
**Motorcycles — Light-alloy wheels —
Test method**

Motorcycles — Roues en alliages légers — Méthodes d'essai

STANDARDSISO.COM : Click to view the full PDF of ISO 8644:2006



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

STANDARDSISO.COM : Click to view the full PDF of ISO 8644:2006

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions.....	1
4 Test.....	2
5 Rotational bending fatigue test	2
5.1 Test equipment	2
5.2 Test conditions	3
5.3 Test procedure	3
6 Radial load durability test	3
6.1 Test equipment	3
6.2 Test conditions	4
6.3 Test procedure	5
7 Radial impact resistance test	5
7.1 Test equipment	5
7.2 Test conditions	7
7.3 Test procedure	8
8 Torsional fatigue test.....	8
8.1 Test equipment	8
8.2 Test conditions	8
8.3 Test procedure	9
9 Air leak test.....	10
9.1 Test equipment	10
9.2 Test conditions	10
9.3 Test procedure	10
10 Performance	11
10.1 Durability against bending moment.....	11
10.2 Durability against radial load.....	11
10.3 Impact resistance.....	11
10.4 Durability against torsional moment	11
10.5 Airtightness of rims	11

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 8644 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 22, *Motorcycles*.

This second edition cancels and replaces the first edition (ISO 8644:1988), which has been technically revised.

Introduction

It is recognized that there are three types of somewhat different equipment for radial impact testing. Application of any of the types of test equipment is effective in this International Standard.

STANDARDSISO.COM : Click to view the full PDF of ISO 8644:2006

[STANDARDSISO.COM](https://standardsiso.com) : Click to view the full PDF of ISO 8644:2006

Motorcycles — Light-alloy wheels — Test method

1 Scope

This International Standard specifies methods for determining the performance of light-alloy road wheels for motorcycles under normal road use.

This International Standard is applicable to wheels for motorcycles with two or three wheels (including motorcycles equipped with side-cars) as defined in ISO 3833, of the following types:

- unit construction light-alloy wheels; and
- composite construction light-alloy wheels.

2 Normative references

The following referenced documents are indispensable for the application 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 3833, *Road vehicles — Types — Terms and definitions*

3 Terms and definitions

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

3.1

unit construction light-alloy wheel

wheel of which rim and spokes, or disc, are manufactured as a single unit

3.2

composite construction light-alloy wheel

wheel of which rim is made of light alloy, and of which support structure of light alloy or other metals is then assembled

3.3

single mass impact test equipment

impact test equipment in which a single striker can be dropped freely

3.4

pendulum impact test equipment

pendulum impact test equipment in which striker can be swung freely

3.5

double mass impact test equipment

impact test equipment in which both main and auxiliary striker weights are joined together with coil springs and can be dropped freely to give a combined force

4 Test

The tests to be carried out shall be the following:

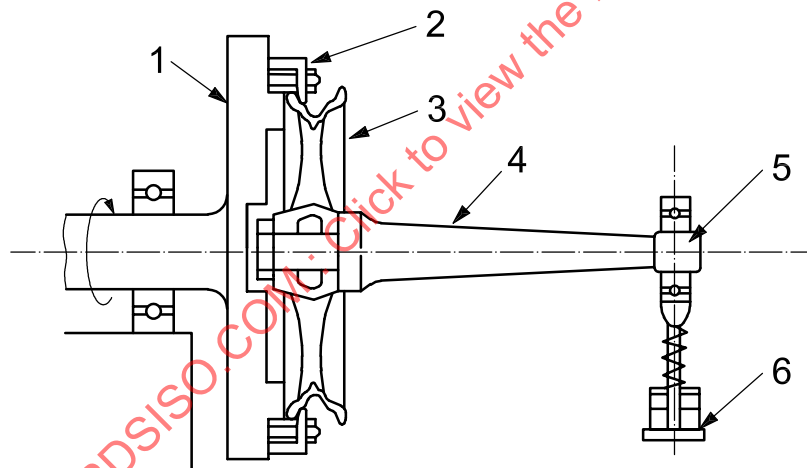
- a) rotational bending fatigue test (see Clause 5);
- b) radial load durability test (see Clause 6);
- c) radial impact resistance test (see Clause 7);
- d) torsional fatigue test (see Clause 8);
- e) air leak test (applicable only to wheels designed and marked for use with tubeless tyres; see Clause 9).

A different wheel may be used for each test.

5 Rotational bending fatigue test

5.1 Test equipment

The test equipment shall be planned to produce a constant bending moment on the centre of the light-alloy wheel which rotates at a constant velocity. An example of such equipment is shown in Figure 1.



Key

- 1 rotary disc
- 2 fastening
- 3 light-alloy wheel
- 4 loading arm
- 5 pivot point
- 6 weight

Figure 1 — Example of equipment for rotational bending fatigue test

5.2 Test conditions

5.2.1 Bending moment

The bending moment, M , in newton metres, applied in accordance with 5.3, shall be determined by the following equation:

$$M = 0,7 \times \mu \times F_v \times R$$

where

μ is the friction coefficient between tyre and road, equal to 0,7;

F_v is the maximum vertical static load on the wheel or the wheel load rating, in newtons, as specified by the vehicle or wheel manufacturer;

R is the maximum static radius, in metres, of the largest applicable tyre, or the tyre specified by the vehicle or wheel manufacturer.

5.2.2 Loading arm length

It is recommended that the length of the loading arm be equal to the radius of the tyre determined in accordance with 5.2.1.

5.3 Test procedure

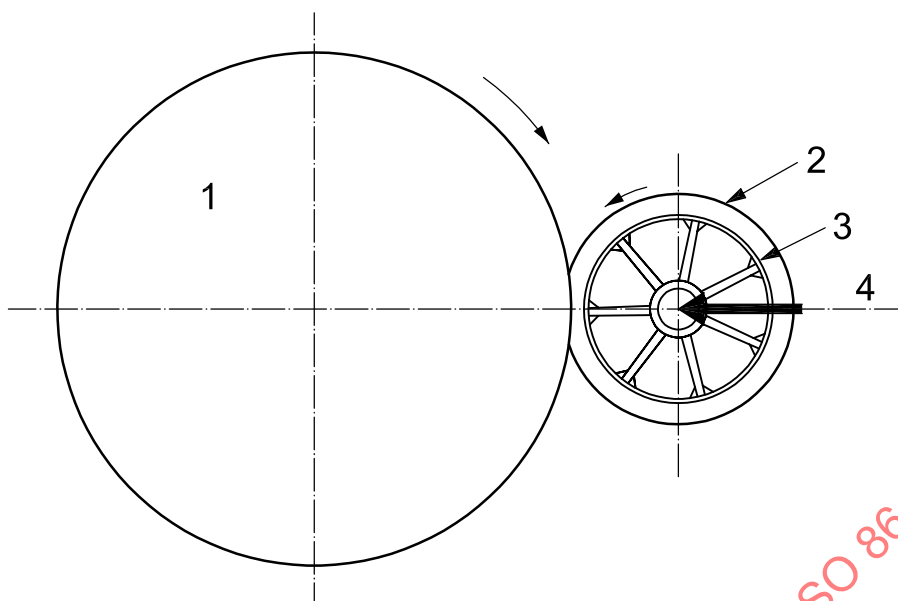
Rotate the test equipment with the bending moment, M , determined in accordance with 5.2.1, applied after the rim flange of the light-alloy test wheel has been fixed to the driven rotating disc (see Figure 1). A loading arm of sufficient rigidity shall be attached to the wheel by the same method as the wheel is normally attached to the vehicle.

6 Radial load durability test

6.1 Test equipment

The test equipment, of which Figure 2 shows an example, shall meet the following requirements:

- the test equipment shall have a drum, of diameter 400 mm or bigger, with a smooth surface which is wider than the overall width of the tyre used in the test;
- the drum specified in a) shall rotate at a constant velocity;
- the test equipment shall permit a radial load to be applied to the wheel and shall be such that the wheel is maintained in contact with the drum under constant load.



Key

- 1 rotating drum
- 2 tyre
- 3 light-alloy wheel
- 4 radial load

Figure 2 — Example of equipment for radial load durability test

6.2 Test conditions

6.2.1 Static radial load

The radial load, Q , in newtons, to be applied as in 6.3, shall be determined by the following equation:

$$Q = 2,25 \times F_v$$

where

F_v is the maximum vertical static load on the wheel or the wheel load rating, in newtons, as specified by the vehicle or wheel manufacturer.

6.2.2 Tyre air pressure

The air pressure before the test, in kilopascals, shall be at least that corresponding to the design maximum load of the tyre to be used in the test.

6.2.3 Tolerance for load fluctuation

The tolerance for load fluctuation during the test shall be $\pm 5\%$.

6.2.4 Tyre failure

In case of tyre failure, the test shall be continued after replacing the tyre.

6.3 Test procedure

Fit the light-alloy wheel with an appropriate tyre to the test equipment (see Figure 2) according to the method used to attach the wheel to the vehicle. The drum shall then be rotated while the radial load, Q , determined in accordance with 6.2.1, is applied.

7 Radial impact resistance test

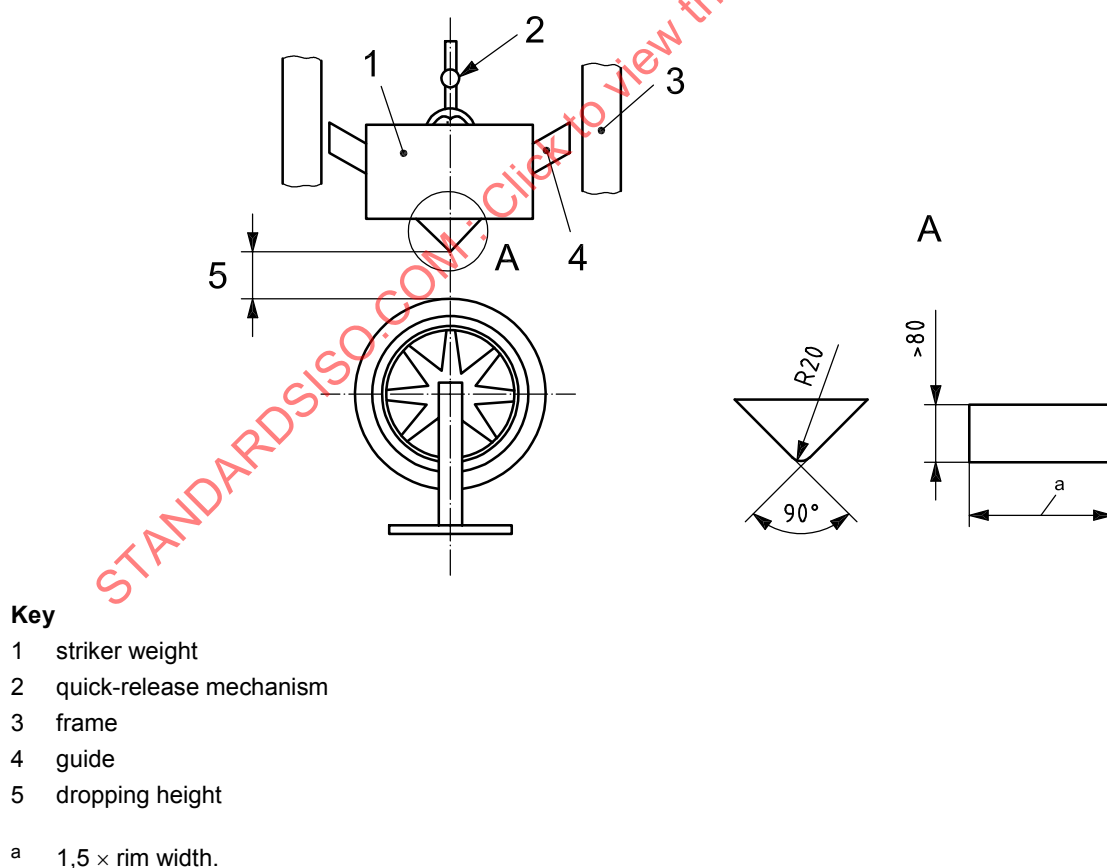
7.1 Test equipment

The equipment striker shall provide the following characteristics:

- the mount on which the wheel is anchored shall have sufficient stiffness and strength;
- a striker of width at least 1,5 times the width of the rim shall be dropped freely to strike the wheel/tyre assembly.

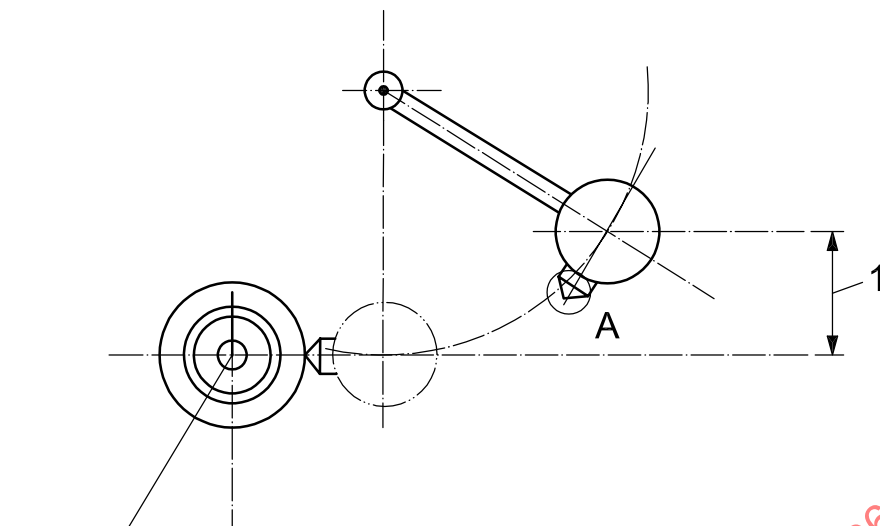
Examples of the test equipment are shown in Figure 3 a), b) and c).

In the case of equipment using a pendulum [Figure 3 b)], the minimum length of the pendulum arm shall be not less than 800 mm measured from the pivot point to the edge of the striker. Figure 3 c) shows an example of double mass impact test equipment, where the combined spring constant of two coil springs shall be $3\,000 \pm 100$ N/cm and the stroke between the auxiliary striker weight and the main weight shall be 100 ± 5 mm.



a) Single mass

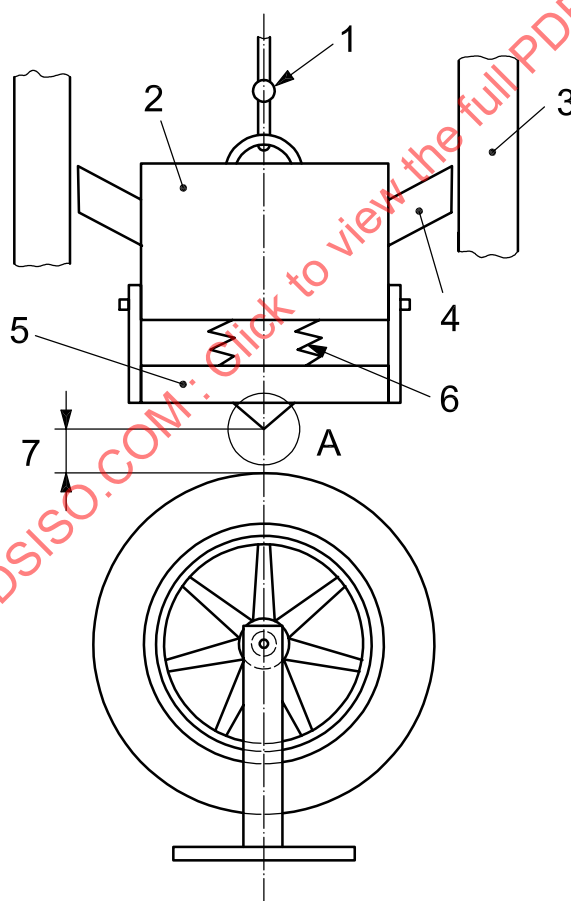
Figure 3 — Example of radial impact resistance test equipment



Key

- 1 dropping height

b) Pendulum



Key

- | | |
|---------------------------|---------------------------|
| 1 quick-release mechanism | 5 auxiliary weight |
| 2 main weight | 6 coil springs (2 pieces) |
| 3 frame | 7 dropping height |
| 4 guide | |

c) Double mass

Figure 3 (continued)

7.2 Test conditions

7.2.1 Impact load

7.2.1.1 Single mass and pendulum impact resistance test equipment

The mass of the striker, M_s , shall be within a range of $\pm 2\%$ of the mass determined by the following equation:

$$M_s = K \times \frac{F_v}{g}$$

where

M_s is the mass of the striker, in kilograms, $\pm 2\%$;

F_v is the maximum vertical static load on the wheel or the wheel load rating, in newtons, as specified by the vehicle or wheel manufacturer;

g is the gravitational acceleration (9,8 m/s²);

K is the coefficient; 1,0 for both front and rear wheels.

7.2.1.2 Double mass impact resistance test equipment

The total mass of two strikers, M_d , in kilograms, shall be within a range of $\pm 2\%$ of the mass determined by the following equation:

$$M_d = K \times \frac{F_v}{g}$$

where

F_v is the maximum vertical static load on the wheel or the wheel load rating, in newtons, as specified by the vehicle or wheel manufacturer;

g is the gravitational acceleration (9,8 m/s²);

K is the coefficient; 2,5 for front wheel or 1,5 for rear wheel.

The mass of the main striker, m_1 , shall be determined by the following equation:

$$M_d = m_1 + m_2$$

where

M_d is the total mass of two strikers, in kilograms, as determined above;

m_1 is the mass of the main striker, in kilograms;

m_2 is the mass of the auxiliary striker including the mass of the springs, which is equal to 40 kg.

7.2.2 Tyre inflation pressure

The tyre inflation pressure, P , in kilopascals shall be within in a range of ± 10 kPa of the pressure determined by the following equation:

$$P = p \times 1,15$$

where

p is the air pressure corresponding to the design maximum load of the tyre to be used in the test, in kilopascals.

7.3 Test procedure

Fit the smallest applicable tyre, or the tyre specified by the vehicle or wheel manufacturer. Then mount the combination on the support according to the method used to attach the wheel to the vehicle. The relative position shall be so determined that at the moment of the impact the speed vector passes through the centre of the wheel (see Figure 3). The impact test should be applied at the weakest part of the rim.

Determine the striker mass in accordance with 7.2.1.1 or 7.2.1.2 and the tyre inflation pressure in accordance with 7.2.2.

The striker weight shall be dropped from the following height:

a) in the case of the single mass striker and pendulum impact test equipment:

- front wheel: 180 mm;
- rear wheel: 120 mm;

b) in the case of the double mass impact test equipment:

- front/rear: 150 mm.

8 Torsional fatigue test

8.1 Test equipment

The test equipment shall permit a torsional moment to be applied between the hub and the rim. Figure 4 shows examples of such equipment.

8.2 Test conditions

The torsional moment, T , in newton metres, applied as in 8.3, shall be determined by the following equation:

$$T = F_v \times R$$

where

- F_v is the maximum vertical static load on the wheel or the wheel load rating, in newtons, as specified by the vehicle or wheel manufacturer;
- R is the maximum static radius, in metres, of the largest applicable tyre, or the tyre specified by the vehicle or wheel manufacturer.