INTERNATIONAL STANDARD

ISO 9112

First edition
1991-02-15

Truck and bus tyres — Method of measuring tyre rolling circumference — Loaded new tyres

Pneumatiques pour véhicules utilitaires et autobus — Méthode de mesure de la circonférence de roulement — Pneumatiques neufs en charge

Reference number
ISO 9112:1991(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9112 was prepared by Technical Committee ISO/TC 31, *Tyres, rims and valves*.

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Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Truck and bus tyres — Method of measuring tyre rolling circumference — Loaded new tyres

1 Scope

This International Standard specifies the method for measuring rolling circumference and revolutions per unit distance (kilometre) for new tyres, under loaded conditions, made for use on trucks and buses. The values thus obtained are not intended for use as levels of performance or quality.

This International Standard applies to all truck and bus tyres.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4209-1:1988, *Truck and bus tyres and rims (metric series) — Part 1: Tyres.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 revolutions per unit distance: Number of tyre revolutions (and portions thereof) that occur when the (axle) centre of the tyre is moved exactly the unit distance of 1 km, under the conditions specified below.

3.2 rolling circumference of tyre: Distance that the (axle) centre of the tyre moves in one revolution of the tyre under the conditions specified below.

4 Principle

The measurement method consists of driving a typical vehicle equipped with the test tyres on the drive axle, on a straight, level, paved road at a constant speed, and counting the number of tyre revolutions (or portions thereof) that occur while traversing an accurately measured distance.

5 Measurement requirements

5.1 Test course

The test course shall be a level, straight section of smooth, dry road surfaced with either asphalt or concrete pavement of medium roughness. The longitudinal and transverse gradient of the road shall be at most 1 %. The length of the course shall be 500 m or longer depending on the accuracy of the test equipment as specified in 5.4.

The length of the test course, expressed in metres, shall be measured to within 0,1 %.

5.2 Weather during test

The ambient temperature shall be between 5 °C and 30 °C; however, an asphaltic surface shall be sufficiently cool that the surface is not tacky. The wind speed shall not exceed 3 m/s.

5.3 Test speed

For tyres with a speed symbol

— G (90 km/h) and above, the test speed shall be 70 km/h ± 2 km/h;

— below G or with a maximum speed marking lower than 90 km/h, the test speed shall be approximately 75 % ± 2 km/h of such a speed.

NOTE 1 When tyres are not marked with a speed symbol, the test should be at 70 km/h ± 2 km/h.

5.4 Test equipment accuracy

The minimum number of impulses per revolution shall be 16. The overall error in the revolution-counting equipment including start and stop errors shall not exceed 0,1 %.

6 Vehicle for measurements

6.1 Test vehicle and tyre positions

The vehicle shall be representative of the size used with the tyre size being tested.

The vehicle shall have only two axles. Since most speedometers and odometers are actuated from the drive-shaft, the test tyres shall be fitted to the drive axle. For four-wheel drive vehicles, one axle shall be disengaged.

Tyre sizes that are normally used as duals on drive axles shall be tested as duals.

6.2 Test load

The load on the drive axle shall be 80 % of the maximum rated tyre load (80 % of maximum dual load rating for tyre sizes normally used as duals on drive axles) times the number of tyres on the axle, within ± 2 %.

The tyre maximum load capacity is the value corresponding to the load index moulded on the sidewall of the tyre.

NOTE 2 When not so marked, the tyre manufacturer literature should be consulted for the maximum load capacity at the speed indicated by the speed symbol rating of the tyre.

The load on the other axle should be as obtained with normal load distribution.

7 Tyres and rims

7.1 Test tyres

7.1.1 The tyres shall be a matched set of the same size designation, type, and brand having inflated unloaded overall diameters within 0,5 % of each other.

7.1.2 For future comparisons with other tyres, record the overall diameter of the new tyres. This shall be measured as specified in ISO 4209-1.

7.2 Tyre inflation pressure

The inflation pressure of the tyre at ambient temperature shall be that pressure corresponding to the maximum load capacity (maximum dual load capacity for tyre sizes normally used as duals on drive axles) specified by the manufacturer.

7.3 Tyre break-in

Prior to the test, the tyres shall be conditioned by running at least 150 km at an average speed of approximately 70 km/h at the load and inflation specified in 6.2 and 7.2 respectively.

After break-in, the tyres shall not have more than 10 % loss of tread depth.

7.4 Test rims

The rims shall be of the size and type approved by the tyre manufacturer for use with the test tyre in highway service. In the absence of such information, the rim nearest or equivalent to the standardized measuring rim shall be chosen.

8 Procedure

8.1 After the tyres have been broken in as indicated in 7.3, allow the tyres to stand inflated at the ambient temperature of the test area for at least 3 h. During this time, the tyre and wheel assembly may be installed on the test vehicle.

8.2 Adjust the inflation to the pressure specified in 7.2. The load shall be that specified in 6.2.

8.3 Drive the vehicle at the test speed for approximately 60 min to warm up the tyres. After warm-up, the inflation pressure shall not be readjusted: the test is run with pressure build-up to simulate normal service conditions.

8.4 Run the test immediately at the test speed specified in 5.3 over the test course specified in 5.1. This requires an approach road at both ends of the test course to allow the course to be entered at the test speed.

Acceleration, braking, and steering shall be kept to an absolute minimum during the measurements.

8.5 Record the number of revolutions (and portions thereof) of the right test wheel and the left test wheel that occur over the test course.

8.6 Repeat the test to a total of traversing the course twice in each direction.

8.7 If the number of revolutions for each wheel on the second run differs from the first run in the same direction by more than 0,2 %, repeat the test until two runs are obtained in each direction with the number of revolutions within 0,2 % for each wheel.

9 Calculations

9.1 Accuracy

A calculation is made for each of the eight readings (i.e. four runs for each drive wheel) that comply with the accuracy requirements of 8.7.

The eight calculated figures are then averaged to obtain the rated value. The revolutions per unit distance (see 9.2) and the rolling circumference (see 9.3) are then rounded to the nearest unit.

9.2 Revolutions per unit distance

The number of tyre revolutions per unit distance is determined by dividing the measured revolutions (and portions thereof) by the measured distance traversed in the test. Thus the number of revolutions per kilometre is given by the expression:

$$\frac{\text{Measured revolutions}}{\text{Test course length}} \times 10^3$$

where the test course length is expressed in metres.

9.3 Rolling circumference

The rolling circumference is determined by dividing the length of the test course by the number of revolutions. Thus the rolling circumference, in millimetres, is given by the expression:

$$\frac{\text{Test course length}}{\text{Measured revolutions}} \times 10^3$$

where the test course length is expressed in metres.

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UDC 629.114.4/.5:629.11.012.55:620.16

Descriptors: road vehicles, trucks, buses (vehicles), tyres, pneumatic tyres, dimensions, tests, performance tests, performance evaluation.

Price based on 3 pages