DRAFT INTERNATIONAL STANDARD

ISO/DIS 18885-3

ISO/TC **31**/SC **9**

Secretariat: **AFNOR**

Voting begins on:
2020-09-01

Voting terminates on:
2020-11-24

TPMS snap-in valves —

Part 3:
Performances

Valves à boutonner («snap-in») pour TPMS —

Partie 3: Performances

ICS: 83.160.01

This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 18885-3:2020(E)

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Published in Switzerland

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Foreword

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For an explanation on 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: www.iso.org/iso/foreword.html.

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

A list of all parts in the ISO 18885 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.

TPMS snap-in valves —

Part 3: Performances

1 Scope

This document specifies test methods for TPMS snap-in tubeless valves.

These methods are defined to determine the minimum level of performances requested.

2 Normatives 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 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 18885-2, *TPMS snap-in valves — Part 2: Valve environment*

3 Terms and definitions

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

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

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

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

3.1
unused valve
valve that has completed final curing processing at least 24 h previously, has not been subjected to any test or service and has been stored for no longer than 4 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.

3.2
stem
insert
metallic part of the valve (usually in brass material) designed to be matched with inner core, cap, *sensor housing* (3.4) and partially covered by rubber

3.3
sealing cap
protection part that is matched with valve *stem* (3.2) and includes an elastomer seal. Example of sealing cap are given in ISO 9413

3.4
sensor housing
rigid case that is matched with valve *stem* (3.2) and contains TPMS sensor components

4 Conditions for testing TPMS snap-in valves

4.1 General

All the pressures mentioned in the testing procedures below are relative pressures.

4.2 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. The material of the test fixture should 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 can be present by the contact of the remaining part of the valve body exterior to the surface of the material around the valve hole. Either or both of these seals can be affected by the compound curvatures in the wheel rims and by stock thickness.

The test fixture used for each of the following tests shall be the worst case. The hole diameter/thickness for the considered test is specified in Table 1.

Table 1 — Test fixtures

Nominal hole	Diameter 11.3 mm	
Test	Test hole mm	Plate thickness mm
Valve to rim seal test low and high temperature test - 5.5	$11.7^{0}_{-0.05}$	1.8 ± 0,05
Installation tests: — Force to seat: 5.6.2 — Force to pull out: 5.6.3	$11.3^{+0.05}_{0}$	3.5 ± 0.05
Ozone resistance - 5.8	$11.3^{+0.05}_{0}$	3.5 ± 0.05
Burst - 5.7 Flexing resistance - 5.9 Pull-back test - 5.6.4	$11.7^{0}_{-0.05}$	1.8 ± 0.05

4.3 Installation

All valves, lubricated following the valve supplier recommendation or a solution of water and soap, shall be installed in a proper test fixture by applying valve insertion force to the housing 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 (as defined in ISO 18885-2) 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 proceeding to tests.

4.4 Ageing

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

5 Test methods

5.1 General

Each of the following tests shall be considered on unused valves.

5.2 Adhesion

5.2.1 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 minute with a traction machine.

The test shall be conducted at 23 °C ± 5 °C and without the TPMS housing.

Alternatively, pliers may be used instead of a traction machine.

5.2.2 Performance

Any separation between the 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.

5.3 Valves core seal

5.3.1 General

To verify valve cores installed in TPMS snap-in valve assemblies (Figure 1), the sensor may not be attached. The installation of the valve core in the valve shall meet the following conditions:

— 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 for a valve core with metallic sealing;

— 0.23 Nm to 0.56 Nm for a valve core with non-metallic gasket.

The same valve core shall be tested in cascade as follows: room temperature test, low temperature test and finally high temperature test.

5.3.2 Room temperature test

5.3.2.1 Test method

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