

BS EN ISO 4210-7:2014



BSI Standards Publication

Cycles — Safety requirements for bicycles

Part 7: Wheels and rims test methods (ISO
4210-7:2014)

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The UK participation in its preparation was entrusted to Technical Committee GME/25, Cycles.

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

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English Version

**Cycles - Safety requirements for bicycles - Part 7: Wheels and
rims test methods (ISO 4210-7:2014)**

Cycles - Exigences de sécurité des bicyclettes - Partie 7:
Méthodes d'essai des roues et des jantes (ISO 4210-
7:2014)

Fahrräder - Sicherheitstechnische Anforderungen an
Fahrräder - Teil 7: Prüfverfahren für Laufräder und Felgen
(ISO 4210-7:2014)

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Foreword

This document (EN ISO 4210-7:2014) has been prepared by Technical Committee ISO/TC 149 "Cycles" in collaboration with Technical Committee CEN/TC 333 "Cycles" the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2015, and conflicting national standards shall be withdrawn at the latest by July 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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The text of ISO 4210-7:2014 has been approved by CEN as EN ISO 4210-7:2014 without any modification.

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Test methods	1
4.1 Rotational accuracy.....	1
4.2 Wheel/tyre assembly — Static strength test — Test method.....	3
4.3 Wheels — Front/rear wheel retention devices secured — Test method.....	4
4.4 Greenhouse effect test for composite wheels — Test method.....	4
Annex A (informative) Wheel/tyre assembly — Fatigue test	6

Foreword

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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 149, *Cycles*, Subcommittee SC 1, *Cycles and major sub-assemblies*.

This first edition of ISO 4210-7, together with ISO 4210-1, ISO 4210-2, ISO 4210-3, ISO 4210-4, ISO 4210-5, ISO 4210-6, ISO 4210-8, and ISO 4210-9, cancels and replaces ISO 4210:1996, which has been technically revised.

ISO 4210 consists of the following parts, under the general title *Cycles — Safety requirements for bicycles*:

- *Part 1: Terms and definitions*
- *Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles*
- *Part 3: Common test methods*
- *Part 4: Braking test methods*
- *Part 5: Steering test methods*
- *Part 6: Frame and fork test methods*
- *Part 7: Wheels and rims test methods*
- *Part 8: Pedals and drive system test methods*
- *Part 9: Saddles and seat-post test methods*

Introduction

This International Standard has been developed in response to demand throughout the world, and the aim has been to ensure that bicycles manufactured in compliance with this International Standard will be as safe as is practically possible. The tests have been designed to ensure the strength and durability of individual parts as well as of the bicycle as a whole, demanding high quality throughout and consideration of safety aspects from the design stage onwards.

The scope has been limited to safety considerations, and has specifically avoided standardization of components.

If the bicycle is to be used on public roads, national regulations apply.

Cycles — Safety requirements for bicycles —

Part 7: Wheels and rims test methods

1 Scope

This part of ISO 4210 specifies wheel and rim test methods for ISO 4210-2.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4210-1, *Cycles — Safety requirements for bicycles — Part 1: Terms and definitions*

ISO 4210-2:2014, *Cycles — Safety requirements for bicycles — Part 2: Requirements for city and trekking, young adult, mountain and racing bicycles*

ISO 4210-3:2014, *Cycles — Safety requirements for bicycles — Part 3: Common test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4210-1 apply.

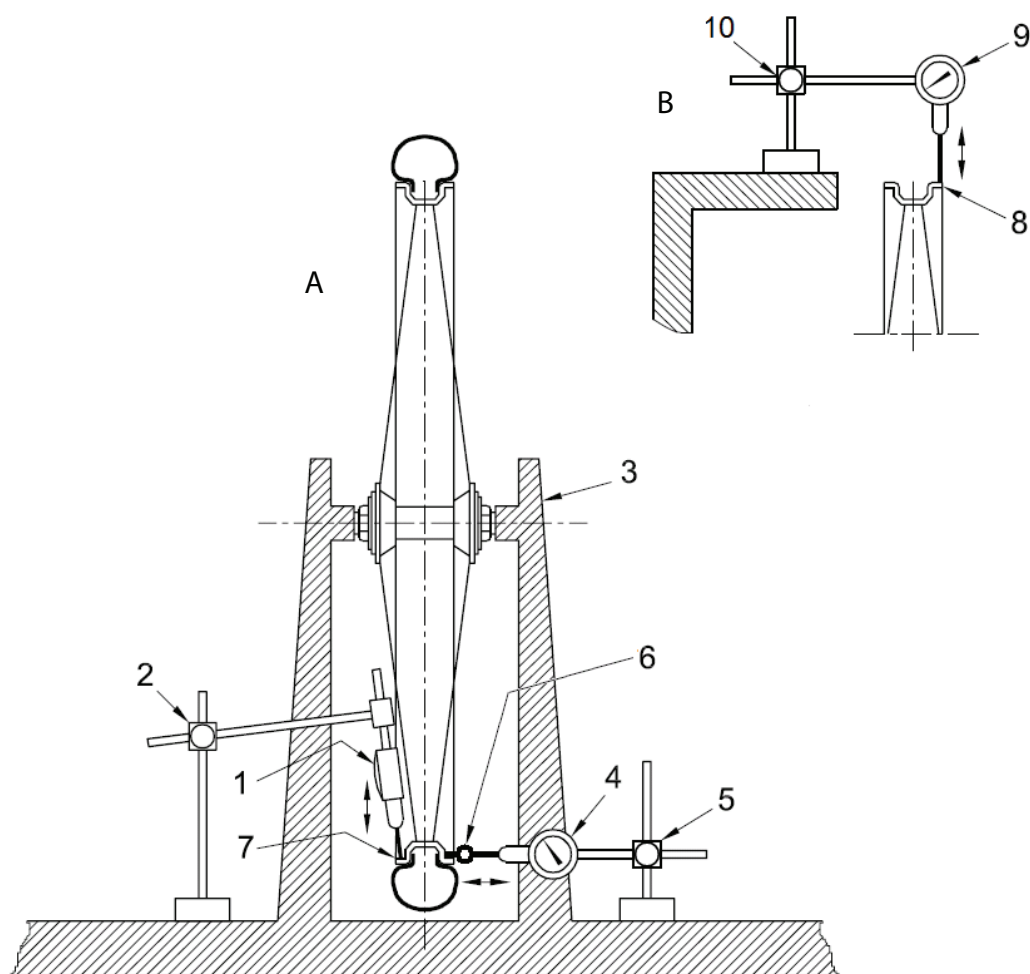
4 Test methods

4.1 Rotational accuracy

The run-out tolerances represent the maximum variation of the position of the rim when measured perpendicular to the axle at a suitable point along the rim (see [Figure 1](#) and [Figure 2](#)) (i.e. full indicator reading) of a fully assembled and adjusted wheel during one complete revolution about the axle without axial movement. Both sides of the rim shall be measured and the maximum value shall be taken as result.

For city and trekking, mountain, and young adult bicycles, the measurement of both axial run-out (lateral) and radial run-out (concentricity) shall be done with a tyre fitted and inflated to the maximum inflation pressure, but for rims where concentricity cannot be measured with the tyre fitted, it is permissible to make measurements with the tyre removed.

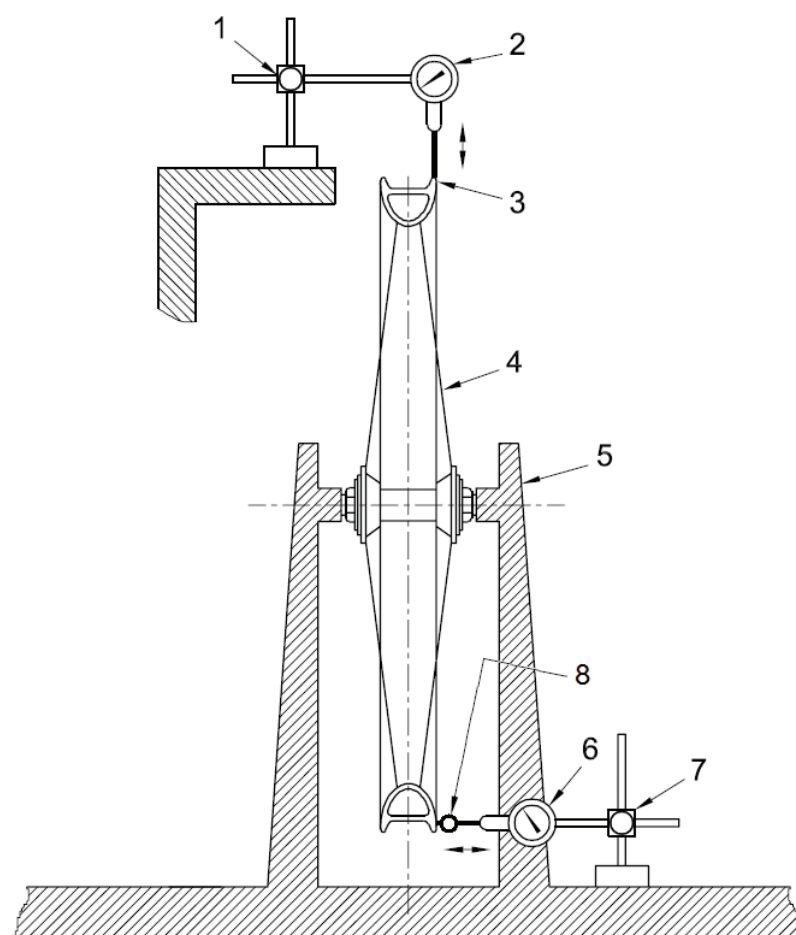
For racing bicycles, the measurement of both axial run-out (lateral) and radial run-out (concentricity) shall be measured at the same time as shown in [Figure 2](#) and a tyre is not required to be fitted.



Key

A	rim with tyre	5	instrument stand
B	rim without tyre	6	roller indicator
1	dial-gauge (concentricity)	7	rim with tyre
2	instrument stand	8	rim without tyre
3	hub axle support	9	dial-gauge (concentricity; alternative positions)
4	dial-gauge (lateral run-out)	10	instrument stand

Figure 1 — Wheels/tyre assembly— Rotational accuracy for city and trekking, young adult, and mountain bicycles



Key

- | | |
|------------------------------|--------------------------------|
| 1 instrument stand | 5 hub axle support |
| 2 dial-gauge (concentricity) | 6 dial-gauge (lateral run-out) |
| 3 rim | 7 instrument stand |
| 4 spoke | 8 roller indicator |

Figure 2 — Wheel — Rotational accuracy for racing bicycles

4.2 Wheel/tyre assembly — Static strength test — Test method

Clamp and support the wheel suitably as shown in [Figure 3](#). Apply a pre-load of 5 N on the rim at one spoke perpendicular to the plane of the wheel as shown in [Figure 3](#). Record the zero position of the rim at the point of load application as shown. Then apply a static force of F given in [Table 1](#) for a duration of 1 min. Reduce the load to 5 N and allow a 1 min settling time. After this settling time and with the 5 N load still applied, re-measure the position of the rim.

The wheel shall be fitted with the appropriate size tyre and inflated to the maximum inflation pressure.

In the case of a rear wheel, apply the force from the sprocket side of the wheel as shown in [Figure 3](#).

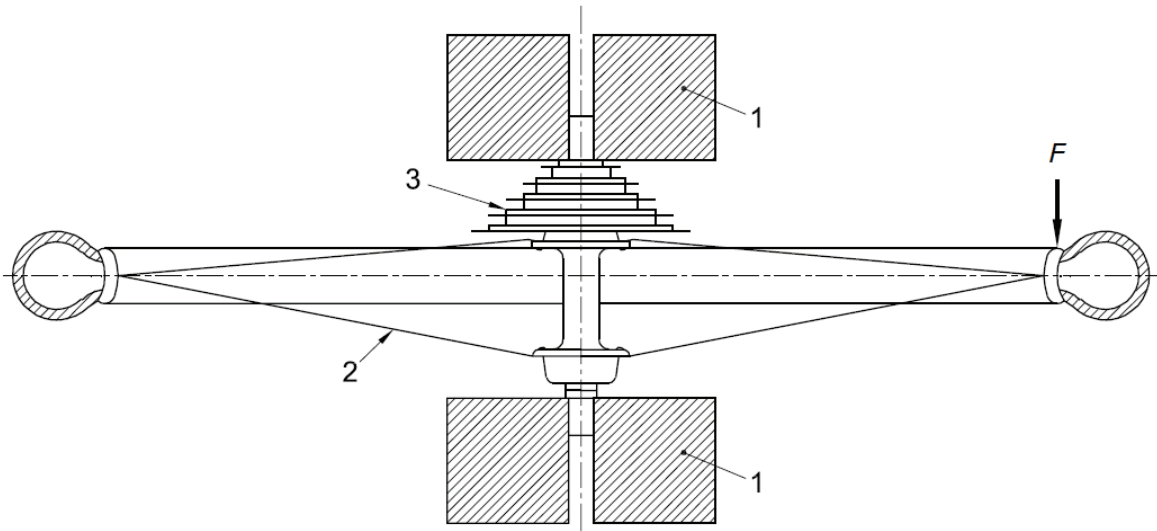
Repeat the above measurement once between two spokes.

See [Annex A](#) for fatigue testing.

Table 1 — Forces on rim

Forces in newtons

Bicycle type	City and trek- king bicycles	Young adult bicycles	Mountain bicycles	Racing bicy- cles
Force <i>F</i>	250	250	370	250



- Key**
- 1 clamping fixture
 - 2 wheel/tyre assembly
 - 3 drive sprockets

Figure 3 — Wheel/tyre assembly— Static strength test

4.3 Wheels — Front/rear wheel retention devices secured — Test method

Apply a force of 2 300 N distributed symmetrically to both ends of the axle for a period of 1 min in the direction of the removal of the front and rear wheel independently.

4.4 Greenhouse effect test for composite wheels — Test method

A fully assembled wheel, fitted with the appropriate size tyre and inflated according to the lower value between maximum inflation pressure recommended on the rim or the tyre, shall be controlled before the test; lateral run-out has to be controlled according to ISO 4210-2:2014, 4.10.1 and maximum widths of the rim have to be reported.

A specific bench as shown in [Figure 5](#) could be used to measure the maximum width all around the rim with tyre and pressure (continuous measuring).

The wheel is laid down on the ground of a climate chamber, which has been pre-heated at 80 °C, leant on axle and tyre support points, sprocket side of the wheel, as shown in [Figure 4](#), during 4 h. At the end of 4 h, the wheel should be taken out of the climate chamber and allowed to cool down at room temperature during 4 h to re-measuring the rim width and its conformance to ISO 4210-2:2014, 4.11.6.1 and 4.11.6.2.

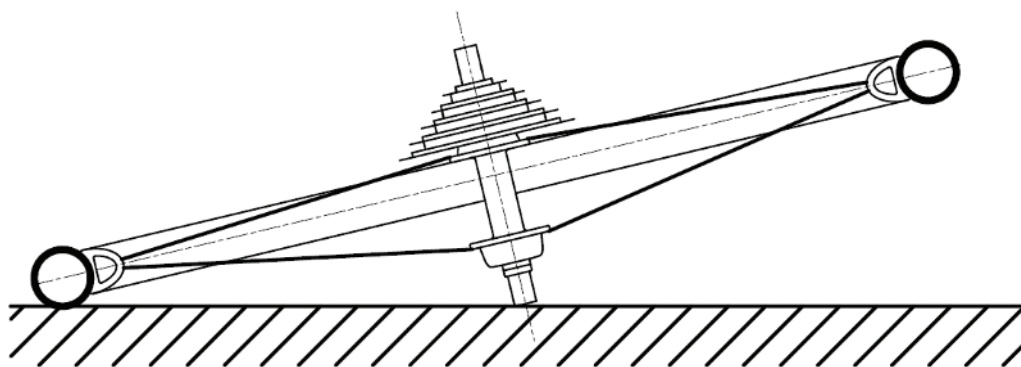


Figure 4 — Wheel laid down on tire and axle

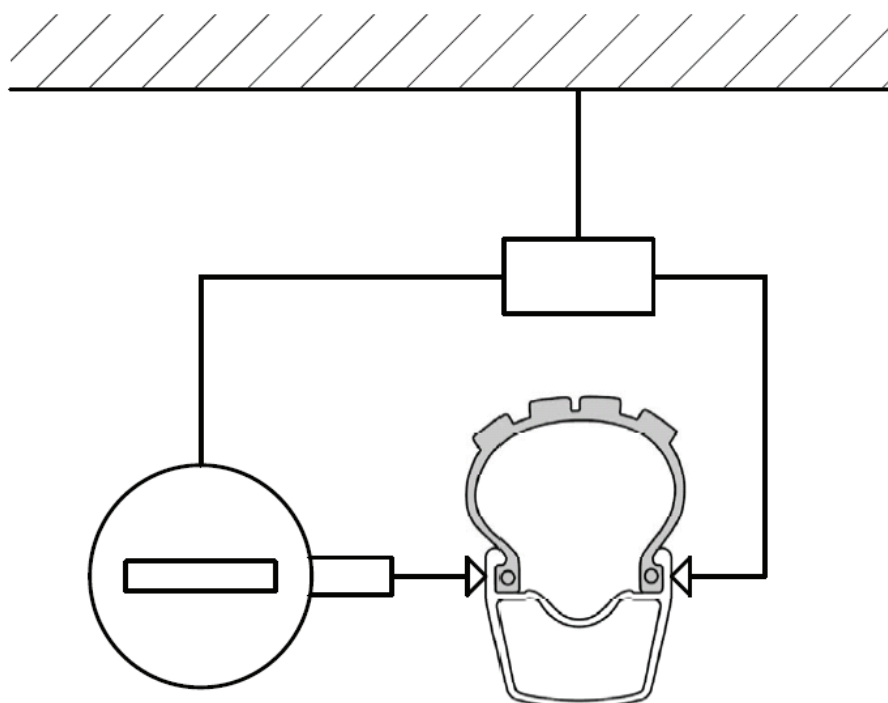


Figure 5 — Maximum rim's width measuring

Annex A (informative)

Wheel/tyre assembly — Fatigue test

A.1 Wheel/tyre assembly — Fatigue test for city and trekking bicycles

A.1.1 Requirements

When tested by the method described in [A.1.2](#), there should be no fractures, detachments, or visible cracks in any part of the wheel, no loss of air pressure in the tyre due to damage from the wheel to the tyre or the inner tube (when fitted), and the undamaged tyre should remain on the rim.

A.1.2 Test method

Assemble the wheel, tyre, and inner tube (when fitted) and inflate the tyre to 90 % of the maximum inflation pressure.

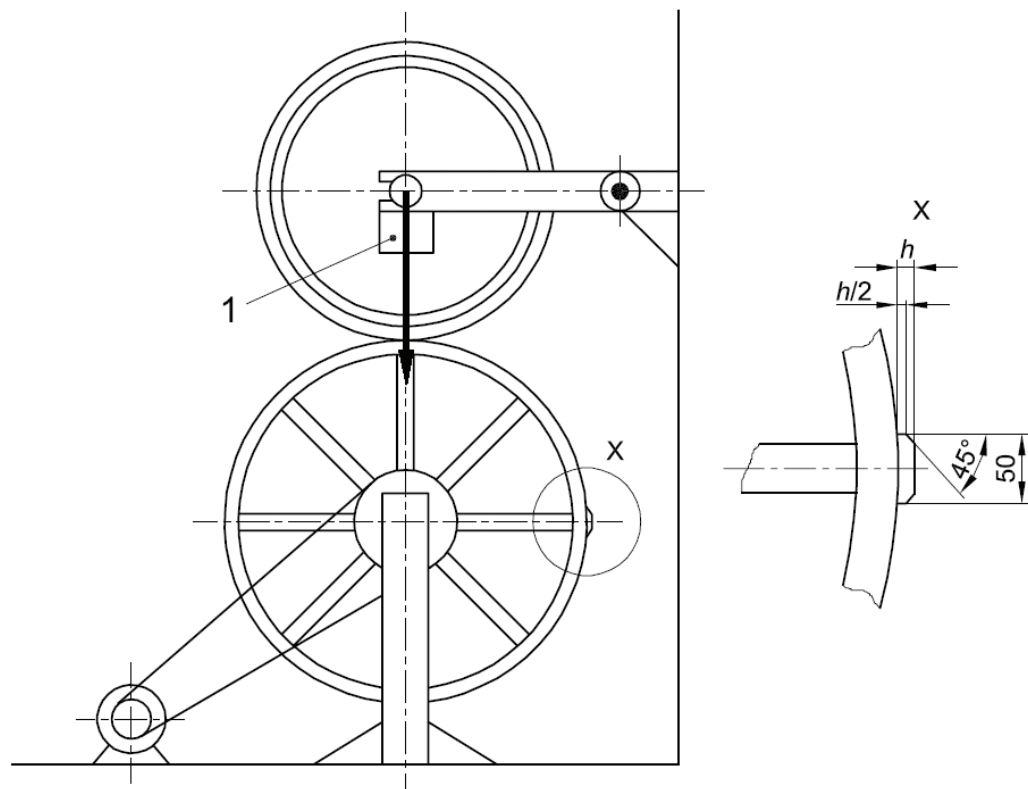
Mount the wheel/tyre assembly free to rotate on its axle, and free to move in a vertical direction. Load the wheel assembly by means of dead weights against a drum equipped with equally spaced, transverse, metallic slats such that the radial force applied to the wheel/tyre assembly is 640 N. The wheel and drum axes shall be vertically aligned.

An example of a test arrangement is shown in [Figure A.1](#), in which the wheel axle is fixed between the free ends of a pair of pivoted arms that extend horizontally with the tyre contacting the drum between the slats.

The diameter of the drum shall be in the range of 500 mm to 1 000 mm, and the slats shall have a width of $50 \text{ mm} \pm 2,5 \text{ mm}$, a thickness of $10 \text{ mm} \pm 0,25 \text{ mm}$, and 45° chamfered edges of half their thickness. The circumferential spacing between the centrelines of two consecutive slats shall be not less than 400 mm.

Rotate the drum to give a linear surface speed of 25 km/h ($\pm 10 \%$) for a period to provide 750 000 impacts between the tyre and the slats.

Dimensions in millimetres



Key

- 1 total force on the axle, 640 N
- h height of slats

Figure A.1 — Wheel/tyre assembly— Fatigue test

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