of SAE J1100 and can be applied to those types of dimensions. While the dimensions H103-1-GVM and H103-2-GVM are not explicitly defined in the 2009 revision of SAE J1100, they are used here to show dimensional parity.

Addition of parking curbstone height clearance to SAE J1100

SAE J1100 will include the following definition and figure for parking curbstone height clearance - which HADD renamed as “Parking clearance height”.

SAE J1100 Table 25 – Exterior Dimensions – Height (page 61 Apr 2009 draft)

Code	Dimension	Definition	Figure and Notes
H113	Parking Clearance Height	The minimum distance between ground and the lowest point across all underbody components in the area forward of the front tires or rearward of the rear tires.	55
		The suffix following H113 indicates the area of measurement.	
H113-1	Parking Clearance Height – Front	Forward of the front tires.	
H113-2	Parking Clearance Height – Rear	Rearward of the rear tires.	

As indicated in the mapping table, the user may add the ‘-GVM’ suffix to H113 to make the SAE J1100 dimension equivalent to the SAE J689 version. SAE J1100 Figure 55 was revised to illustrate this dimension (page 105 of Apr2009 draft):