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Tubeless tyres — Valves and components —

Part 1: Snap-in tyre valves test methods

FDIS stage

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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~~document 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).

Field Code Changed

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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~~of 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: Foreword - Supplementary information~~.www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee Technical Committee ISO/TC 31, *Tyres, rims and valves*, Subcommittee SC 9, *Valves for tube and tubeless tyres*.

This second edition ~~of ISO 14960-1, together with ISO 14960-2,~~ cancels and replaces the first edition (ISO 14960~~:2004, 1~~:2014), which has been technically revised.

The main changes are as follows:

— ~~Technical revision of~~ all test methods have been revised;

— ~~Test~~test methods have been added for valve hole with diameter 8,8~~-~~ mm;

— ~~Resistance~~resistance tests have been added.

A list of all parts in the ISO 14960 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Field Code Changed

Tubeless tyres — Valves and components —

Part 1:
Snap-in tyre valves test methods

1 Scope

This document specifies test methods for snap-in tubeless tyre valves intended for, but are not limited to, on-road applications. TPMS valves and high-pressure valves are not included in this document.

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 3877-2, *Tyres, valves and tubes — List of equivalent terms — Part 2: Tyre valves*

ISO 9413, *Tyre valves — Dimensions and designation*

3 Terms and definitions

For the purposes of this document, the terms, definitions and designations given in ISO 3877-2 and ISO 9413 and the following apply.

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

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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
snap-in valve
tyre valve having a rigid housing adhered to a resilient body designed to retain and seal the valve in the rim hole

3.2
unused valve
valve that has completed final curing processing at least 24 h previously, that has not been subjected to any test or service and that has been stored for no longer than four months in the dark at an ambient temperature between 18 °C and 28 °C, in an optimal and non-aggressive environment

Note 1 to entry: Rubber compounds can change characteristics during their life expectancy.

3.3
sealing cap
protective part that is matched with a valve stem and includes an elastomer seal

Note 1 to entry: An example of sealing cap is given in ISO 9413.

4 Methods for testing tubeless tyres snap-in valves

4.1 General

All the pressures mentioned in the testing procedures are gauge pressures.

A tested snap-in valve shall be a unit free of rubber in the air passage, no rubber or cement above the second thread on the housing, and without flow cracks, blisters, voids, or other moulding defects. The mould parting line flash if present should not influence the test execution.

4.2 Ageing

If nothing specified, each of the following tests shall be considered on unused valves.

For the purpose of this testing method, aged valves are those unused valves that have been subjected to 100 °C ± 3 °C for 4 h in circulating hot air and then cooled at 23 °C ± 5 °C a minimum of 4 h.

Other ageing profile should be considered regarding the real-life case. The definition of other ageing profile shall be agreed between the customer and the valve manufacturer.

4.3 Test fixtures

Break both edges on both sides of the valve hole either by a 45° chamfer or a radius from 0,3 mm to 0,4 mm. Emery cloth or suitable tooling is recommended. It is recommended that material of the test fixture be representative of the material of the actual rim.

The primary external seal of a "snap-in" valve in a valve hole is obtained from the rubber compression of the valve body onto the internal surface of the valve hole. Secondary external sealing may be present by the contact of the remainder of the valve body exterior to the surface of the material around the valve hole. Either ~~of both~~ of these seals can be affected by the compound curvatures in the wheel rims and by stock thickness.

The hole diameter and thickness for the considered test is specified in ~~Table 1.~~Table 1.

Table 1 — Test fixtures

Test	Nominal hole diameter 8,8 mm		Nominal hole diameter 11,3 mm		Nominal hole diameter 15,7 mm	
	Test hole diameter mm	Test plate thickness mm	Test hole diameter mm	Test plate thickness mm	Test hole diameter mm	Test plate thickness mm
Valve to rim seal tests (see ~~5.4.1~~5.4.1 and ~~5.4.2)~~5.4.2)	~~9,10 +0/-0,059~~, $10^{+0}_{-0,05}$	1,8 ± 0,05	~~11,7~~$^{+0}_{-0,05}$ 11, $7^{+0}_{-0,05}$	1,8 ± 0,05	~~16,1~~$^{+0}_{-0,05}$ 16, $1^{+0}_{-0,05}$	1,8 ± 0,05
Installation tests (see ~~5.5.1~~5.5.1 and ~~5.5.2)~~5.5.2)	~~8,8 +0,05/-08~~, $8^{+0,05}_{-0}$	1,8 ± 0,05	~~11,3~~$^{+0,05}_{-0}$ 11, $3^{+0,05}_{-0}$	3,5 ± 0,05	~~15,7~~$^{+0,05}_{-0}$ 15, $7^{+0,05}_{-0}$	3,5 ± 0,05
Ozone resistance test (see ~~5.7)~~5.7)	~~8,8 +0,05/-08~~, $8^{+0,05}_{-0}$	1,8 ± 0,05	~~11,3~~$^{+0,05}_{-0}$ 11, $3^{+0,05}_{-0}$	3,5 ± 0,05	~~15,7~~$^{+0,05}_{-0}$ 15, $7^{+0,05}_{-0}$	3,5 ± 0,05

Test	Nominal hole diameter 8,8 mm		Nominal hole diameter 11,3 mm		Nominal hole diameter 15,7 mm	
	Test hole diameter mm	Test plate thickness mm	Test hole diameter mm	Test plate thickness mm	Test hole diameter mm	Test plate thickness mm
Burst test (see ~~5.6)~~5.6) and flexing resistance test (see ~~5.8)~~5.8)	~~9,10 +0/-0,05~~9, $10^{+0}_{-0,05}$	1,8 ± 0,05	~~11,7$^{+0}_{-0,05}$~~ 11, $7^{+0}_{-0,05}$	1,8 ± 0,05	~~16,1$^{+0}_{-0,05}$~~ 16, $1^{+0}_{-0,05}$	1,8 ± 0,05

4.4 Installation

All valves, while wet with clean water as a lubricant, shall be installed in a proper test fixture by applying valve insertion force to the end of the valve metal insert or by applying valve traction force to the mouth of the valve perpendicular to the plane of the valve mounting hole and directly through the centre of the valve mounting hole. However, no valve assembly, which has damage resulting from installation, shall be tested.

A valve shall be considered properly seated when all of the indicator ring is observed to be through the rim or valve mounting hole fixture.

After installation, valve assemblies shall be thoroughly dried in the sealing area before continuing tests.

5 Test methods and performances requirements

5.1 Adhesion

5.1.1 Test method

— ~~—~~Make two axial, parallel cuts 180° apart through the full thickness of the rubber cover down the entire length of the valve.

— ~~—~~Pull each side of the button base away from the insert towards the cap thread end at 150 mm ± 15 mm per min with a traction machine.

The test shall be conducted at 23 °C ± 5 °C.

An alternative to the traction machine is to use pliers.

5.1.2 Performances

Any separation between stem and rubber, stem and cement, or cement and rubber in excess of 41 mm^2, on each valve, shall be considered as a failure.

Any separation that made a strip along the complete valve axis direction shall be considered as a failure.

5.2 Valve core seal

Valve cores installed in snap-in valve assemblies (see ~~Figure 1)~~Figure 1) have the following characteristics:

— ~~—~~pin position of the valve core: from +0,25 mm to –0,90 mm (relative to the valve mouth);

— ~~—~~standard torque:

— ~~—~~0,34 Nm to 0,56 Nm with metallic sealing;

— ~~—~~0,23 Nm to 0,56 Nm for non-metallic gasket.

5.2.1 Room temperature test

5.2.1.1 Test method

Soak the valve assembly in clean water at 23 °C ± 5 °C with the mouth down vertically and not more than 100 mm below the surface of the water (see ~~Figure 1).~~Figure 1).

Check for leakage with test pressures as follows:

a) ~~a)~~ cup gasket seal — apply 35 kPa ± 5 kPa air pressure;

b) ~~b)~~ barrel seal — apply 475 kPa ± 15 kPa air pressure.

5.2.1.2 Performances

Leakage at a rate less than 0,2 cm^3/min or no bubble detaching during the test time of 1 min is considered acceptable.

5.2.2 Low temperature test

5.2.2.1 Test method

a) ~~a)~~ Depress and release valve core pin once after a 24 h minimum exposure at –40 °C ± 3 °C, and assembly pressure shall be maintained to 180 kPa ± 15 kPa (see ~~Figure 1).~~Figure 1).

b) ~~b)~~ Check for leakage with –40 °C ± 3 °C ethanol or methanol at a minimum depth of 25 mm above valve mouth, with assembly still pressurized to 180 kPa ± 15 kPa.

c) ~~c)~~ Begin leak detection after 1 min soak period.

5.2.2.2 Performances

Leakage at a rate less than 0,2 cm^3/min or no bubble detaching during the test time of 1 min is considered acceptable.

5.2.3 High temperature test

5.2.3.1 Test method

a) ~~a)~~ Depress and release valve core pin once after a 48 h minimum exposure at 100 °C ± 3 °C, and assembly pressure shall be maintained to 600 kPa ± 15 kPa.

b) ~~b)~~ Check for leakage with 66 °C ± 3 °C clean water not more than 50 mm above valve mouth with assembly still pressurized to 600 kPa ± 15 kPa (See ~~Figure 1).~~Figure 1).

c) ~~c)~~ Begin leak detection after 1 min soak period.

5.2.3.2 Performances

Leakage at a rate less than 0,2 cm^3/min or no bubble detaching during the test time of 1 min is considered acceptable.

