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Passenger car road wheels — Test methods

Roues pour voitures particulières — Méthodes d'essai

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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 3006 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 19, *Wheels*.

This third edition cancels and replaces the second edition (ISO 3006:1977), of which it constitutes a technical revision.

Annex A forms an integral part of this International Standard.

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Introduction

This International Standard was developed in response to requests to establish uniform test methods to evaluate certain fatigue strength characteristics of wheels used on passenger cars. Only laboratory test methods are given. No minimum performance levels are part of this International Standard.

The standardization of test methods allows manufacturers of vehicles and/or wheels to evaluate their products in a uniform manner. By using these methods, wheels from different parts of the world can be compared and evaluated for use.

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Passenger car road wheels — Test methods

1 Scope

This International Standard specifies two laboratory methods for testing certain essential fatigue strength characteristics of wheels intended for road use on passenger cars as defined in ISO 3833.

The test methods are

a) dynamic cornering fatigue test;

b) dynamic radial fatigue test.

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 3833:1977, *Road vehicles — Types — Terms and definitions.*

ISO 3911:1977, *Wheels/rims — Nomenclature, designation, marking, and units of measurement.*

3 General

Only fully processed new wheels which are representative of wheels intended for the vehicle shall be used for the tests. No wheel shall be used for more than one test.

4 Dynamic cornering fatigue test

4.1 Equipment

The test machine shall have a driven rotatable device whereby either the wheel rotates under the influence of a stationary bending moment or the wheel is stationary and is subjected to a rotating bending moment (see figure 1).

4.2 Procedure

4.2.1 Preparation

Clamp the rim of the wheel securely to the test fixture. The adaptor face of the test machine shall have equivalent wheel mounting systems to those used on the vehicle. The mating surfaces of the test adaptor and wheel shall be free of excessive scoring and deformation, and excessive build-up of paint, dirt or foreign matter.

Attach the load arm and adaptor assembly to the mounting surface of the wheel using non-lubricated studs or bolts, and nuts, in good condition, representative of those used on the vehicle. Tighten these wheel nuts or bolts at the beginning of the test to the vehicle or wheel manufacturer's specified torque values.

Wheel bolts or nuts may be retorqued once during the test.

4.2.2 Bending moment application

To impart a bending moment to the wheel, apply a force parallel to the plane of the wheel mounting surface at a specified distance, l (moment arm) of 0,5 m to 1,04 m, as shown in figure 1.

Maintain the bending moment within $\pm$ 2,5 % of the calculated value.

4.3 Bending moment determination

Determine the bending moment M (force × moment arm), in newton metres, from the formula:

$$M = (\mu R + d)F_v S$$

where

μ is the assumed coefficient of friction developed between tyre and road (see table A.1, annex A);

R is the static loaded radius, in metres, of the largest tyre to be used on the wheel as specified by the vehicle or wheel manufacturer;

d is the inset or outset (positive for inset; negative for outset), of the wheel, in metres (see ISO 3911);

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;

S is the accelerated test factor (see table A.1, annex A).

4.4 Test termination

The test shall be terminated in either of the two following circumstances:

— inability of wheel to sustain load;

— propagation of a crack(s) existing prior to test or new visible stress-caused cracks penetrating through a section of the wheel.

5 Dynamic radial fatigue test

5.1 Equipment

The test machine shall be equipped with a means of imparting a constant radial load as the wheel rotates. There are many means of imparting radial loads: the suggested equipment incorporates a driven rotatable drum which presents a smooth surface wider than the loaded test tyre section width. The recommended minimum external diameter of the drum is 1 700 mm.

The test wheel (single application) and tyre fixture shall provide loading normal to the drum external surface and in line radially with the centre of the test wheel and the drum. The axes of the drum and test wheel shall be parallel (see figure 2).

The mating surfaces of the test adaptor and wheel shall be free of excessive scoring and deformation, and excessive build-up of paint, dirt or foreign matter.

5.2 Procedure

Tyres selected for this wheel test shall meet the load rating, F_v, of the wheel or be representative of the maximum load capacity, size and type specified by the vehicle or wheel manufacturer, whichever is greater.

The test adaptor shall be representative of production hubs using studs or bolts and nuts representative of those specified for the wheel.

The cold inflation pressure of the test tyre shall be in accordance with the values in table 1.

Table 1 — Test inflation pressures

Service pressure kPa [1]	Test pressure kPa [1]
up to 160	280
161 to 280	450
281 to 450	550

1) 100 kPa = 1 bar

There will be an increase in pressure during the test. This increase is normal and no adjustment is necessary. The loading system shall maintain the specified load within ± 2,5 % of the calculated value.

5.3 Radial load determination

Determine the radial load F_r, in newtons, from the formula:

$$F_r = F_v K$$

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;

K is the accelerated test factor (see table A.2, annex A).