



BSI Standards Publication

<http://www.china-gauges.com/>

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

National foreword

This British Standard is the UK implementation of ISO 11795:2018+A1:2022. It supersedes BS ISO 11795:2018, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO/IEC amendment 1 is indicated by

The UK participation in its preparation was entrusted to Technical Committee AUE, Tyres and wheels for motor vehicles.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2022
Published by BSI Standards Limited 2022

ISBN 978 0 539 03152 2

ICS 65.060.01; 83.160.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2018.

Amendments/corrigenda issued since publication

Date	Text affected
30 April 2022	Implementation of ISO amendment A1:2022

<http://www.china-gauges.com/>

**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*



<http://www.china-gauges.com/>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2018, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword.....	iv
Introduction.....	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principle	1
5 Test conditions	2
5.1 Tyre installation	2
5.2 Test tyres	2
5.3 Tyre load and inflation pressure.....	2
5.4 Tyre measurement	2
5.5 Test course	2
5.6 Weather conditions	2
5.7 Test measurement.....	2
5.8 Test speed.....	2
6 Method of test	2
6.1 Test preparation	2
6.2 Test procedure.....	3
7 Expression of results	3
8 Test report	3
9 Other test conditions	3
10 Rolling circumference index (RCI)	4
11 Speed radius index (SRI)	5

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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](http://www.iso.org/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.

<http://www.china-gauges.com/>

<http://www.china-gauges.com/>

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*

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

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

[ISO 7867-2](#), *Metric series for agricultural, forestry machines and construction tyres — Part 2: Load ratings for agricultural tyres*

[ISO 8664](#), *Tyres for agricultural tractors and machines — Code-designated and service-description marked radial drive-wheel tyres*

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 <http://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.

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 a 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 [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) a reference to this document, i.e. ISO 11795:2018;
- b) the identification of the tested tyre (tyre size designation and service description);
- 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 shall clearly indicate that results were obtained under non-standard conditions which shall be defined.

10 Rolling circumference index (RCI)

The RCI gives logical, even progression of rolling circumferences where each RC is approximately 5,4 % larger than the previous one.

Equal index differences have equal ratios in rolling circumference. If the front/rear rolling circumference ratio of a mechanical front wheel assist tractor is satisfactory with a front tyre RCI of 40 and a rear tyre RCI of 45 ($45 - 40 = 5$), the rolling circumference relationship between the front and rear tyres will be preserved with a front having an RCI of 41 and a rear having an RCI of 46 ($46 - 41 = 5$).

To decrease proliferation, it is recommended that R-1 and R-1W drive tyres be designed to fall on integer values of RCI. To accommodate deeper tread depth, RCI values for R-2 tyres should be .5 higher than equivalent R-1/R-1W RCI.

If RCI is included as part of the tyre designation on the tyre, it should be near but not part of the service description (RCI designation example: R-1 41).

For a tyre to have a certain RCI value, it shall be within $\pm 0,2$ of the RCI. Certain existing tyres may not fit within this tolerance and therefore an RCI number is not shown.

RCI values are shown in [Table 1](#).

Table 1 — Rolling circumference index (RCI) values

RCI value	Rolling circumference min mm	Rolling circumference (target)	Rolling circumference max mm
0	495	500	505
1	521	525	532
2	549	555	561
3	579	585	591
4	610	615	623
5	643	650	656
6	677	685	692
7	714	720	729
8	752	760	768
9	792	800	809
10	835	845	853
11	880	890	898
12	927	935	947
13	977	985	998
14	1 029	1 040	1 051
15	1 085	1 095	1 108
16	1 143	1 155	1 167
17	1 204	1 215	1 230
18	1 269	1 285	1 296
19	1 337	1 350	1 366
20	1 409	1 425	1 439
21	1 485	1 500	1 516
22	1 565	1 580	1 598
23	1 649	1 665	1 684
24	1 737	1 755	1 774
25	1 831	1 850	1 869

RCI value	Rolling circumference min mm	Rolling circumference (target)	Rolling circumference max mm
26	1 929	1 950	1 970
27	2 033	2 055	2 076
28	2 142	2 165	2 187
29	2 257	2 280	2 305
30	2 378	2 405	2 428
31	2 506	2 530	2 559
32	2 641	2 670	2 696
33	2 782	2 810	2 841
34	2 932	2 965	2 994
35	3 089	3 120	3 155
36	3 255	3 290	3 324
37	3 430	3 465	3 503
38	3 615	3 655	3 691
39	3 809	3 850	3 889
40	4 013	4 055	4 098
41	4 229	4 275	4 319
42	4 456	4 505	4 551
43	4 696	4 745	4 795
44	4 948	5 000	5 053
45	5 214	5 270	5 324
46	5 494	5 550	5 610
47	5 789	5 850	5 911
48	6 100	6 165	6 229
49	6 428	6 495	6 564
50	6 773	6 845	6 916
51	7 137	7 210	7 288
52	7 520	7 600	7 680
53	7 924	8 010	8 092

11 Speed radius index (SRI)

The speed radius index (SRI) is by convention a parameter used exclusively for the calculation of the theoretical speed of tractors during certain regional homologation procedures and for interchangeability of different tyre sizes. In no case can the SRI be used as, or converted into, an actual measurable value of rolling circumference.

When calculating the theoretical speed, no allowance shall be made for tyre dimensional deviations.

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than one device provided that it is accessible by the sole named user only and that only one copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than one copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright and Licensing team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email cservices@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Useful Contacts

Customer Services

Tel: +44 345 086 9001

Email: cservices@bsigroup.com

Subscriptions

Tel: +44 345 086 9001

Email: subscriptions@bsigroup.com

Knowledge Centre

Tel: +44 20 8996 7004

Email: knowledgecentre@bsigroup.com

Copyright & Licensing

Tel: +44 20 8996 7070

Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK