



SLOVENSKI STANDARD
SIST EN 15625:2021

01-april-2021

Nadomešča:

SIST EN 15625:2009+A1:2011

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

[SIST EN 15625:2021](https://standards.iteh.ai/catalog/standards/sist/f0f47de7-62e8-4f9b-a1ce-275a87fd877a/sist-en-15625-2021)

Ta slovenski standard je istoveten z: EN 15625:2021

ICS:

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

SIST EN 15625:2021

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 15625:2021

<https://standards.iteh.ai/catalog/standards/sist/f0f47de7-62e8-4f9b-a1ce-273a891d877a/sist-en-15625-2021>

EUROPEAN STANDARD

EN 15625

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2021

ICS 45.040

Supersedes EN 15625:2008+A1:2010

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 European Standard was approved by CEN on 20 December 2020.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/1047de7-62e8-4f9b-a1ce-273a891d877a/sist-en-15625-2021>



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

	Page
European foreword.....	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Symbols and abbreviations	7
5 Design and manufacture	7
5.1 General.....	7
5.2 Functional requirements.....	7
5.2.1 Operating requirements.....	7
5.2.2 Characteristics of weighing valves.....	7
5.2.3 Mechanical requirements.....	8
5.2.4 Tightness.....	8
5.3 Fire behaviour.....	8
5.4 Shock and vibration.....	9
5.5 Service life.....	9
5.6 Compressed air quality.....	9
5.7 Environmental conditions.....	9
5.7.1 General.....	9
5.7.2 Ambient temperature.....	9
5.7.3 Altitude.....	9
5.7.4 Humidity.....	10
5.7.5 Rain.....	10
5.7.6 Snow, ice and hail.....	10
5.7.7 Solar radiation.....	10
5.7.8 Pollution.....	10
5.8 External appearance.....	11
5.9 Design requirements regarding pressure stress.....	11
5.10 Pneumatic connections.....	11
6 Type tests	11
6.1 General.....	11
6.2 Individual automatic variable load sensing device type tests.....	12
6.2.1 Test bench for individual automatic variable load sensing devices type tests.....	12
6.2.2 Sampling for type test.....	13
6.2.3 Test requirements.....	13
6.2.4 Check of physical and geometrical characteristics.....	14
6.2.5 Tightness.....	14
6.2.6 Characteristic, hysteresis.....	15
6.2.7 Operation at extreme temperature.....	16
6.2.8 Shock and vibration tests.....	18
7 In-service assessment	19
8 Designation	19
9 Identification and marking	19

Annex A (informative) Assessment of an automatic variable load sensing device when fitted to a vehicle.....	21
A.1 General	21
A.2 Design acceptance testing set up	21
A.3 Running tests.....	21
A.3.1 General	21
A.3.2 Pneumatic automatic variable load sensing device – Air consumption	21
A.3.2.1 Procedure	21
A.3.2.2 Pass/fail criteria	21
A.3.3 Automatic variable load sensing device – Output signal variation	22
A.3.3.1 Procedure	22
A.3.3.2 Pass/fail criteria	22
Annex B (normative) In-service assessment	23
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2016/797/EU aimed to be covered.....	24
Bibliography	26

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 15625:2021](https://standards.iteh.ai/catalog/standards/sist/f0f47de7-62e8-4f9b-a1ce-273a891d877a/sist-en-15625-2021)

<https://standards.iteh.ai/catalog/standards/sist/f0f47de7-62e8-4f9b-a1ce-273a891d877a/sist-en-15625-2021>

EN 15625:2021 (E)**European foreword**

This document (EN 15625:2021) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2021, and conflicting national standards shall be withdrawn at the latest by August 2021.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15625:2008+A1:2010.

The main changes compared to EN 15625:2008+A1:2010 are:

- a) normative references have been updated;
- b) terms and definitions have been revised;
- c) requirements on design and manufacture have been revised;
- d) requirements on materials have been removed;
- e) requirements on type tests have been revised;
- f) requirements on routine test and inspection have been removed;
- g) requirements on type validation have been removed;
- h) requirements on in-service assessment have been added;
- i) requirements on documentation have been removed;
- j) requirements on designation, identification and marking have been revised;
- k) Annex ZA has been updated.

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 2016/797/EU.

For relationship with EU Directive 2016/797/EU, see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document applies to automatic variable load sensing devices designed to continuously sense the load of a railway vehicle and provide a pneumatic output 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, testing and quality assurance of automatic variable load sensing devices.

The requirements of this document are not fully applicable for tests on vehicle level (vehicle homologation tests).

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 14478:2017, *Railway applications — Braking — Generic vocabulary*

EN 60721-3-5:1997, *Classification of environmental conditions — Part 3: Classification of groups of environmental parameters and their severities — Section 5: Ground vehicle installations (IEC 60721-3-5:1997)*

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

EN 45545-2:2020, *Railway applications — Fire protection on railway vehicles — Part 2: Requirements for fire behavior of materials and components*

EN ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

ISO 8573-1:2010, *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 14478:2017 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 <https://www.iso.org/obp>

3.1

automatic variable load sensing device weighing valve

device connected to the vehicle, which responds 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

EN 15625:2021 (E)

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 valve.

3.2**mechanically operated pneumatic device**

device or mechanism which responds to a mechanical input by a change of the output pressure

3.3**hydraulic to pneumatic converter**

device or mechanism which transforms a hydraulic pressure 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 a pressure in the elastomer into a pneumatic pressure with a defined transmission ratio

3.5**load control pressure****LCP**

output pressure delivered by the automatic variable load sensing device, which signals the load of the vehicle to the brake control device

3.6**supply pressure**

input pressure from the air supply to the pneumatic variable load sensing device

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

<https://standards.iteh.ai/catalog/standards/sist/f0f47de7-62e8-4f9b-a1ce-273a891d877a/sist-en-15625-2021>

3.7**normal litre****NI**

unit of amount of a gas equal to the amount of 1 l at a pressure of 1,0 bar and at a standard temperature, at 20 °C

Note 1 to entry: Air flow is often stated in normal litres per minute (NI/min).

3.8**sensitivity**

minimum change of load which causes a variation of the LCP, when the change of load (input) is in the same direction

3.9**hysteresis**

difference in LCP for the same load, which is first rising to a given value and then, having exceeded that value, subsequently falls to the same value

4 Symbols and abbreviations

- F mechanical force, generated by the share of vehicle mass acting at the automatic variable load sensing device, expressed in kN
- LCP load control pressure, expressed in bar
- LCP_r measured value of LCP, expressed in bar
- LCP_n nominal value of LCP, expressed in bar

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.

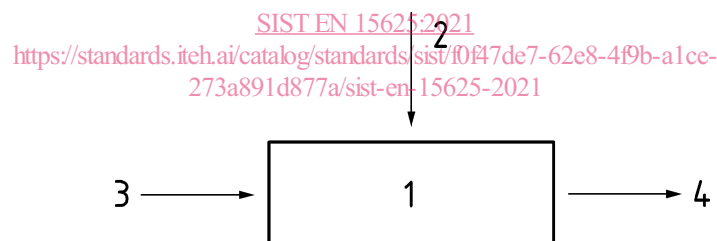
5.2 Functional requirements

5.2.1 Operating requirements

The automatic variable load sensing device shall, in all cases, supply a pneumatic 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 mass
- 3 supply pressure, typically taken from the vehicle's auxiliary reservoir
- 4 LCP

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

5.2.2 Characteristics of weighing valves

Three characteristics of weighing valves are defined:

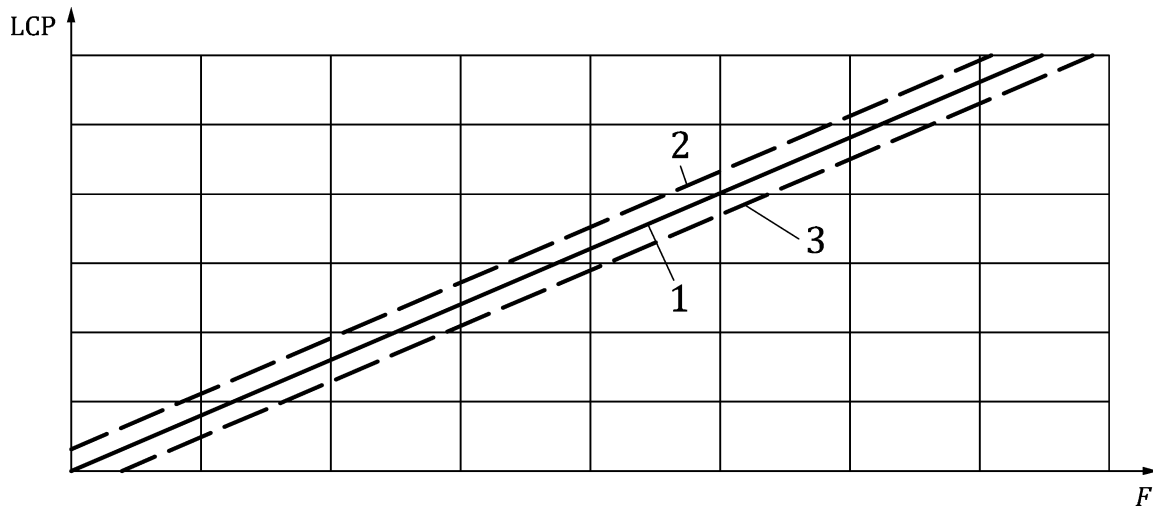
- type 1: $(0,8 \pm 0,1)$ bar/10 kN;
- type 2: $(0,88 \pm 0,1)$ bar/10 kN;
- type 3: $(1,0 \pm 0,1)$ bar/10 kN.

These types are for new interoperable freight wagons.

EN 15625:2021 (E)

The characteristics of the types shall be tested in accordance with 6.2.6.

The example of characteristics with tolerances is shown in Figure 2.



Key

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

iTeh STANDARD PREVIEW

Figure 2 — Characteristic of the automatic variable load sensing device

(standards.itih.ai)

5.2.3 Mechanical requirements

SIST EN 15625:2021

The automatic variable load sensing device shall be designed for a static force F of at least 60 kN. The maximum force shall not cause any damage or change of its characteristic. This shall be tested in accordance with 6.2.6.1.

5.2.4 Tightness

Leakage of the automatic variable load sensing device shall be such that technical performance as specified by this document is met without restrictions.

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

At an environmental temperature of $(20 \pm 5) ^\circ\text{C}$, the automatic variable load sensing device shall not have a leakage rate greater than 0,005 Nl/min when tested at a pressure of $(7,0 \pm 0,1)$ bar. This requirement shall be tested in accordance with 6.2.5.

At an environmental temperature of $-25 ^\circ\text{C}$, also at $+70 ^\circ\text{C}$, the automatic variable load sensing device shall not have a leakage rate greater than 0,01 Nl/min when tested at a pressure of $(7,0 \pm 0,1)$ bar. This requirement shall be tested in accordance with 6.2.7.

At $-40 ^\circ\text{C} \leq$ environmental temperature $< -25 ^\circ\text{C}$ an automatic variable load sensing device shall have a leakage rate not greater than 0,1 Nl/min when tested at a pressure of $(7,0 \pm 0,1)$ bar in accordance with 6.2.7.

5.3 Fire behaviour

The fire behaviour of the automatic variable load sensing device shall correspond to the requirements of EN 45545-2:2020.

5.4 Shock and vibration

The design of the automatic variable load sensing device shall consider outside influences, e.g. impacts and vibrations, and protect the device appropriately.

The automatic variable load sensing device shall be able to operate without restriction under shock and vibration conditions as specified in EN 61373:2010. The class and category of test severity shall be declared by design documentation.

These requirements shall be tested in accordance with 6.2.8.

5.5 Service life

No specific requirements for the automatic variable load sensing device to attain a particular service life are contained in this document.

Any testing to estimate the service life of an automatic variable load sensing device should be conducted as part of the product development.

NOTE The service life of the automatic variable load sensing device is a function of the environment/operating conditions in which the automatic variable load sensing device will function, and the requirements for the automatic variable load sensing device to achieve a serviceable life in accordance with the maintenance requirements of the vehicle to which it is fitted.

5.6 Compressed air quality

It shall be possible to operate the automatic variable load sensing device without restrictions with at least the compressed air quality in accordance with the following classes defined in ISO 8573-1:2010:

- class 3 – for the maximum particle size and the maximum concentration of solid contaminants;
- class 4 – for the water dew point; [SIST EN 15625:2021](https://standards.iteh.ai/catalog/standards/sist/f047de7-62e8-4f9b-a1ce-273a891d877a/sist-en-15625-2021)
- class 4 – for the maximum total (droplets, aerosols and vapours) oil concentration.

The automatic variable load sensing device shall be capable of operating in an air supply system that is not fitted with an air dryer, or when the air dryer is out of order. The air system should therefore include some means of preventing water collecting within the automatic variable load sensing device and hence freezing of the water in conditions below 0 °C.

5.7 Environmental conditions

5.7.1 General

All the environmental requirements listed shall be taken into account within the design concept of the components. However only the assessment tests listed in Clause 6 shall be performed. The remaining proofs shall be presented in the declarations of conformity.

5.7.2 Ambient temperature

The automatic variable load sensing device covered by this document shall be able to operate from –40 °C to +70 °C in accordance with the requirements of this document.

5.7.3 Altitude

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