(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; 77 FR 755, Jan. 6, 2012]

§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 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,'' of SAE Aerospace-Automotive Drawing Standards (1963) (incorporated by reference, see §571.5).

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 (1966) (incorporated by reference, see §571.5).

Overall width means the maximum overall body width dimension ''W116'', as defined in section E, ''Ground Vehicle Practice,'' of SAE Aerospace-Automotive Drawing Standards (1963) (incorporated by reference, see §571.5).

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 (1966) (incorporated by reference, see §571.5); 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,'' of SAE Aerospace-Automotive Drawing Standards (1963) (incorporated by reference, see §571.5).

95 percent eye range contour means the 95th percentile tangential cutoff specified in SAE Recommended Practice J941 (1965) (incorporated by reference, see §571.5).

S4. *Requirements*.

S4.1 *Windshield wiping system.* Each vehicle shall have a power-driven windshield 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 (1966) (incorporated by reference, see § 571.5).

S4.1.2 *Wiped area.* When tested wet in accordance with SAE Recommended Practice J903a (1966) (incorporated by reference, see § 571.5), 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 (1966) (incorporated by reference, see § 571.5) 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	Column 2—Minimum percent to be wiped	Angles in degrees			
		Column 3—Left	Column 4—Right	Column 5—Up	Column 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	Column 2—Minimum percent to be wiped	Angles in degrees			
		Column 3—Left	Column 4—Right	Column 5—Up	Column 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	Column 2—Minimum percent to be wiped	Angles in degrees			
		Column 3—Left	Column 4—Right	Column 5—Up	Column 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	Column 2—Minimum percent to be wiped	Angles in degrees			
		Column 3—Left	Column 4—Right	Column 5—Up	Column 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 (1965) (incorporated by reference, see § 571.5), 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 (1965) 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 (1965) (incorporated by reference, see §571.5), 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 (1965) 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; 77 FR 755, Jan. 6, 2012]

§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 multi-purpose passenger vehicles, trucks, and buses with a GVWR greater than 3,500 kilograms (7,716 pounds) that are equipped with hydraulic or electric brake systems.

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

(3) Transmitting those controlling signals to one or more modulators which adjust brake actuating forces in response to those signals.

Backup system means a portion of a service brake system, such as a pump, that automatically supplies energy, in the event of a primary brake power source failure.

Brake power assist unit means a device installed in a hydraulic brake system that reduces the operator effort required to actuate the system, and that if inoperative does not prevent the operator from braking the vehicle by a continued application of muscular force on the service brake control.

Brake power unit means a device installed in a brake system that provides the energy required to actuate the brakes, either directly or indirectly through an auxiliary device, with the operator action consisting only of modulating the energy application level.

Directly Controlled Wheel means a wheel for which the degree of rotational wheel slip is sensed, either at that wheel or on the axle shaft for that wheel and corresponding signals are transmitted to one or more modulators that adjust the brake actuating forces at that wheel. Each modulator may also adjust the brake actuating forces at other wheels that are on the same axle or in the same axle set in response to the same signal or signals.

Electric vehicle or *EV* means a motor vehicle that is powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electrical current, and which may include a non-electrical source of power designed to charge batteries and components thereof.

Electrically-actuated service brakes means service brakes that utilize electrical energy to actuate the foundation brakes.

Full brake application means a brake application in which the force on the brake pedal reaches 150 pounds within 0.3 seconds from the point of application of force to the brake control.

Hydraulic brake system means a system that uses hydraulic fluid as a medium for transmitting force from a service brake control to the service brake, and that may incorporate a brake power assist unit, or a brake power unit.

Indirectly Controlled Wheel means a wheel at which the degree of rotational wheel slip is not sensed, but at which the modulator of an antilock braking system adjusts its brake actuating forces in response to signals from one or more sensed wheels.

Initial brake temperature means the average temperature of the service