



Transport  
Canada  
Motor Vehicle  
Safety

Transports  
Canada  
Sécurité des  
véhicules  
automobiles

## TECHNICAL STANDARDS DOCUMENT No. 119, Revision 1

# New Tires for Motor Vehicles With a GVWR of More Than 4 536 kg and Motorcycles

The text of this document is based on Federal Motor Vehicle Safety Standard No. 119, *New pneumatic tires for motor vehicles with a GVWR of more than 4,536 kilograms (10,000 pounds) and motorcycles*, as published in the U.S. *Code of Federal Regulations*, Title 49, Part 571, revised as of October 1, 2009.

<b>Publication Date:</b>	<b>November 20, 2013</b>
<b>Effective Date:</b>	<b>November 20, 2013</b>
<b>Mandatory Compliance Date:</b>	<b>September 1, 2014</b>

*(Ce document est aussi disponible en français)*

## Introduction

As defined by section 12 of the *Motor Vehicle Safety Act*, a Technical Standards Document (TSD) is a document that is published by the Minister, as provided for in the regulations, that adapts, or that reproduces in whole or in part in the official languages of Canada, an enactment of a foreign government or material produced by an international organization. The adaptations may include amendments to the content of the originating enactment or material. Furthermore, the *Motor Vehicle Safety Regulations (MVSR)* may contain provisions setting out that the provisions of the Regulations prevail over the provisions of the TSD in the case of inconsistency. Consequently, it is advisable to read a TSD in conjunction with the Act and its counterpart Regulation. As a guide, where the MVSR contains a provision that specifies additional requirements or removes requirements from the TSD, footnotes will refer the reader to that provision of the MVSR.

TSDs are amended from time to time to include amendments made to the originating enactment or material, with adaptations as required. When the TSD is amended, a Notice of Revision is published in the *Canada Gazette* Part I. All TSDs are assigned a revision number, with “Revision 0” designating the initial version.

## Identification of Changes

Adaptations may be made that include amendments to the content of the originating enactment or material. Such adaptations are marked as follows:

- Underlined text indicates text that is not part of the originating enactment or material and which therefore represents additional text in comparison to the originating text.
- Struck out text is text reproduced from the originating enactment or material that has been deleted from the TSD and thus it is not to be read as part of the TSD nor as part of the material incorporated by reference into the MVSR.
- “CONTENT NOT REPRODUCED” informs the reader that the text of the corresponding provision of the originating enactment or material has not been reproduced in the TSD.

## Publication, Effective and Mandatory Compliance Dates

The publication date is the date the TSD appears on the Transport Canada website.

The effective date of an initial TSD (revision 0) is the date of coming into force of the provision of the MVSR that incorporates it by reference (the incorporating provision).

Similarly, the effective date of a revised TSD (e.g. revision 1) that is accompanied by an amendment to the incorporating provision of the MVSR is the date of coming into force of the amended incorporating provision.

The effective date of a revised TSD (e.g. revision 2) that is not accompanied by an amendment to the incorporating provision of the MVSR is the date of publication of the TSD.

The mandatory compliance date is the date upon which compliance with the requirements of the TSD is required by law. If the effective date and mandatory compliance date are different, a manufacturer may follow the requirements that were applicable before the effective date, or those of the TSD, until the mandatory compliance date.

## **Official Version of Technical Standards Documents**

The PDF version is a replica of the TSD as published by the Department and is to be used for the purposes of legal interpretation and application.

## Table of Contents

<b>Introduction</b> .....	<b>1</b>
<b>S1. Scope</b> .....	<b>1</b>
<b>S2. Purpose</b> .....	<b>1</b>
<b>S3. Application</b> .....	<b>1</b>
<b>S4. Definitions</b> .....	<b>1</b>
<b>S5. Tire and rim matching information</b> .....	<b>2</b>
<b>S6. Requirements</b> .....	<b>2</b>
S6.1 Endurance .....	2
S6.2 Strength.....	2
S6.3 High speed performance.....	2
S6.4 Treadwear indicators .....	2
S6.5 Tire markings.....	3
S6.6 Maximum load rating .....	4
<b>S7. Test procedures</b> .....	<b>4</b>
S7.1 General conditions .....	4
S7.2 Endurance .....	4
S7.3 Strength.....	5
S7.4 High speed performance .....	6

## List of Tables

<b>Table I — Strength Test Plunger Diameter</b> .....	<b>7</b>
<b>Table II — Minimum Static Breaking Energy (Part 1 of 2)</b> .....	<b>8</b>
<b>Table II — Minimum Static Breaking Energy (Part 2 of 2)</b> .....	<b>9</b>
<b>Table III — Endurance Test Schedule</b> .....	<b>10</b>

## S1. Scope

This Technical Standards Document (TSD) standard establishes performance and marking requirements for tires for use on motor vehicles with a GVWR of more than 4 536 kg (10 000 pounds) and motorcycles.

## S2. Purpose

The purpose of this TSD standard is to provide safe operational performance levels for tires used on motor vehicles with a GVWR of more than 4 536 kg (10 000 pounds), trailers, and motorcycles, and to place sufficient information on the tires to permit their proper selection and use.

## S3. Application

[CONTENT DELETED] For applicability, see subsection 4(1) of the [Motor Vehicle Tire Safety Regulations](#).

## S4. Definitions

All terms defined in the [Motor Vehicle Tire Safety Regulations](#) (MVTSR) and in TSD 109 and TSD 139 Act and the rules and standards issued under its authority are used as defined therein<sup>1</sup>.

<sup>2</sup>~~**Light-truck tire** Light truck tire means a tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles. (*Pneu pour camion léger*)~~

**Model rim assembly** means a test device that :

- (a) includes a rim which conforms to the published dimensions of a commercially available rim,
- (b) includes an air valve assembly when used for testing tubeless tires or an innertube and flap (as required) when used for testing tube type tires, and
- (c) undergoes no permanent rim deformation and allows no loss of air through the portion that it comprises of the tire-rim pressure chamber when a tire is properly mounted on the assembly and subjected to the requirements of this TSD standard.

*(Ensemble de jante modèle)*

---

<sup>1</sup> Please see subsection 1(3) of the [Motor Vehicle Tire Safety Regulations](#) (MVTSR) for the applicable requirements.

<sup>2</sup> Please see subsection 2(1) of the [Motor Vehicle Safety Regulations](#) for the applicable definition.

**Retreaded tire** means a tire, on which only the tread has been removed and replaced and whose original markings remain. This definition excludes tires not designed by the manufacturer of the original tire to have the tread removed and replaced. (*Pneu Rechapé*)

## S5. Tire and rim matching information

[CONTENT DELETED] Please see section 8 of the MVTSR for the applicable requirements.

## S6. Requirements

Each tire, except a retreaded tire, shall be capable of meeting any of the applicable requirements set forth below, when mounted on a model rim assembly corresponding to any rim designated by the tire manufacturer for use with the tire in accordance with section 8 of the MVTSR S5. However, a particular tire need not meet further requirements after having been subjected to and met the endurance test (S6.1), strength test (S6.2), or high speed performance test (S6.3).

### S6.1 Endurance

**S6.1.1** Prior to testing in accordance with the procedures of S7.2, a tire, except a retreaded tire, shall exhibit no visual evidence of tread, sidewall, ply, cord, innerliner, or bead separation, chunking, broken cords, cracking, or open splices.

**S6.1.2** When tested in accordance with the procedures of S7.2:

- (a) There shall be no visual evidence of tread, sidewall, ply, cord, innerliner, or bead separation, chunking, broken cords, cracking, or open splices.
- (b) The tire pressure at the end of the test shall be not less than the initial pressure specified in S7.2(a).

### S6.2 Strength

When tested in accordance with the procedures of S7.3, except a retreaded tire, a tire's average breaking energy value shall be not less than the value specified in Table II for that tire's size and load range.

### S6.3 High speed performance

When tested in accordance with the procedures of S7.4 ~~S7.3~~, a tire, except a retreaded tire, shall meet the requirements set forth in S6.1.1 and S6.1.2(a) and (b). However, this requirement applies only to motorcycle tires and to non-speed-restricted tires of nominal rim diameter code 14.5 or less marked load range A, B, C, or D.

### S6.4 Treadwear indicators

Except as specified in this paragraph, each tire, except a retreaded tire, shall have at least six treadwear indicators spaced approximately equally around the circumference of the tire that

enable a person inspecting the tire to determine visually whether the tire has worn to a tread depth of 1.6 mm (one-sixteenth of an inch). Tires with a rim diameter code of 12 or smaller shall have at least three such treadwear indicators. Motorcycle tires shall have at least three such indicators which permit visual determination that the tire has worn to a tread depth of 0.8 mm (one-thirty-second of an inch).

## S6.5 Tire markings

Except as specified in this paragraph, each tire, except a retreaded tire, shall be marked on each sidewall with the information specified in paragraphs (a) through (j) of this section. The markings shall be placed between the maximum section width (exclusive of sidewall decorations or curb ribs) and the bead on at least one sidewall, unless the maximum section width of the tire is located in an area which is not more than one-fourth of the distance from the bead to the shoulder of the tire. If the maximum section width falls within that area, the markings shall appear between the bead and a point one-half the distance from the bead to the shoulder of the tire, on at least one sidewall. The markings shall be in letters and numerals not less than 2 mm (0.078 inch) high and raised above or sunk below the tire surface not less than 0.4 mm (0.015 inch), except that the marking depth shall be not less than 0.25 mm (0.010 inch) in the case of motorcycle tires. The tire identification and the national safety mark DOT symbol labeling shall comply with sections 6 and 7 of the MVTSR part 574 of this chapter. Markings may appear on only one sidewall and the entire sidewall area may be used in the case of motorcycle tires and recreational, boat, baggage, and special trailer tires.

- (a) ~~The symbol DOT, which shall constitute a certification that the tire conforms to applicable Federal motor vehicle safety standards. This symbol may be marked on only one sidewall.~~<sup>3</sup>
- (b) The tire identification number required by section 6 of the MVTSR part 574 of this chapter. This number may be marked on only one sidewall.
- (c) The tire size designation as listed in the documents and publications designated in section 8 of the MVTSR §5.1.
- (d) The maximum load rating and corresponding inflation pressure of the tire, shown as follows:

*(Mark on tires rated for single and dual load):*

Max load single \_\_\_ kg (\_\_\_ lb) at \_\_\_ kPa (\_\_\_ psi) cold. Max load dual \_\_\_ kg (\_\_\_ lb) at \_\_\_ kPa (\_\_\_ psi) cold.

*(Mark on tires rated only for single load):*

Max load \_\_\_ kg (\_\_\_ lb) at \_\_\_ kPa (\_\_\_ psi) cold.

---

<sup>3</sup> Please see section 7 of the [MVTSR](#) for the applicable requirements.

- (e) The speed restriction of the tire, if 90 km/h (55 mph) or less, shown as follows:

Max speed \_\_\_ km/h (\_\_\_ mph).

- (f) The actual number of plies and the composition of the ply cord material in the sidewall and, if different, in the tread area;
- (g) The words “tubeless” or “tube type” as applicable.
- (h) The word “ regroovable ” if the tire is designed for regrooving.
- (i) The word “radial” if a radial ply tire.
- (j) The letter designating the tire load range.

## **S6.6 Maximum load rating**

If the maximum load rating for a particular tire size is shown in one or more of the publications described in subsection 8(2) of the MVTSR S5.1(b), each tire, except a retreaded tire, of that size designation shall have a maximum load rating that is not less than the published maximum load rating, or if there are differing published ratings for the same tire size designation, not less than the lowest published maximum load rating for the size designation.

## **S7. Test procedures**

### **S7.1 General conditions**

**S7.1.1** The tests are performed using an appropriate new tube, tube valve, and flap assembly (as required) that allows no loss of air for testing of tube-type tires under S7.2, S7.3, and S7.4, and tubeless tires under S7.3.

**S7.1.2** The tire must be capable of meeting the requirements of S7.2 and S7.4 when conditioned to a temperature of 35°C (95°F) for 3 hours before the test is conducted, and with an ambient temperature maintained at 35°C (95°F) during all phases of testing. The tire must be capable of meeting the requirements of S7.3 when conditioned at a temperature of 21°C (70°F) for 3 hours before the test is conducted.

### **S7.2 Endurance**

- (a) Mount the tire on a model rim assembly and inflate it to the inflation pressure corresponding to the maximum load rating marked on the tire. Use a single maximum load value when the tire is marked with both single and dual maximum load.
- (b) After conditioning the tire-rim assembly in accordance with S7.1.2, adjust the tire pressure to that specified in (a) immediately before mounting the tire-rim assembly.
- (c) Mount the tire-rim assembly on an axle and press it against a flat-faced steel test wheel that is 1 708 mm (67.23 inches) in diameter and at least as wide as the tread of the tire.



- (d) Apply the test load and rotate the test wheel as indicated in Table III for the type of tire tested conducting each successive phase of the test without interruption.
- (e) Immediately after running the tire the required time, measure the tire inflation pressure. Remove the tire from the model rim assembly and inspect the tire.

### S7.3 Strength

- (a) Mount the tire on a model rim assembly and inflate it to the pressure corresponding to the maximum load, or maximum dual load where there is both a single and dual load marked on the tire. If the tire is tubeless, a tube may be inserted to prevent loss of air during the test in the event of puncture.
- (b) After conditioning the tire-rim assembly in accordance with S7.1.2, adjust the tire pressure to that specified in (a).
- (c) Force a cylindrical steel plunger, with a hemispherical end and of the diameter specified in Table I for the tire type and size, perpendicularly into a raised tread element as near as possible to the centerline of the tread, at a rate of 50 mm (2 inches) per minute, until the tire breaks or the plunger is stopped by the rim.
- (d) Record the force and the distance of penetration just before the tire breaks, or if it fails to break, just before the plunger is stopped by the rim.
- (e) Repeat the plunger application at 72° intervals around the circumference of the tire, until five measurements are made. However, in the case of tires of 12 inch rim diameter code or smaller, repeat the plunger application at 120° intervals around the circumference of the tire, until three measurements are made.
- (f) Compute the breaking energy for each test point by one of the two following formulas:

$$W = \frac{F \times P}{2} \times 10^{-3}$$

Where:

W = Breaking energy in joules (J) (~~kJ~~),

F = Force in newtons (N), and

P = Penetration in millimeters (mm), or;

$$W = \frac{F \times P}{2}$$

Where:

W = Breaking energy in inch-pounds,

F = Force in pounds, and

P = Penetration in inches.

- (g) Determine the average breaking energy value for the tire by computing the average of the values obtained in accordance with paragraph (f).

#### **S7.4 High speed performance**

- (a) Perform steps (a) through (c) of S7.2.
- (b) Apply a force of 88 percent of the maximum load rating marked on the tire (use single maximum load value when the tire is marked with both single and dual maximum loads), and rotate the test wheel at 250 rpm for 2 hours.
- (c) Remove the load, allow the tire to cool to 35°C (95°F), and then adjust the pressure to that marked on the tire for single tire use.
- (d) Reapply the same load, and without interruption or readjustment of the inflation pressure, rotate the test wheel at 375 rpm for 30 minutes, then at 400 rpm for 30 minutes, and then at 425 rpm for 30 minutes.
- (e) Immediately after running the tire the required time, measure the tire inflation pressure. Remove the tire from the model rim assembly and inspect the tire.

**Table I — Strength Test Plunger Diameter**

Tire type	Plunger diameter	
	mm	inches
<u>Light-truck</u> <del>Light truck</del>	19.05	¾
Motorcycle	7.94	5/16
≤ 12 rim diameter code (except motorcycles)	19.05	¾
Tubeless:		
≤ 17.5 rim diameter code	19.05	¾
> 17.5 rim diameter code, load range F or less	31.75	1¼
> 17.5 rim diameter code, load range over F	38.10	1½
Tube-type:		
Load range F or less	31.75	1¼
Load range over F	38.10	1½

**Table II — Minimum Static Breaking Energy (Part 1 of 2)**

[Joules (J) and inch-pounds (in-lb)]

Tire characteristic	Motorcycle		All 12 Rim diameter code or smaller except motorcycle		<del>Light-truck</del> <b>Light truck and 17.5 rim diameter code or smaller tubeless</b>	
	Plunger diameter					
Plunger diameter	7.94 mm	5/16 in	19.05 mm	¾ in	19.05 mm	¾ in
Breaking Energy	J	in-lb	J	in-lb	J	in-lb
<b>Load Range:</b>						
A	16	150	67	600	225	2 000
B	33	300	135	1 200	293	2 600
C	45	400	203	1 800	361	3 200
D			271	2 400	514	4 550
E			338	3 000	576	5 100
F			406	3 600	644	5 700
G					711	6 300
H					768	6 800
J						
L						
M						
N						

Note: For rayon cord tires, applicable energy values are 60 percent of those in the table.

Measurements in joules are rounded down to the nearest whole number.

**Table II — Minimum Static Breaking Energy (Part 2 of 2)**

[Joules (J) and inch-pounds (in-lb)]

Tire characteristic	Tires other than for light-truck, motorcycle, 12 rim diameter code or smaller							
	Tube type		Tubeless greater than 17.5 rim diameter code		Tube type		Tubeless greater than 17.5 rim diameter code	
<b>Plunger diameter</b>	31.75 mm	1¼ in	31.75 mm	1¼ in	38.10 mm	1½ in	38.10 mm	1½ in
<b>Breaking Energy</b>	J	in-lb	J	in-lb	J	in-lb	J	in-lb
<b>Load Range:</b>								
A								
B								
C	768	6 800	576	5 100				
D	892	7 900	734	6 500				
E	1 412	12 500	971	8 600				
F	1 785	15 800	1 412	12 500				
G					2 282	20 200	1 694	15 000
H					2 598	23 000	2 090	18 500
J					2 824	25 000	2 203	19 500
L					3 050	27 000		
M					3 220	28 500		
N					3 389	30 000		

Note: For rayon cord tires, applicable energy values are 60 percent of those in the table.

Measurements in joules are rounded down to the nearest whole number.

Table III — Endurance Test Schedule<sup>4</sup>

Description	Load range	Test wheel speed		Test load: Percent of maximum load rating			Total test revolutions (thousands)
		km/h	r/m	I- 7 hours	II- 16 hours	III- 24 hours	
<b>Speed-restricted service:</b> 90 km/h (55 mph)	F, G, H, J, L, M, N	40	125	66	84	101	352.0
80 km/h (50 mph)	F, G, H, J, L	32	100	66	84	101	282.5
56 km/h (35 mph)	All	24	75	66	84	101	211.0
<b>Motorcycle</b>	All	80	250	100 <sup>1</sup>	108 <sup>2</sup>	117	510.0
<b>All Other</b>	F	64	200	66	84	101	564.0
	G	56	175	66	84	101	493.5
	H, J, L, N	48	150	66	84	101	423.5

~~4 hours for tire sizes subject to high speed requirements (S6.3).~~

~~6 hours for tire sizes subject to high speed requirements (S6.3).~~

<sup>4</sup> Please see the table to subsection 4(2) of the [MVTSR](#) for the applicable requirements.