

(b) Each passenger car, multipurpose passenger vehicle, truck, and bus manufactured for sale in the noncontinental United States may, at the option of the manufacturer, have a windshield defogging system which operates either by applying heat to the windshield or by dehumidifying the air inside the passenger compartment of the vehicle, in lieu of meeting the requirements specified by paragraph (a) of this section.

S4.1 Each vehicle shall have a windshield defrosting and defogging system.

S4.2 Each passenger car windshield defrosting and defogging system shall meet the requirements of section 3 of SAE Recommended Practice J902, "Passenger Car Windshield Defrosting Systems," August 1964, when tested in accordance with S4.3, except that "the critical area" specified in paragraph 3.1 of SAE Recommended Practice J902 shall be that established as Area C in accordance with Motor Vehicle Safety Standard No. 104, "Windshield Wiping and Washing Systems," and "the entire windshield" specified in paragraph 3.3 of SAE Recommended Practice J902 shall be that established as Area A in accordance with § 571.104.

S4.3 *Demonstration procedure.* The passenger car windshield defrosting and defogging system shall be tested in accordance with the portions of paragraphs 4.1 through 4.4.7 of SAE Recommended Practice J902, August 1964, or SAE Recommended Practice J902a, March 1967, applicable to that system, except that—

(a) During the first 5 minutes of the test:

(1) For a passenger car equipped with a heating system other than a heat exchanger type that uses the engine's coolant as a means to supply the heat to the heat exchanger, the warm-up procedure is that specified by the vehicle's manufacturer for cold weather starting, except that connection to a power or heat source external to the vehicle is not permitted.

(2) For all other passenger cars, the warm-up procedure may be that recommended by the vehicle's manufacturer for cold weather starting.

(b) During the last 35 minutes of the test period (or the entire test period if the 5-minute warm-up procedure speci-

fied in paragraph (a) of this section is not used),

(1) For a passenger car equipped with a heating system other than a heat exchanger type that uses the engine's coolant as a means to supply the heat to the heat exchanger, the procedure shall be that specified by the vehicle's manufacturer for cold weather starting, except that connection to a power or heat source external to the vehicle is not permitted.

(2) For all other passenger cars, either—

(i) The engine speed shall not exceed 1,500 r.p.m. in neutral gear; or

(ii) The engine speed and load shall not exceed the speed and load at 40 kilometers per hour in the manufacturer's recommended gear with road load;

(c) A room air change of 90 times per hour is not required;

(d) The windshield wipers may be used during the test if they are operated without manual assist;

(e) One or two windows may be open a total of 25 millimeters;

(f) The defroster blower may be turned on at any time; and

(g) The wind velocity is at any level from 0 to 3 kilometers per hour.

(h) The test chamber temperature and the wind velocity shall be measured, after the engine has been started, at the forwardmost point of the vehicle or a point 914 millimeters from the base of the windshield, whichever is farther forward, at a level halfway between the top and bottom of the windshield on the vehicle centerline.

[36 FR 22902, Dec. 2, 1971, as amended at 40 FR 12992, Mar. 24, 1975; 40 FR 32336, Aug. 1, 1975; 50 FR 48775, Nov. 27, 1985; 59 FR 11006, Mar. 9, 1994; 60 FR 13642, Mar. 14, 1995]

#### **§ 571.104 Standard No. 104; Windshield wiping and washing systems.**

S1. *Scope.* This standard specifies requirements for windshield wiping and washing systems.

S2. *Application.* This standard applies to passenger cars, multipurpose passenger vehicles, trucks, and buses.

S3. *Definitions.* The term *seating reference point* is substituted for the terms *manikin H point*, *manikin H point with seat in rearmost position* and *H point* wherever any of these terms appear in

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any SAE Standard or SAE Recommended Practice referred to in this standard.

*Daylight opening* means the maximum unobstructed opening through the glazing surface, as defined in paragraph 2.3.12 of section E, Ground Vehicle Practice, SAE Aerospace-Automotive Drawing Standards, September 1963.

*Glazing surface reference line* means the line resulting from the intersection of the glazing surface and a horizontal plane 635 millimeters above the seating reference point, as shown in Figure 1 of SAE Recommended Practice J903a, "Passenger Car Windshield Wiper Systems," May 1966.

*Overall width* means the maximum overall body width dimension "W116", as defined in section E, Ground Vehicle Practice, SAE Aerospace-Automotive Drawing Standards, September 1963.

*Plan view reference line* means—

(a) For vehicles with bench-type seats, a line parallel to the vehicle longitudinal centerline outboard of the steering wheel centerline 0.15 times the difference between one-half of the shoulder room dimension and the steering wheel centerline-to-car-centerline dimension as shown in Figure 2 of SAE Recommended Practice J903a, May 1966; or

(b) For vehicles with individual-type seats, either—

(i) A line parallel to the vehicle longitudinal centerline which passes through the center of the driver's designated seating position; or

(ii) A line parallel to the vehicle longitudinal centerline located so that the geometric center of the 95 percent eye range contour is positioned on the longitudinal centerline of the driver's designated seating position.

*Shoulder room dimension* means the front shoulder room dimension "W3" as defined in section E, Ground Vehicle Practice, SAE Aerospace-Automotive Drawing Standards, September 1963.

*95 percent eye range contour* means the 95th percentile tangential cutoff specified in SAE Recommended Practice J941, "Passenger Car Driver's Eye Range," November 1965.

*S4. Requirements.*

*S4.1 Windshield wiping system.* Each vehicle shall have a power-driven wind-

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shield wiping system that meets the requirements of S4.1.1.

*S4.1.1 Frequency.*

S4.1.1.1 Each windshield wiping system shall have at least two frequencies or speeds.

S4.1.1.2 One frequency or speed shall be at least 45 cycles per minute regardless of engine load and engine speed.

S4.1.1.3 Regardless of engine speed and engine load, the highest and one lower frequency or speed shall differ by at least 15 cycles per minute. Such lower frequency or speed shall be at least 20 cycles per minute regardless of engine speed and engine load.

S4.1.1.4 Compliance with subparagraphs S4.1.1.2 and S4.1.1.3 may be demonstrated by testing under the conditions specified in sections 4.1.1 and 4.1.2 of SAE Recommended Practice J903a, May 1966.

*S4.1.2 Wiped area.* When tested wet in accordance with SAE Recommended Practice J903a, May 1966, each passenger car windshield wiping system shall wipe the percentage of Areas A, B, and C of the windshield (established in accordance with S4.1.2.1) that (1) is specified in column 2 of the applicable table following subparagraph S4.1.2.1 and (2) is within the area bounded by a perimeter line on the glazing surface 25 millimeters from the edge of the daylight opening.

S4.1.2.1 Areas A, B, and C shall be established as shown in Figures 1 and 2 of SAE Recommended Practice J903a, May 1966, using the angles specified in Columns 3 through 6 of Table I, II, III, or IV, as applicable.

TABLE I—PASSENGER CARS OF LESS THAN  
1520 MILLIMETERS IN OVERALL WIDTH

Column 1— Area	Col- umn 2— Min- imum per- cent to be wiped	Angles in degrees			
		Col- umn 3—Left	Col- umn 4— Right	Col- umn 5—Up	Col- umn 6— Down
A .....	80	16	49	7	5
B .....	94	13	46	4	3
C .....	99	7	15	3	1

**TABLE II—PASSENGER CARS OF 1520 OR MORE BUT LESS THAN 1630 MILLIMETERS IN OVERALL WIDTH**

Column 1— Area	Col- umn 2— Min- imum per- cent to be wiped	Angles in degrees			
		Col- umn 3—Left	Col- umn 4— Right	Col- umn 5—Up	Col- umn 6— Down
A .....	80	17	51	8	5
B .....	94	13	49	4	3
C .....	99	7	15	3	1

**TABLE III—PASSENGER CARS OF 1630 OR MORE BUT LESS THAN 1730 MILLIMETERS IN OVERALL WIDTH**

Column 1— Area	Col- umn 2— Min- imum per- cent to be wiped	Angles in degrees			
		Col- umn 3—Left	Col- umn 4— Right	Col- umn 5—Up	Col- umn 6— Down
A .....	80	17	53	9	5
B .....	94	14	51	5	3
C .....	99	8	15	4	1

**TABLE IV—PASSENGER CARS OF 1730 OR MORE MILLIMETERS IN OVERALL WIDTH**

Column 1— Area	Col- umn 2— Min- imum per- cent to be wiped	Angles in degrees			
		Col- umn 3—Left	Col- umn 4— Right	Col- umn 5—Up	Col- umn 6— Down
A .....	80	18	56	10	5
B .....	94	14	53	5	3
C .....	99	10	15	5	1

**S4.2 Windshield washing system.**

S4.2.1 Each passenger car shall have a windshield washing system that meets the requirements of SAE Recommended Practice J942, "Passenger Car Windshield Washer Systems," November 1965, except that the reference to "the effective wipe pattern defined in SAE J903, paragraph 3.1.2" in paragraph 3.1 of SAE Recommended Practice J942 shall be deleted and "the areas established in accordance with subparagraph S4.1.2.1 of Motor Vehicle Safety Standard No. 104" shall be inserted in lieu thereof.

S4.2.2 Each multipurpose passenger vehicle truck, and bus shall have a windshield washing system that meets the requirements of SAE Recommended Practice J942, November

1965, except that the reference to "the effective wipe pattern defined in SAE J903, paragraph 3.1.2" in paragraph 3.1 of SAE Recommended Practice J942 shall be deleted and "the pattern designed by the manufacturer for the windshield wiping system on the exterior surface of the windshield glazing" shall be inserted in lieu thereof.

[36 FR 22902, Dec. 2, 1971, as amended at 58 FR 13023, Mar. 9, 1993; 60 FR 13643, Mar. 14, 1995; 63 FR 51000, Sept. 24, 1998]

**§ 571.105 Standard No. 105; Hydraulic and electric brake systems.**

S1. *Scope.* This standard specifies requirements for hydraulic and electric service brake systems, and associated parking brake systems.

S2. *Purpose.* The purpose of this standard is to insure safe braking performance under normal and emergency conditions.

S3. *Application.* This standard applies to hydraulically-braked vehicles with a GVWR greater than 3,500 kilograms (7,716 pounds). This standard applies to hydraulically-braked passenger cars manufactured before September 1, 2000, and to hydraulically-braked multipurpose passenger vehicles, trucks and buses with a GVWR of 3,500 kilograms or less that are manufactured before September 1, 2002. At the option of the manufacturer, hydraulically-braked passenger cars manufactured before September 1, 2000, and hydraulically-braked multipurpose passenger vehicles, trucks and buses with a GVWR of 3,500 kilograms (7,716 pounds) or less manufactured before September 1, 2002, may meet the requirements of Federal Motor Vehicle Safety Standard No. 135, Light Vehicle Brake Systems instead of this standard.

**S4. Definitions.**

*Antilock brake system* or *ABS* means a portion of a service brake system that automatically controls the degree of rotational wheel slip during braking by:

- (1) Sensing the rate of angular rotation of the wheels;
- (2) Transmitting signals regarding the rate of wheel angular rotation to one or more controlling devices which interpret those signals and generate responsive controlling output signals; and