SLOVENSKI STANDARD
oSIST prEN 15625:2019

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Železniške naprave - Zavore - Naprave za samodejno zaznavanje spremembe obtežbe

Railway applications - Braking - Automatic variable load sensing devices

Bahnanwendungen - Bremse - Automatisch kontinuierlich wirkende Lasterfassungseinrichtungen

Applications ferroviaires - Freinage - Dispositifs de pesée variable automatiques

Ta slovenski standard je istoveten z: **prEN 15625**

ICS:

45.040	Materiali in deli za železniško tehniko	Materials and components for railway engineering

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English Version

Railway applications - Braking - Automatic variable load sensing devices

Applications ferroviaires - Freinage - Dispositifs de pesée variable automatiques

Bahnanwendungen - Bremse - Automatisch kontinuierlich wirkende Lasterfassungseinrichtungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (prEN 15625:2019) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15625:2008+A1:2010.

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

1 Scope

This document applies variable load sensing devices designated to continuously sense the load of a railway vehicle and provide a signal that can be used by a relay valve for the automatic variation of the air pressure used for brake applications, thereby adjusting the brake force accordingly to achieve the required brake performance.

This document specifies the requirements for the design, dimensions, manufacture and testing of automatic variable load sensing devices.

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.

EN 14478, *Railway applications — Braking — Generic vocabulary*

EN 50125-1, *Railway applications — Environmental conditions for equipment — Part 1: Rolling stock and on-board equipment*

EN 60721-3-5, *Classification of environmental conditions — Part 3: Classification of groups of environmental parameters and their severities — Section 5: Ground vehicle installations (IEC 60721-3-5)*

EN 61373:2010, *Railway applications — Rolling stock equipment — Shock and vibration tests (IEC 61373:2010)*

EN ISO 228-1, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1)*

ISO 8573-1, *Compressed air — Part 1: Contaminants and purity classes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14478 and the following apply.

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

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

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

3.1
automatic variable load sensing device
weight device
device connected to the vehicle, which response to the loading of that vehicle to provide a continuous load proportional signal to the brake control device

Note 1 to entry: The load input is normally a share of the wagon's mass because of the devices position in the vehicle suspension system. The result is a pneumatic output signal pressure that can be any value between a minimum at tare mass and a maximum at maximum mass. Most of the existing self-adjusting load-dependant brakes generate the load signal using a weighing device.

3.2
mechanically operated pneumatic device
device or mechanism having both mechanical and pneumatic elements

3.3
hydraulic to pneumatic converter
device or mechanism which transforms the hydraulic pressure generated by the mass of the vehicle into a pneumatic pressure with a defined transmission ratio

3.4
elastomeric to pneumatic converter
device or mechanism having both elastomeric and pneumatic components, which transforms the pressure in the elastomer generated by the mass of the vehicle into a pneumatic pressure with a defined transmission ratio

3.5
output signal pressure
load continuous pressure
Lcp
output pressure delivered by the automatic variable load sensing device, which signals the load of the vehicle to the brake control mechanism

3.6
supply pressure
input pressure of the air supply to pneumatic variable load sensing device

Note 1 to entry: Typically supplied from the vehicle's distributor auxiliary reservoir, or from the vehicle distributor output pressure/brake cylinder pressure system.

3.7
normal litre
Nl
unit of mass for gases equal to the mass of 1 l at a pressure of 1,013 2 bar (1 atmosphere) and at a standard temperature, often 0 °C or 20 °C

Note 1 to entry: Airflow is often stated in normal litres per minute (Nl/min).

3.8
sensitivity
minimum change of load which causes a variation of the output signal pressure (*Lcp*), when the change of load (input) is in the same direction

3.9
hysteresis
difference in output signal pressure (*Lcp*) with the same load is first rising to a value and then, having been taken past that value, subsequently falls to the same value

4 Symbols and abbreviations

F mechanical force, generated by the share of vehicle weight acting at the automatic variable load sensing device, expressed in kN

5 Design and manufacture

5.1 General

The design and manufacture of the automatic variable load sensing device shall, for all intended operating conditions, take into account the following requirements.

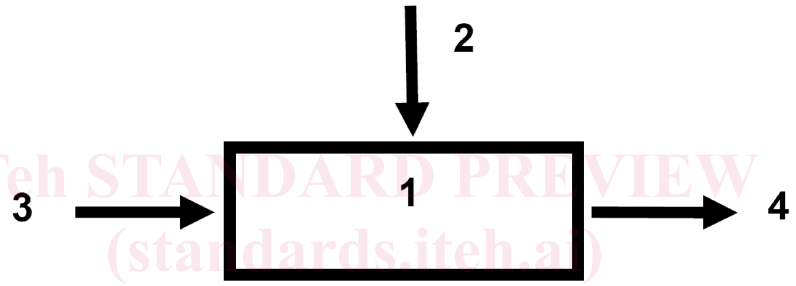
5.2 Functional requirements

5.2.1 Operating requirements

The automatic variable load sensing device shall, in all cases, supply a pneumatic output signal pressure (*Lcp*) which is a function of the load. The transmission of this load signal to the brake control system shall be pneumatic.

The method of producing the pneumatic signal *Lcp* can be mechanically operated pneumatic device, a hydraulic to pneumatic converter or an elastomeric to pneumatic converter.

Figure 1 indicates the principles of operation of an automatic variable load sensing device.



Key

1 automatic variable load sensing device
2 *F*, mechanical force, generated by a share of the vehicle weight
3 supply pressure, typically taken from the distributor auxiliary reservoir
4 *Lcp*, output signal pressure

Figure 1 — Principles of operation of the automatic variable load sensing device

5.2.2 Characteristics of weighing valves

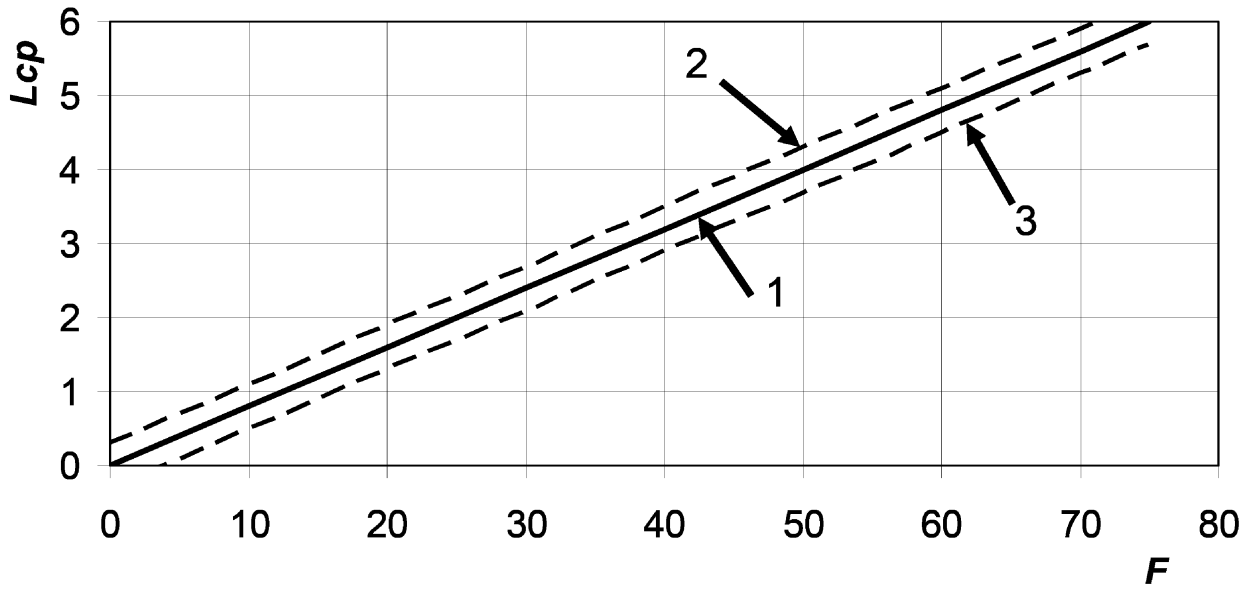
Two characters of weighing valves are defined:

— type 1: (0,8 ± 0,1) bar/10 kN (see Figure 2);

— type 3: (1,0 ± 0,1) bar/10 kN (see Figure 3).

The characteristics for type 1 and type 3 shall be tested in accordance with 7.2.6.

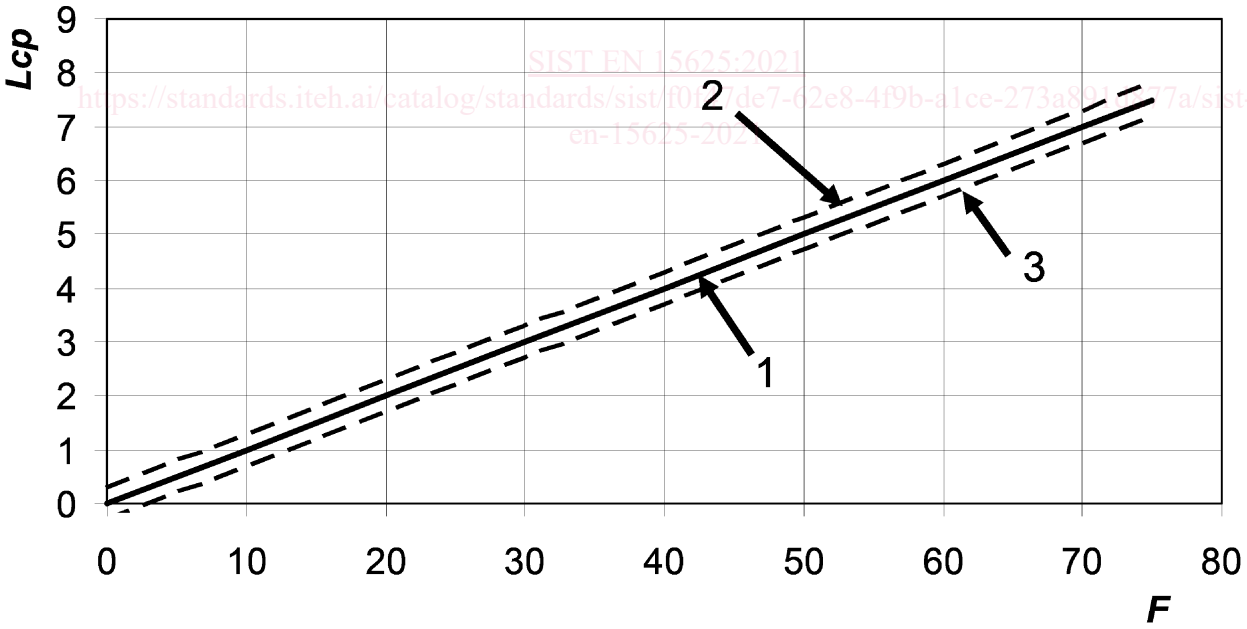
These types are recommended for new interoperable freight wagons. For applications other than interoperable freight wagons other characteristics may be used by agreement between the manufacturer and the customer.



Key

1 characteristic (nominal value)
2 upper limit of tolerance
3 lower limit of tolerance

Figure 2 — Characteristic of the automatic variable load sensing device type 1



Key

1 characteristic (nominal value)
2 upper limit of tolerance
3 lower limit of tolerance

Figure 3 — Characteristic of the automatic variable load sensing device type 3

5.2.3 Mechanical requirements

The automatic variable load sensing device shall be designated to operate with at least a static force *F* at 60 kN without any damage or change of its characteristic. This shall be tested in accordance with 7.2.6.

5.2.4 Leakage

The sealing arrangement within the automatic variable load sensing device shall prevent any unacceptable loss of air.

At of (20 ± 5) °C the automatic variable load sensing device shall not have a leakage rate greater than 0,005 Nl/min at the normal working pressure. This requirement shall be tested in accordance with 7.2.5.2, 7.2.5.3 and 7.2.5.4.

At an environmental temperature of –25 °C, also at +70 °C, the automatic variable load sensing device shall not have a leakage rate greater than 0,01 Nl/min at the normal working pressure. This requirement shall be tested in accordance with 7.2.7.2, 7.2.7.3 and 7.2.7.4.

At –40 °C ≤ environmental temperature < –25 °C the automatic variable load sensing device shall not have a leakage rate greater than 0,1 Nl/min at the normal working pressure. This requirement shall be tested in accordance with 7.2.7.2, 7.2.7.3 and 7.2.7.4.

5.3 Vibrations and shock

The automatic variable load sensing device shall be able to operate without restriction under vibration and shock conditions as specified by EN 61373, Category 2. This requirement shall be tested in accordance with 7.2.8.

The automatic variable load sensing device shall fulfil the specified requirements during a random vibration test in accordance with EN 61373:2010, Clause 8.

The automatic variable load sensing device shall withstand a simulated long life test at increased random vibration levels in accordance with EN 61373:2010, Clause 9, without any loss of performance.

The automatic variable load sensing device shall withstand shock testing in accordance with EN 61373:2010, Clause 10, without any loss of performance.

The above shall be tested in accordance with 7.2.8.

5.4 Environment

5.4.1 General

The design shall be taken into account that the automatic variable load sensing device shall be able to be put into service and operate normally in the conditions and climatic zones for which it is designed and in which it is likely to run, as specified in this document.

NOTE 1 The environmental conditions are expressed in classes for temperature, etc. thereby giving the vehicle designer to choice of an automatic variable load sensing device suitable for operation on a vehicle all over Europe, or have a restricted use.

NOTE 2 The environmental range limits specified are those that have a low probability of being exceeded. All specified values are maximum or limits values. These values may be reached, but do not occur permanently. Depending on the situation there can be different frequencies of occurrence related to a certain period of time.

NOTE 3 The environmental requirements of this document cover the environment requirements of the TSI relating to the subsystem 'rolling stock — locomotives and passenger rolling stock' which only refers to EN 50125-1.

The automatic variable load sensing device shall be tested in accordance with requirements given in Clause 7 including where required environmental/climatic testing

5.4.2 Temperature

The automatic variable load sensing device covered by this document shall be able to operate

— at –25 °C ≤ environmental temperature ≤ 70 °C without any deviation from the technical requirements specified in Clause 5,

— at –40 °C ≤ environmental temperature < –25 °C with allowed deviation from the technical requirements specified in this document but without affecting the function of the automatic variable load sensing device.

Deviations from the technical requirement when testing at extremes are defined in 7.2.7.

The purchaser can be specify higher or lower extreme temperature limit values if operational constraints demand it, In this case the temperature limit values used in the extreme temperature tests of 7.2.7 shall be change accordingly.

5.4.3 Other environmental conditions

5.4.3.1 General

The following environmental conditions shall be considered in the design of the automatic variable load sensing device.

It shall be demonstrated that these environmental conditions have been taken into account in the design of the automatic variable load sensing device. It is sufficient for the supplier to make a declaration of conformity stating how the environmental conditions in the following clauses have been taken into account.

If not specifically required to be tested as part of the type testing requirements in Clause 7, suitable tests and/or design assessments considering the effect of the following environmental conditions on the automatic variable load sensing device, shall be used in the development/design proving of the automatic variable load sensing device, prior to type testing.

5.4.3.2 Altitude

The automatic variable load sensing device shall be able to operate without restrictions up to an altitude of 2 000 m.

5.4.3.3 Humidity

The following external humidity levels shall be considered:

— yearly average: ≤ 75 % relative humidity;

— on 30 days in the year continuously: between 75 % and 95 % relative humidity;

— on the other days occasionally: between 95 % and 100 % relative humidity;

— maximum absolute humidity: 30 g/m^3 occurring in tunnels.

An operationally caused infrequent and slight moisture condensation shall not lead to any malfunction or failure.

The psychometric charts contained in EN 50125-1 shall be used to establish the range of variation of the relative humidity for the different temperature classes that it is considered will not be exceeded for more than 30 days per year.