SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE STANDARD

SAE J1206

REV. APR97

Issued 1977-09
Revised 1997-04

Superseding J1206 AUG78

(R) METHODS FOR TESTING SNAP-IN TUBELESS TIRE VALVES

1. ***Scope—***This SAE Standard contains recommended test methods for snap-in tubeless tire valves intended for, but not limited to, highway applications. A snap-in valve is a tire valve having a rigid housing adhered to a resilient body designed to retain and seal the valve in the rim hole.

2. ***References***

2.1 **Applicable Publications—**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 PUBLICATION—Available from SAE, 400 Commonweatlh Drive, Warrendale, PA 15096-0001.

SAE J1205—Performance Requirements for Snap-In Tubeless Tire Valves

2.1.2 TIRE AND RIM ASSOCIATION—Tire and Rim Association, 175 Montrose West Avenue, Suite 150, Copley, OH 44321.

Tire and Rim Association Year Book

2.2 **Related Publication—**The following publications are provided for information purposes only and are not a required part of this document.

2.2.1 ISO PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 3877/2—Tyres, valves, and tubes—List of equivalent terms

3. ***General Requirements—***Section 4, Test Methods of this document correspond to Section 4, Test Values, of SAE J1205.

3.1 A snap-in valve is a unit free of rubber in the air passage, no rubber or cement above the second thread on the housing and without flow cracks, blisters, voids, or other molding defects. Mold parting line flash should not exceed 1.3 mm (0.050 in) in height and 0.15 mm (0.006 in) thickness at the outer edge.

3.2 **Test Fixtures—**Break both edges of the valve hole to approximately 0.13 mm (0.005 in) radius. Emery cloth or suitable tooling is recommended. It is recommended that material of the test fixture be representative of the material of the actual rim.

QUESTIONS REGARDING THIS DOCUMENT: (412) 772-8512 FAX: (412) 776-0243
TO PLACE A DOCUMENT ORDER; (412) 776-4970 FAX: (412) 776-0790
SAE WEB ADDRESS http://www.sae.org

3.3 All valves, while wet with clean water as a lubricant, shall be installed in a proper test fixture by applying valve insertion force to the end of the valve metal insert, perpendicular to the plane of the valve mounting hole and directly through the center of the valve mounting hole. No valve assembly, however, shall be tested which has damage resulting from installation.

A valve shall be considered properly seated when all of the indicator ring is observed to be through the rim or fixture valve mounting hole.

After installation, valve assemblies must be thoroughly dried in the sealing area before continuing tests.

3.4 Definitions

3.4.1 UNUSED VALVES—Those that have completed final manufacturing processing at least 24 h previously and have not been subjected to any test or service conditions (excluding the hardness test). Rubber compounds may change characteristics during their life expectancy.

3.4.2 AGED VALVES—Those unused valves that have been subjected to 100 °C ± 3 °C (212 °F ± 5 °F) for 4 h in circulating hot air and cooled at 20 to 26 °C (68 to 78 °F) for a minimum of 4 h.

4. Test Methods

4.1 Adhesion—Subject unused molded valve to 100 °C ± 3 °C (212 °F ± 5 °F) for 4 h in a hot air circulating oven and allow to cool at 20 to 26 °C (68 to 78 °F) for 24 h. Make two axial, parallel cuts 180 degrees apart through the full thickness of the rubber cover down the entire length of the valve. Pull each side of the button base away from the insert towards the cap thread end.

4.2 Hardness—The rubber hardness of unused and aged snap-in valves shall be tested midway on the button base on a smooth area with a Shore Test A-2 Durometer gauge. The recommended equipment for this test is a Shore CVXAMX Conveloader Type A-2 Durometer (see Figure 1).

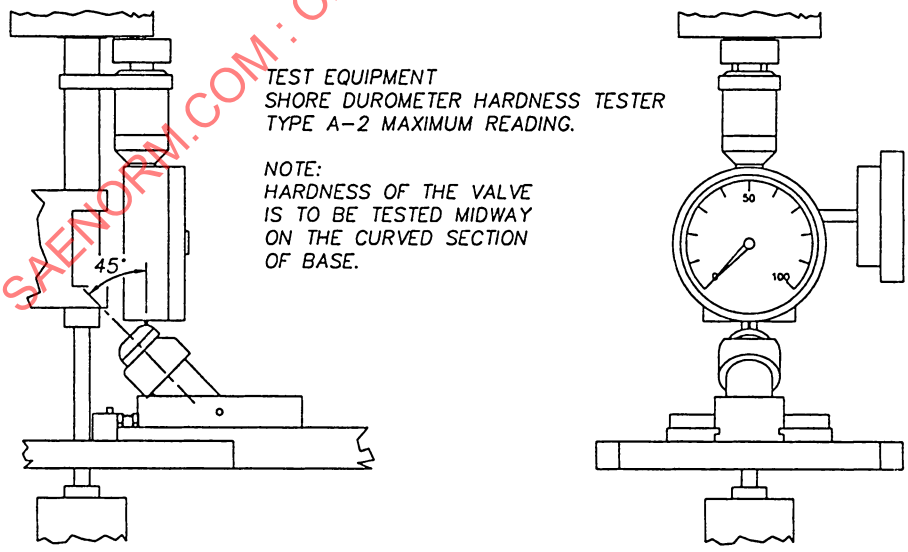


FIGURE 1—DUROMETER TEST FIXTURE

4.2.1 Hardness shall be measured on unused valves (see 3.4).

4.2.2 Hardness shall be measured on aged valves.

4.3 Valve Core Seal—Valve cores installed in snap-in valve assemblies within standard pin height tolerance +0.25, –0.90 mm (+0.010, –0.035 in) with reference to valve mouth, and standard torque, 0.17 to 0.34 N·m (1.5 to 3 in-lb), shall be tested with valve caps removed as follows:

4.3.1 ROOM TEMPERATURE TEST—Completely immerse valve assembly in clean water with mouth down vertically and not more than 100 mm (4 in) below the surface of the water (see Figure 2). Pressure test 1. Cap gasket seal. Apply 35 kPa (5 psig) air pressure. 2. Barrel Seal - Apply 415 kPa (60 psig) air pressure.

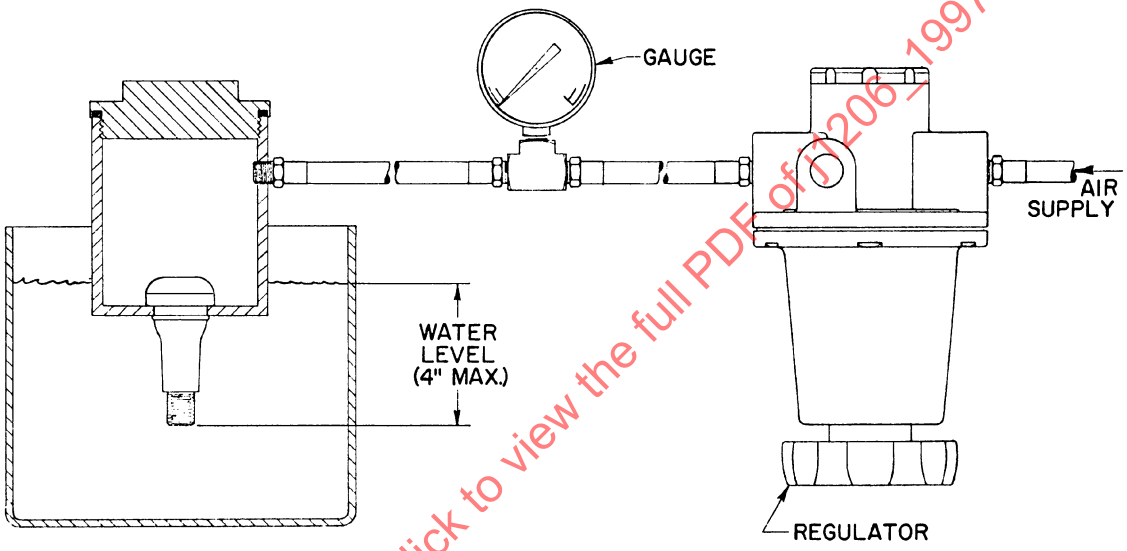


FIGURE 2—TEST SETUP—ROOM TEMPERATURE LEAK TEST

4.3.2 LOW TEMPERATURE TEST (MAY BE CONDUCTED WITH 4.4.1)—Depress and release valve core pin once after a 4 h minimum exposure at –40 °C ± 3 °C (–40 °F ± 5 °F). Check for leakage with –40 °C ± 3 °C (–40 °F ± 5 °F) methanol 25 mm (1 in) above valve mouth with assembly pressurized to 180 kPa (26 psig). Begin leak detection after 1 min soak period.

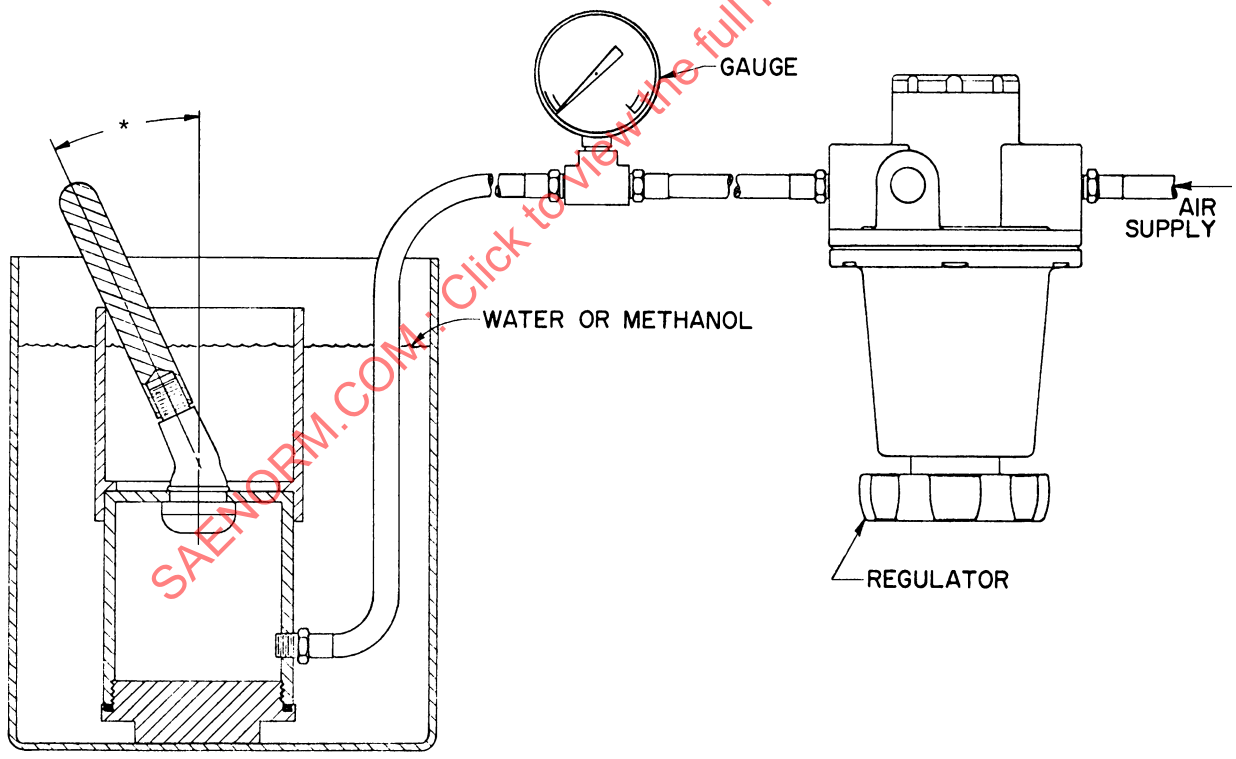
4.3.3 HIGH TEMPERATURE TEST (MAY BE CONDUCTED WITH 4.4.2)—If this test is not conducted with 4.4.2, pressure and temperature requirements shall be duplicated. Depress and release valve core pin once after 6 h minimum soak period at 100 °C ± 3 °C (212 °F ± 5 °F). Check for leakage with 66 °C ± 3 °C (150 °F ± 5 °F) clean water not more than 50 mm (2 in) above mouth of valve.

4.4 Valve to Rim Seal—Temperature tests are performed to subject the valves to extremes in temperature. Flexing of valves simulates possible operational conditions. The same valves and assemblies as shown may be used for both tests provided the low temperature is conducted first. (See Table 1 and Figure 3.)

TABLE 1—VALVE HOLE TEST SPECIFICATIONS

Test	Rim or Test[1] Plate Thickness	Test Hole Dia for Nominal Hole Dia. 11.3 mm (0.453 in)	Test Hole Dia for Nominal Hole Dia. 15.7 mm (0.625 in)
Valve to Rim Seat Test - low and high temperature test (see 4.4.1 and 4.4.2)	3.20 mm ± 0.05 mm (0.126 in ± 0.002 in)	11.7 + 000/–0.05 mm (0.460 + 0.000 in/–0.002 in)	16.08 + 0.00 mm/–0.05 mm (0.633 + 0.000 in/–0.002 in)
Burst or Unseating (see 4.6)	3.20 mm ± 0.05 mm (0.126 in ± 0.002 in)	11.7 + 00/–0.05 mm (0.460 + 0.000 in/–0.002 in)	16.08 + 0.00 mm/–0.05 mm (0.633 + 0.000 in/–0.002 in)
Installation Tests (see 4.5.1 and 4.5.2)	3.20 mm ± 0.05 mm (0.126 in ± 0.002 in)	11.3 + 0.05 mm/–0.00 mm (0.445 + 0.002 in/–0.000 in)	15.70 + 0.005 mm/–0.05 mm (0.618 + 0.002 in/–0.000 in)
Ozone Resistance (see 4.7)	3.20 mm ± 0.05 mm (0.126 in ± 0.002 in)	11.3 + 0.05 mm/–0.00 mm (0.445 + 0.002 in/–0.00 in)	15.70 + 0.05 mm/–0.00 mm (0.618 + 0.002 in/–0.000 in)

1. The primary external seal of a “snap-in” valve in a valve hole is obtained from the rubber compression of the valve body onto the internal surface of the valve hole. Secondary external sealing may be present by the contact of the remainder of the valve body exterior to the surface of the material around the valve hole. Either or both of these seals may be affected by the compound curvatures in the wheel rims and by stock thickness.



* 25 degrees ± 3 degrees for Low and High Temperature tests for valves with maximum pressure of 450 kPa (65 psig).

10 degrees ± 3 degrees for High Temperature test for valves with maximum pressure above 450 kPa (65 psig).

FIGURE 3—TEST SETUP—HOT AND COLD RIM SEAL LEAK TEST

4.4.1 LOW TEMPERATURE—The test valve (or valves) shall be mounted in a test plate (or actual wheel rim) as specified in 3.2 and 3.3. The assembly shall then be exposed to a temperature of –40 °C ± 3 °C (–40 °F ± 5 °F) for a period of 4 h minimum to insure that the valve seal area is at the test temperature. The valve assembly, pressurized to 180 kPa ± 15 kPa (26 psig ± 2 psig) shall then be immersed valve mouth up in methanol at –40 °C ± 3 °C (–40 °F ± 5 °F).

With respect to the axis of the valve mounting hole, the immersed valve shall be flexed to an angle of 25 degrees ± 3 degrees for valves with a maximum pressure of 450 kPa (65 psig) and no flex (zero degrees) for valves rated above 450 kPa (65 psig). The cap end of the valve shall then be revolved one complete turn around the axis of the mounting hole. This single revolution shall be executed at a uniform rate without the application of torque to the valve body and shall be accomplished within 15 to 45 s.

Conduct the previous procedure at 0.5 h for a total of five times.

4.4.2 HIGH TEMPERATURE—The test valve (or valves) shall be mounted in a test plate (or actual wheel rim) as specified in 3.2 and 3.3. The assembly shall be pressurized to 180 kPa ± 15 kPa (26 psig ± 2 psig) at 20 to 26 °C (68 to 70 °F) temperature. The test assembly shall then be exposed to a temperature of 100 °C ± 3 °C (212 °F ± 5 °F) for the 72 h in a hot air circulating oven to simulate aging. The assembly is completely immersed valve mouth up in water at not less than 66 °C (150 °F) during flexing.

With respect to the axis of the valve mounting hole, the immersed valve shall be flexed to an angle of 25 degrees ± 3 degrees for valves with a maximum pressure of 450 kPa (65 psig) and 10 degrees ± 3 degrees for valves rated above 450 kPa (65 psig). The cap end of the valve shall then be revolved one complete turn around the axis of the mounting hole. This single revolution shall be executed at a uniform rate without the application of torque to the valve body and shall be accomplished within 15 to 45 s.

This procedure is performed twice in every 24 h period with a minimum of 6 h interval between the tests for a total of 6 cycles. The last test shall be performed at the end of the 72 h. The assembly shall be returned to the hot air oven after each test.

4.5 Installation Tests

4.5.1 FORCE TO SEAT—The valve shall be installed into a fixture as specified in 3.2 and 3.3 at a rate of 150 mm ± 15 mm (6 in ± 0.5 in) per minute with a method of measuring the force required.

4.5.2 FORCE TO PULL OUT—After the valve is installed as in 4.5.1, additional force shall be applied as in 4.5.1 and the force to break the valve or pull it out shall be measured.

4.6 Burst—The valve shall be installed into a fixture as specified in 3.2 and 3.3; hydrostatic pressure shall be applied to the valve base at a rating of 3x the maximum rated pressure (as shown in the current Tire and Rim Association publications) over a 1 min interval. This test shall be conducted at 20 to 26 °C (68 to 78 °F).

4.7 Ozone Resistance—The unmounted valve shall be aged for 72 h at 100 °C ± 3 °C (212 °F ± 5 °F) (alternate equivalent aging 18 h at 121 °C ± 3 °C (250 °F ± 5 °F) in a hot air circulating oven. The aged valve is installed in a test fixture as specified in 3.2 and 3.3. With respect to the axis of the mounting hole, the valve is deflected 10 degrees from its axis and retained in that position for the duration of the test. The retain valve is placed into a darkened enclosure at 20 to 26 °C (68 to 78 °F) for a minimum of 24 h. The valve shall then be tested in ozone circulating chamber, maintaining 100 ± 5 parts of ozone to 100 million parts of air for three days at 38 °C ± 3 °C (100 °F ± 5 °F).

4.8 Valve Core or Unsealing Pressure—Depress core pin and release same. Install valve assembly in test fixture (reference 4.3 and Figure 4). Raise pressure until core opens to allow 10 to 25 bubbles per minute flow. Record pressure.