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Tubeless tyres — Valves and components —

Part 2: Clamp-in tubeless tyre valve-test method

Pneumatiques sans chambre — Valves et composants —
Partie 2: Méthodes d'essai pour les valves à visser

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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.

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).

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

This first edition of ISO 14960-2, together with ISO 14960-1, cancels and replaces ISO 14960:2004, which has been technically revised.

ISO 14960 consists of the following parts, under the general title *Tubeless tyres — Valves and components*:

— *Part 1: Test methods*

— *Part 2: Clamp-in tubeless tyre valve-test method*

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Tubeless tyres — Valves and components —

Part 2:
Clamp-in tubeless tyre valve-test method

1 Scope

This part of ISO 14960 establishes minimum specifications for clamp-in tubeless tire valves. A clamp-in valve is an assembly of a valve stem, valve core, valve cap, rubber grommet or O-ring, hex nut, and ring washer which conforms to ISO 9413.

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 9413, *Tyre valves — Dimensions and designation*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

3 Test methods and performance requirements

3.1 Valve core

3.1.1 Valve core specifications

Valve cores installed in clamp-in valve assemblies (see Figure 1) shall have a pin height tolerance of $^{+0,25}_{-0,90}$ mm, relative to the valve mouth, and a standard torque of 0,23 N m to 0,34 N m.

3.1.2 Room temperature test

3.1.2.1 Test procedure

a) Immerse the valve assembly vertically in clean water at 23 °C ± 5 °C not more than 25 mm below the surface of the water (see Figure 1).

b) Check for leakage using a pressure of 35 kPa ± 5 kPa.

3.1.2.2 Performance requirement

The leak rate shall not be greater than 0,2 cm^3/min.

3.1.3 Low temperature test

3.1.3.1 Test procedure

a) Depress and release the valve core pin once after a 24 h minimum exposure at –40 °C ± 3 °C; maintain pressure at 180 kPa ± 15 kPa. See Figure 1.

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b) Immerse the valve assembly vertically in ethanol or methanol at −40 °C ± 3°C not more than 25 mm below the surface with the pressure maintained at 180 kPa ± 15 kPa.

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

d) Increase pressure to 1,4 MPa ± 0,15 MPa.

e) Begin leak detection after 1 min soak period.

3.1.3.2 Performance requirement

The leak rate shall not be greater than 0,2 cm^3/min.

3.1.4 High temperature test

3.1.4.1 Test procedure

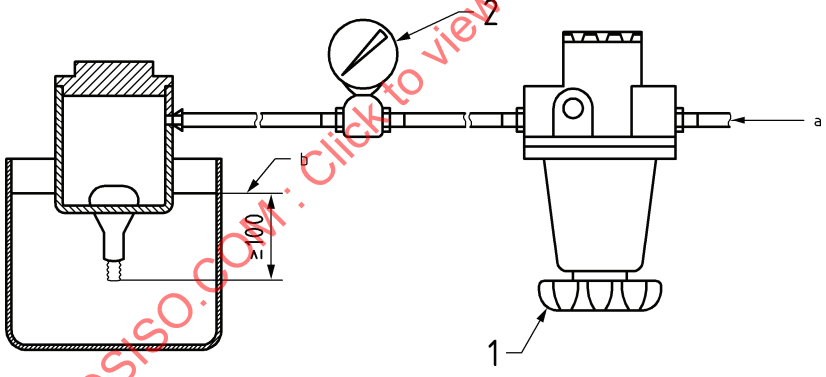
a) Depress and release the valve core pin once after a 48 h minimum soak period at 100 °C ± 3 °C; maintain pressure at 1,4 MPa ± 0,15 MPa. See Figure 1.

b) Check for leakage with 66 °C ± 3 °C clean water at not more than 25 mm above the valve mouth, with the pressure maintained at 1,4 MPa ± 0,15 MPa.

3.1.4.2 Performance requirement

The leak rate shall not be greater than 0,2 cm^3/min.

Dimensions in millimetres



Key

1 regulator
2 gauge
a Air supply.
b Liquid level.

Figure 1 — Valve seal test set-up

3.1.5 Valve core torque test

3.1.5.1 Test procedure

With a calibrated torque wrench, torque the core on the valve twice the maximum specified torque. Remove the core and examine for separation of the swivel from the barrel, and barrel gasket from the barrel.

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3.1.5.2 Performance requirement

The core shall come out of the valve without separation.

3.1.6 Cycle test

3.1.6.1 Test procedure

a) With the valve pressurized to 1,4 MPa, depress the valve core pin to its maximum travel 120 times.

b) Immerse the valve assembly vertically in clean water at 23 °C ± 5 °C not more than 25 mm below the surface of the water (see Figure 1).

c) Check for leakage using a pressure of 1,4 MPa ± 0,15 MPa.

3.1.6.2 Performance requirement

The leak rate shall not be greater than 0,2 cm^3/min.

3.1.7 Air flow test

3.1.7.1 Test procedure

The valve with core shall be attached to a standard inflation chuck with depressor pin. Measure the air flow through the tire valve with 690 kPa pressure applied.

3.1.7.2 Performance requirement

The valve shall flow a minimum of 100 l/min.

3.2 Valve cap seal

3.2.1 Room temperature test (optional, for sealing caps only)

3.2.1.1 Test procedure

a) Screw the cap with a sealing gasket at 0,15 N m to 0,20 N m torque on a valve without a core.

b) Immerse the valve assembly vertically in clean water at 23 °C ± 5°C not more than 25 mm below the surface of the water (see Figure 1).

c) Check for leakage using a 1,4 MPa ± 0,15 MPa test pressure.

3.2.1.2 Performance requirement

The leak rate shall not be greater than 0,2 cm^3/min.

3.3 Valve-to-rim seal

3.3.1 Temperature Test

Valves with grommets shall be tested in accordance with the Table 1.

It is not required to test valves with O-rings to the maximum and minimum values of rim hole diameter and rim thickness.

Minimum and maximum values are according to ISO 9413 for the particular valve being tested.

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Table 1 — Temperature test

Trial	Factor		
	Rim hole diameter	Rim thickness	Installation torque
1	Maximum $^{0}_{-0,05}$	Minimum ±0,05	Minimum ±5 %
2	Maximum $^{0}_{-0,05}$	Maximum ±0,05	Maximum ±5 %
3	Minimum $^{+0,05}_{0}$	Minimum ±0,05	Maximum ±5 %
4	Minimum $^{+0,05}_{0}$	Maximum ±0,05	Minimum ±5 %

3.3.2 Low temperature test

3.3.2.1 Test procedure

a) Subject the valves to –40 °C ± 3 °C for 24 h at 180 kPa ± 15 kPa.

b) Immerse the valve assembly vertically in ethanol or methanol at -40 °C ± 3 °C not more than 25 mm below the surface with the pressure maintained at 180 kPa ± 15 kPa. See Figure 1.

c) Begin leak detection after a 1 min period.

d) Increase pressure to 1,4 MPa ± 0,15 MPa.

e) Begin leak detection after 1 min period.

3.3.2.2 Performance requirement

The leak rate shall not be greater than 0,2 cm^3/min.

3.3.3 High temperature test

3.3.3.1 Test procedure

a) Subject the valves to 100 °C ± 3 °C for 72 h at 1,4 MPa ± 0,15 MPa.

b) Check for leakage with 66 °C ± 3 °C clean water at not more than 25 mm above the valve mouth, with the pressure maintained at 1,4 MPa ± 0,15 MPa. See Figure 1.

3.3.3.2 Performance requirement

The leak rate shall not be greater than 0,2 cm^3/min.

3.3.4 Peak temperature test

3.3.4.1 Test procedure

Subject the valves to 135 °C ± 3 °C at 1,4 MPa for 1 h.

Submerge the fixture in water at 66 °C ± 3 °C and check for leakage at the valve core and grommet/rim interface.

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3.3.4.2 Performance requirement

The leak rate shall not be greater than 0,2 cm^3/min.

3.4 Valve mechanical resistance

3.4.1 Torque test

3.4.1.1 Test procedure

Using a calibrated torque wrench, tighten the hex nut on the valve to two times the maximum installation torque given in ISO 9413, then unscrew immediately.

3.4.1.2 Performance requirement

No mechanical breakage of either the nut or the valve is permitted.

3.4.2 High pressure test

3.4.2.1 Test procedure

At 23 °C ± 5 °C, apply 4,2 MPa pressure (pneumatic or hydraulic) to the valve. Maintain this pressure for 3 min.

3.4.2.2 Performance requirement

The valve shall not burst.

3.5 Environmental resistance

3.5.1 Ozone test

3.5.1.1 Test procedure

Age the seal (unmounted) for 72 h at 100 °C ± 3 °C.

Assemble the seal on a fixture 10 % larger than the stem diameter where the seal sits.

Expose the assembled seal to 100 ± 5 parts of ozone to 100 million parts of air at 38 °C ± 3 °C for 72 h. Then, remove the seals from the ozone chamber and examine the rubber grommet or O-ring at a magnification of 5x for cracks.

3.5.1.2 Performance requirement

The rubber grommet shall not exhibit any cracks when viewed at a 5x magnification.

3.5.2 Salt fog test

3.5.2.1 Test procedure

Assemble valves on steel and alloy fixtures representative of real rims, and expose assemblies for 240 h minimum of salt fog in accordance with ISO 9227, NSS test.

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