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Agricultural tractor drive wheel tyres — Method of measuring tyre rolling circumference

Pneumatiques pour roues motrices de tracteurs agricoles — Méthode de mesure de la circonférence de roulement

Reference number
ISO 11795:1997(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 11795 was prepared by Technical Committee ISO/TC 31, *Tyres, rims and valves*, Subcommittee SC 5, *Agricultural tyres and rims*.

Annex A of this International Standard is for information only.

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Introduction

Matching front and rear wheels with different tyre sizes on four-wheel drive agricultural tractors requires accurate rolling circumference values. The test method to determine rolling circumference outlined below was developed to follow this requirement. The values thus obtained are not intended for use as levels of performance or quality.

The test speed has been set at typical working speed when the four-wheel drive will likely be engaged and the most critical match is required. Generally, the four-wheel drive is disengaged at roading speeds. Therefore, the determination of rolling circumference is not related to the tyre's maximum speed, e.g. 30 km/h or 40 km/h. Nevertheless, other speeds or conditions may be run provided it is clearly documented in the results.

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Agricultural tractor drive wheel tyres — Method of measuring tyre rolling circumference

1 Scope

This International Standard specifies the method for measuring rolling circumference for new tyres, under loaded conditions, made for use on agricultural tractors and machines, and applies to agricultural tractor drive wheel tyres in diagonal and radial construction.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were 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 editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4251-1:—[1], *Tyres (ply rating marked series) and rims for agricultural tractors and machines — Part 1: Tyre designation and dimensions, and approved rim contours.*

ISO 4251-2:—[2], *Tyres (ply rating marked series) and rims for agricultural tractors and machines — Part 2: Tyre load ratings.*

ISO 7867-1:1996, *Tyres and rims (metric series) for agricultural tractors and machines — Part 1: Tyre designation, dimensions, marking and tyre/rim coordination.*

ISO 7867-2:1996, *Tyres and rims (metric series) for agricultural tractors and machines — Part 2: Service description and load ratings.*

ISO 8664:1992, *Agricultural tractor drive-wheel tyres — Service description (load index - speed symbol) marked tyres.*

3 Definition

For the purposes of this International Standard, the following definition applies.

3.1 rolling circumference of tyre
distance that the (axle) centre of the tyre moves in one revolution of the tyre under the conditions specified in clause 5

4 Principle

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

1) To be published. (Revision of ISO 4251-1:1992)
2) To be published. (Revision of ISO 4251-2:1992)

5 Test conditions

5.1 Tyre installation

Tyre to be tested shall be installed as a single on the drive wheels of a vehicle which shall be representative of that used with the tyre size being tested. An approved rim in accordance with ISO 4251-1, ISO 7867-1 or ISO 8664 shall be used.

Only the test axle shall be driven.

5.2 Test tyres

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.

5.3 Tyre load and inflation pressure

The load on each tyre shall be the maximum rated load at 30 km/h, in accordance with ISO 4251-2, ISO 7867-2 or ISO 8664. Tyre inflation pressure shall be the reference inflation pressure that corresponds to the 30 km/h load. The tyre shall be inflated with air only.

5.4 Tyre measurement

The overall diameter of each tyre shall be measured after being inflated for 24 h at ambient temperature with no applied load and the inflation pressure specified in 5.3. Inflation pressure shall be checked and adjusted, if necessary, immediately prior to measurement.

5.5 Test course

The test course for the distance specified in clause 6 shall be a level, straight section of flat, dry road surface (asphalt or concrete).

5.6 Weather conditions

The ambient air temperature for measuring, warm-up, and test 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 15 km/h.

5.7 Test measurement

Distance shall be determined by direct measurement or by tyre use of a calibrated fifth wheel. Each tyre on test shall be instrumented to return a minimum of eight impulses per revolution.

5.8 Test speed

Tyres shall be tested at 10 km/h ± 2 km/h.

6 Method of test

6.1 Test preparation

Immediately prior to testing, the inflation pressure of the loaded tyres shall be adjusted to the inflation pressure specified in 5.3 at the ambient temperature. Tyres shall be run for 30 min at 25 km/h ± 5 km/h or until inflation pressure stabilizes (warm-up). The inflation pressure shall not be readjusted afterwards.

6.2 Test procedure

Immediately after the test preparation, run the test at the speed specified in 5.8 to achieve a minimum of 1 000 impulses over a test course of 100 m minimum while recording the number of impulses for the right wheel and the left wheel separately. During the test run, a differential lock shall not be engaged, acceleration and braking shall be

avoided and steering input should be kept to minimum. Two runs shall be made in each direction of travel on the test course. Repeat this procedure if the number of impulses recorded on any run differs from the others by more than 0,2 %.

In the event of stoppage or interruption of the test, repeat the whole test.

7 Expression of results

The tyre rolling circumference is calculated by averaging the impulses recorded for the eight observations per test (4 runs × 2 tyres) and then using the following formula:

$$RC = \frac{1000 \times S \times ipr}{I}$$

where:

RC = rolling circumference, in millimetres;

S = test course length, in metres;

ipr = number of impulses per tyre revolution;

I = average number of impulses recorded per test.

8 Test report

The test report shall include the following information:

a) a reference to this International Standard;

b) the identification of the tested tyre;

c) the rim width (code);

d) the tyre overall diameter (mm);

e) the tyre load (kg);

f) the inflation pressure (kPa);

g) the ambient air temperature (°C);

h) the test speed (km/h);

i) the test distance (m);

j) the test result (rolling circumference in mm);

k) the date of the test (year-month-day).

9 Other test conditions

If desired and agreed upon among the interested parties, rolling circumference under other conditions may be determined by following the above method of test. The test report must clearly indicate that results were obtained under non-standard conditions which shall be defined.

Annex A
(informative)

Bibliography

ISO 4251-3:1994, *Tyres (ply rating marked series) and rims for agricultural tractors and machines — Part 3: Rims.*

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Descriptors: agricultural machinery, agricultural tractors, drive-wheels, tyres, pneumatic tyres, tests, determination, circumference, dimensional measurements.

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