VEHICLE EQUIPMENT SAFETY COMMISSION

REGULATION V-1

(REVISED - 1)

MINIMUM PERFORMANCE REQUIREMENTS AND UNIFORM TEST PROCEDURES FOR NEW TIRES FOR PASSENGER CARS AND STATION WAGONS

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PASSENGER CARS AND STATION WAGONS

- SCOPE: This specification is for new pneumatic tires, designed for use on passenger cars and station wagons operated on highways open to public use for vehicular traffic.
- 2. DEFINITIONS:
- 2-1 BEAD-that part of the tire which is shaped to fit the rim.
- 2-2 CARCASS-tire structure, excepting tread and sidewall rubber.
- 2-3 CHUNKING—separation of the tread from the carcass in particles which may range from a very small size to several square inches in area.
- 2-4 CORD-strands forming a ply in a tire.
- 2-5 CROSS SECTION—the lateral width of a tire mounted on an official measuring rim, after it has been allowed to stand for 24 hours at room temperature inflated to the pressure recommended in Table 1. An official measuring rim is one that has been calibrated and found to meet the precise measurements specified by the Tire and Rim Association, Inc. The tire shall be calipered at six different points approximately equally spaced around the circumference. The average of these measurements is to be taken as the cross section. In the event the widest part of the tire occurs at a letter of sidewall design, the height of such configuration shall be deducted from measurements. The tire shall meet the minimum cross-section dimensions specified in Table 1 for the tire size listed.
- 2-6 GROOVE—space between two tread rows.
- 2-7 PLY-layer of parallel cords used in forming the tire body.
- 2-8 PLY RATING—an index of tire strength; does not necessarily represent the actual number of plys in the tire.
- 2-9 RIB-tread section running circumferentially around tire.
- 2-10 RIM-metal support for tire or tire and tube assembly on the wheel. Tire beads are seated on the rim.

- 2-11 SIDEWALL-portion of tire between buttress and bead.
- 2-12 STANDARD RIM—one that has been calibrated and found to meet the precise measurements specified by the Tire and Rim Association, Inc.
- 2-13 TREAD-portion of tire which comes in contact with road.
- 2-14 TREAD SEPARATION—tread pulling away from tire body.
- 3. TEST PROCEDURES AND REQUIREMENTS:
- 3-1 TIRE ENDURANCE TEST:
- 3-1.1 PREPARATION OF TIRE FOR ENDURANCE TEST: A new tire shall be mounted on a standard rim and inflated to the pressure shown in Table 1. Loads on the tire during the test shall be determined with the tire positioned on the standard test wheel after the tire has been conditioned at a temperature of 100° F, plus or minus 5° F, for a minimum of three hours and with inflation pressure adjusted to that specified.

Four groups of cuts shall be placed circumferentially around the tire, spaced approximately 90° apart. Each group shall consist of one cut in each groove with the cuts located so that one does not come directly opposite a cut in the adjacent groove. Dimensions of cuts are to be one-quarter inch long and one-sixteenth inch deep. If brambles or tie bars are present in the grooves, the cuts shall be located approximately midway between them. The initial total length of the cuts so made shall be recorded for the particular tire involved.

- 3-1.2 EQUIPMENT: The test wheel shall be a flat-faced steel wheel 67.23 inches in diameter and at least the same width as the cross-sectional diameter of the tire to be tested. The tire while being tested shall be located in an air space controlled at a temperature of 100° F, plus or minus 5° F.
- 3-1.3 PROCEDURE: The tire and wheel assembly shall be mounted on the test axle and pressed against the test wheel with the required axle load. Specifications for the test shall be as follows: 100 percent of the required axle load shall be the load specified in Table 1.

TIRE ENDURANCE TEST

Speed	Initial Inflation Pressure	Test Load	Hours	Test Miles
50 MPH	From Table 1	100%	4	200
		120%	6	300
		140%	24	1,200
			To	otal 1.700

- 3-1.4 At the conclusion of the endurance test, there shall be no evidence of tread, ply, cord, or bead separation or broken cords. The final total length of such cuts made pursuant to Section 3-1.1 shall not exceed five times the length of the original cuts (400 percent increase) made for this test.
- 3-2 BREAKING ENERGY TEST:
- 3-2.1 PREPARATION OF TIRE FOR BREAKING ENERGY TEST:
 The tire used in this test shall be one which has survived the endurance test. This tire shall be mounted on a standard rim and shall be inflated to the pressure shown in Table 1.
- 3-2.2 EQUIPMENT: The test shall be made with a cylindrical steel plunger three-quarters inch in diameter with a hemispherical end.
- 3-2.3 PROCEDURE: The plunger shall be forced into the tread as near to the center line as possible avoiding penetration into a tread groove or in the area of the cuts made pursuant to Section 3-1.1 and at the rate of two inches per minute until the tire breaks or until the plunger is stopped.

Tires shall meet the requirements for minimum breaking strength as shown in Table 2. No tire shall have a strength below that of a tire of the same size and cross section, with four-ply rating. For sizes not listed, the strength requirement shall not be less than that for the nearest smaller size in cross section and the same ply rating.

Final measurement of force and penetration at break shall be made at five points equally spaced around the circumference of the tire. In the event the tire does not break before the plunger is stopped by the rim, the force and penetration shall be taken as this occurs. The energy value to break a tire shall be calculated from the average value at break by means of the following formula:

Where W=Energy at break in inch pounds
F=Force at break in pounds
P=Penetration at break in inches

- 3-3 HIGH SPEED PERFORMANCE TEST:
- 3-3.1 PREPARATION OF TIRE FOR HIGH SPEED TEST: A new tire shall be mounted on a standard rim and inflated to 30 psi pressure. The tire shall be conditioned at a temperature of 100° F, plus or minus 5° F, for a minimum of three hours and with inflation pressure adjusted to that specified.

- 3-3.2 EQUIPMENT: The test wheel shall be a flat-faced steel wheel 67.23 inches in diameter and at least the same width as the cross-sectional diameter of the tire to be tested. The tire while being tested shall be located in an air space controlled at a temperature of 100° F, plus or minus 5° F.
- 3-3.3 PROCEDURE: The tire and wheel assembly shall be mounted on the test axle and pressed against the test wheel with the load as specified in Table 1. Specifications for the progressive test speeds and conditions shall be as follows:

HIGH-SPEED PERFORMANCE

Speed	Initial Inflation Pressure	Test Load	Hours	Test Miles
50 MPH ¹ 75 MPH 80 MPH 85 MPH ²	30 psi 30 psi	From Table 1 From Table 1 From Table 1	2 ½ ½ ½ ½	100 37.5 40 42.5
			Total Mile	s 220.0

¹ After two hours break-in, running at 50 MPH, tire should be allowed to cool 100° F temperature. Inflation pressure should then be readjusted to 30 psi before continuing test.

3-4. TIRE BEAD UNSEATING (ROLL-OFF) TEST:

- 3-4.1 PREPARATION OF TIRE-WHEEL ASSEMBLY FOR BEAD UN-SEATING TEST: The tire should be washed and dried at the two beads, mounted on a new finished painted standard rim without the use of lubrication and inflated to pressures indicated in Table 1 at ambient temperature.
- 3-4.2 EQUIPMENT: A fixture used to support the mounted tire-wheel assembly is shown in Figure 1. A standard block (detailed in Figure 2) is forced against the tire sidewall as dictated by the fixture geometry. This load can be applied by a hydraulic ram or its equivalent.
- 3-4.3 PROCEDURE: With the tire and wheel mounted in the fixture the load should be applied through the block to the tire sidewall at a rate of two inches per minute. The load at which the bead unseats shall be recorded. Raise the block and rotate the tire-wheel assembly one wheel stud hole. Repeat the test for each stud hole position, thus acquiring from four to six load figures for each tire-wheel assembly.

² This test is not performed on deep tread winter tires.

^{3-3.4} At the conclusion of the high-speed performance tests there shall be no evidence of separation or tread chunking.

- 3-4.4 RESISTANCE TO BEAD UNSEATING: When tested in accordance with the foregoing procedures, the applied force required to unseat the tire bead at the point of contact shall not be less than 2,500 pounds for conventional tires mounted on 13, 14, or 15 inch rims conforming to Tire and Rim Association, Inc. standards.
- 4. IDENTIFICATION: Each tire which meets or exceeds the standards prescribed by these regulations shall be permanently identified in the English language on one sidewall thereof at a location which will normally not be obstructed by the rim when the tire is inflated on the rim and will normally not be removed in a retreading or recapping process, with at least the following information:
 - (a) Manufacturer's or distributor's name or trademark
 - (b) Brand name, if any
 - (c) Size
 - (d) The designation "V-1," see design type and size as shown in Figure 3

On the other sidewall of the tire there shall appear at least the designation "V-1" at a location which will normally not be obstructed by the rim when the tire is inflated on the rim and will normally not be removed in a retreading or recapping process.

5. REPORT: Any report required to be made to secure approval under this regulation shall include full information on tests and observations made as required by this regulation.

Adopted: May 14, 1965

Revised: October 11, 1965

Issued: February, 1966

TABLE 1

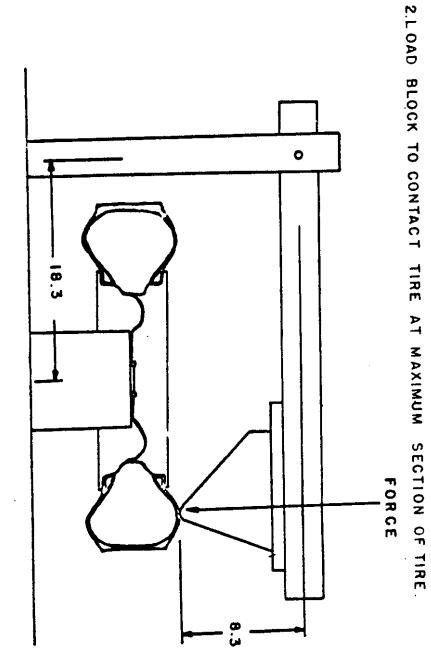
Tire Size (Nominal) Inches	Ply Rating	Measuring Rim (T&RA) Inches	Load Lbs.	Tire Inflation Lbs./Sq.Ii	Cross Sec. (Minimum) n. Inches
6.00-13	4	4 J	730	24	5.70
6.50-13	4	4 1∕2 J	840	24	6.25
7.00-13	4	5J	920	24	6.70
6.00-14	4	4 J	800	24	5.75
6.50-14	4	4 ½ K	890	24	6.25
7.00-14	4	5 K	980	24	6.70
7.50-14	4	5½K	1090	24	7.20
8.00-14	4	6K	1180	24	7.70
8.50-14	4	6K	1270	24	7.85
9.00-14	4	$6\%\mathbf{K}$	1360	24	8.25
9.50-14	4	6 1⁄2 K	1470	24	8.55
6.00-15	4	4 J	900	26	5.75
6.50-15	4	41/4K	1000	26	6.25
6.70-15	4	414K	1120	26	6.55
7.10-15	4	5 K	1210	26	6.95
7.60-15	$\tilde{4}$	51/4K	1320	26	7.45
8.00-15	. 4	6L	1400	26	7.85
8.20-15	4	6L	1420	24	8.00
8.90-15	$\hat{6}$	61/2 L	1790	28	8.80
6.15-14	4	4 J	730	24	5.70
6.45-14	4	4 ½ J	840	24	6.25
6.95-14	4	5 J	920	24	6.65
7.35-14	4	5 J	1020	24	6.95
7.75-14	4	5½JK	1120	24	7.35
8.25-14	4	6JK	1210	24	7.80
8.55-14	$\hat{4}$	6JK	1320	24	8.10
8.85-14	4	6½JK	1390	24	8.50
6.35-15	4	414J	800	24	5.95
6.85-15	4	5 J	800	24	6.45
7.35-15	4	514JK	1035	24	7.05
7.75-15	. 4	516JK	1100	24	7.15
8.15-15	4	6JK	1180	24	7.65
8.45-15	4	6JK	1280	24	7.85
8.85-15	4	61 ₂ JK	1370	24	8.25
9.15-15	4	61gJK	1470	24	8.50
9.00-15	· 4	6JK	1420	24	8.00

TABLE 2
MINIMUM BREAKING ENERGY REQUIREMENTS

Tire Size Code	Minimum Breaking Inches-Lbs.
6,00-13	1250
6.50-13	1250
7.00-13	1375
	1250
6.00-14	1250
6.50-14	1375
7.00-14	1500
7.50-14	1625
8.00-14	1625
8.50-14	
9.00-14	1625
9.50-14	1625
6.00-15	1250
6.50-15	1250
6,70-15	1375
7.10-15	1375
7.60-15	1500
8.00-15	1625
8.20-15	1625
8.90-15	1875
£ 15 14	1250
6.15-14 6.45-14	1250
6.95-14	1250
7.35-14	1375
7.75-14	1500
8.25-14	1625
8.55-14 8.55-14	1625
8.85-14	1625
	1250
6.35-15	1250
6.85-15	1250 . 1250
7.35-15	1375
7.75-15	1375
8.15-15	1500
8.45-15	1500 1625
8.85-15	
9.15-15	1625
9.00-15	1625

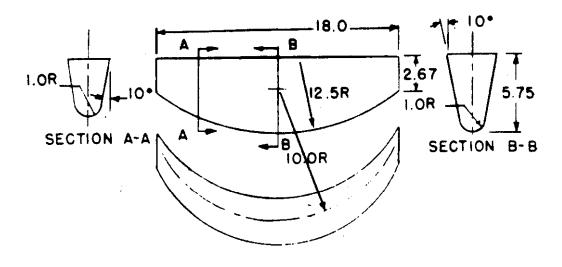
FIGURE 1

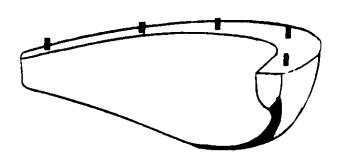
ILOAD ARM TO BE PARALLEL TO TIRE & RIM ASSEMBLY AT TIME OF ENGAGEMENT



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FIGURE 2

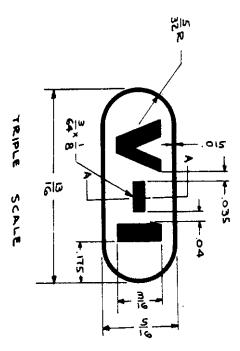




MATERIAL : HARDWOOD

Figure 3





MOLD MOLD TIRE

TOLERAPE ON THISTED SUFFACE:

± 010" ON PERMITTORIL SIMPLISTORS.

± 002" ON PERMIT. PROFISEOUS.

VILLES OTHERWISE PROPARTED.

V-1 TO BE . 025 DEEP.

YE SC