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Agricultural tractor drive wheel tyres — Explanation of rolling circumference index (RCI) and speed radius index (SRI) and method of measuring tyre rolling circumference

Pneumatiques pour roues motrices de tracteurs agricoles — Explication de l'indice de circonférence de roulement (RCI) et de l'indice de rayon de roulement (SRI) et de la méthode de mesure de la circonférence de roulement

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ISO 11795:2018

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Foreword

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This document was prepared by Technical Committee ISO/TC 31, *Tyres, rims and valves*, Subcommittee SC 5, *Agricultural tyres and rims*.

This second edition cancels and replaces the first edition (ISO 11795:1997), which has been technically revised. It also incorporates the Amendment ISO 11795:1997/Amd.1:2010.

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 in this document 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 road 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 — Explanation of rolling circumference index (RCI) and speed radius index (SRI) and method of measuring tyre rolling circumference

1 Scope

This document 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. It also includes an explanation of the rolling circumference index (RCI) and speed radius index (SRI).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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ISO 7867-1, Metric series for agricultural, forestry machines and construction tyres — Part 1: Tyre designation, dimensions and marking, and tyre/rim coordination,

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ISO 7867-2, Metric series for agricultural, forestry machines and construction tyres — Part 2: Load ratings for agricultural tyres

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ISO 8664, Tyres for agricultural tractors and machines — Code-designated and service-description marked radial drive-wheel tyres

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

rolling circumference of tyre

distance that the (axle) centre of the tyre moves in one revolution of the tyre under specified conditions

Note 1 to entry: Test conditions are 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.

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 stamped on the tyre sidewall, 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.

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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 \pm 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 \pm 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 \times 2 tyres) and then using Formula (1):

$$RC = \frac{1\,000 \times S \times ipr}{n} \quad (1)$$

where

- RC is the rolling circumference, in millimetres;
 S is the test course length, in metres;
 ipr is the number of impulses per tyre revolution;
 n is the average number of impulses recorded per test.

8 Test report

The test report shall include the following information:

- a reference to this document, i.e. ISO 11795:2018;
- the identification of the tested tyre (tyre size designation and service description);
- the rim width code;
- the tyre overall diameter (mm);
- the tyre load (kg);
- the inflation pressure (kPa);
- the ambient air temperature ($^{\circ}$ C);
- the test speed (km/h);