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Železniške naprave - Kazalniki zavor

Railway applications - Brake indicators

Bahnanwendungen - Bremsanzeigevorrichtungen

Applications ferroviaires - Indicateurs de freins

Ta slovenski standard je istoveten z: prEN 15220

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Railway applications - Brake indicators

Applications ferroviaires - Indicateurs de freins

Bahnanwendungen - Bremsanzeigevorrichtungen

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
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Contents

	Page
European foreword.....	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Symbols and abbreviated terms	6
5 Requirements	6
5.1 Functional requirements.....	6
5.1.1 General.....	6
5.1.2 Application/release status	6
5.1.3 Lubrication (pneumatic brake indicator)	6
5.1.4 Leakage (pneumatic brake indicator)	6
5.1.5 Electrical characteristics	6
5.2 Operating conditions	7
5.2.1 Shock and vibration	7
5.2.2 Altitude	7
5.2.3 Ambient temperature.....	7
5.2.4 Humidity.....	7
5.2.5 Rain	7
5.2.6 Snow, ice and hail.....	7
5.2.7 Solar radiation	8
5.2.8 Pollution	8
5.2.9 Specific requirements for pneumatic parts of brake indicators.....	8
5.2.10 Specific requirements for electrical parts of brake indicators	8
5.3 Design requirements	9
5.3.1 External appearance	9
5.3.2 Fire/smoke behaviour	9
5.3.3 Pneumatic connections.....	9
5.3.4 Electric connections and contacts.....	9
5.3.5 Space envelope.....	9
5.3.6 Indicator window	9
6 Type test methods.....	9
6.1 Sampling for type test.....	9
6.2 Test requirements	10
6.3 Test procedure	10
6.3.1 Principle	10
6.3.2 Check of physical and geometrical characteristics	11
6.3.3 Pressure test (water pressure)	11
6.3.4 Protection against ingress of dust and water	11
6.3.5 Insulation test.....	12
6.3.6 Dielectric strength	12
6.3.7 Tightness test.....	12
6.3.8 Application/release status control.....	15
6.3.9 Vibration test.....	16
6.3.10 Resistance to shock test.....	16
6.3.11 Endurance at ambient temperature test	17

6.3.12 Corrosion test	17
6.3.13 Fire/smoke behaviour	18
6.3.14 Examination	18
7 In-service assessment	18
8 Marking	18
Annex A (informative) Brake indicator and parking brake indicator overall dimensions	19
Annex B (informative) In-service assessment	24

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[oSIST prEN 15220:2024](https://standards.iteh.ai/catalog/standards/sist/ac87fa83-3af4-4fd8-82a3-49860bdaa2c3/osist-pren-15220-2024)

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prEN 15220:2023 (E)

European foreword

This document (prEN 15220:2023) 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 15220:2016.

prEN 15220:2023 includes the following significant technical changes with respect to EN 15220:2016:

- Scope has been modified;
- Normative references have been updated;
- Clause 5 “Requirements” has been revised and restructured;
- Clause 6 “Type test methods” has been revised;
- Clause 7 “In Service assessment” has been revised and restructured (new informative Annex B added);
- Clause 8 “Routine tests” has been deleted;
- Clause 9 “Designation” has been deleted;
- Annex ZA has been updated.

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1 Scope

This document specifies the requirements for the function, design, performance and testing of brake indicators. It applies to brake indicators visible from the outside of the rail vehicle.

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

EN 50121-3-2:2016, *Railway applications - Electromagnetic compatibility - Part 3-2: Rolling stock - Apparatus*

EN 50125-1:2014, *Railway applications - Environmental conditions for equipment - Part 1: Rolling stock and on-board equipment*

EN 50155:2021, *Railway applications - Rolling stock - Electronic equipment*

EN 60529:1991+A1:2000, Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989+A1:1999+A2:2013)

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*

EN 61373:2010, *Railway applications - Rolling stock equipment - Shock and vibration tests*

EN ISO 228-2:2003, *Pipe threads where pressure-tight joints are not made on the threads - Part 2: Verification by means of limit gauges (ISO 228-2:1987)*

EN ISO 9227:2022, *Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227:2022)*

ISO 5208:2015, *Industrial valves — Pressure testing of metallic valves*

ISO 4975:2022, *Railway applications — Braking system — Quality of compressed air for pneumatic apparatus and systems*

ISO 24478:2023, *Railway applications — Braking — General vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 24478:2023 and the following apply.

3.1

uncertain braking status of a parking brake

parking brake indication becoming uncertain in case of isolated parking brake with possibility of manual release or, e.g. lack of air pressure in a pneumatic brake system

3.2

application status of the brake unit

condition which indicates that the brake is applied or not completely released

prEN 15220:2023 (E)**3.3****release status of the brake unit**

condition which indicates that the brake is released

4 Symbols and abbreviated terms

U_n nominal voltage

UV ultraviolet (UV irradiation)

“ inch

IP International Protection Marking as defined in EN 60529:1991+A1:2000+A2:2013

RAL colour standardisation system of the German Institute for Quality Assurance and Certification e.V.

NOTE IP is a coding system to indicate the degrees of protection provided by an enclosure against access to hazardous particles, ingress of solid foreign objects, ingress of water and to give additional information in connection with such protection.

5 Requirements**5.1 Functional requirements****5.1.1 General**

Brake indicators shall be able to display status of the brake unit with and without electric energy on board. It is permitted to have other means of indication of the status of the brake unit without electrical energy on board (e.g. gauges).

5.1.2 Application/release status

In normal operation the application status of the brake unit shall be displayed with red colour and the release status of the brake unit shall be displayed with green colour.

When the input signal corresponds to the braking force less than 10 % of the maximum braking force, the brake indicator should display fully released status.

When the input signal corresponds to the braking force more than 30 % of the maximum braking force, the brake indicator should display fully applied status.

The operating conditions of the application/release flag and its change in status shall be tested in accordance with 6.3.8.

5.1.3 Lubrication (pneumatic brake indicator)

The brake indicator shall operate at the air pressure range defined by this document without additional lubrication between overhauls.

5.1.4 Leakage (pneumatic brake indicator)

The sealing arrangement within the brake indicator shall prevent any unacceptable loss of air. The allowable loss of air shall be less than the leakage values when tested in accordance with 6.3.7.1.

5.1.5 Electrical characteristics

For pneumatic brake indicators, the electrical circuits within the brake indicator shall withstand an insulation test of at least 500 V DC and a dielectric test (flash test) in accordance with EN 50155:2021. This requirement shall be tested in accordance with 6.3.5 and 6.3.6.

For electrical brake indicators the requirements of EN 50155:2021 and EN 50121-3-2:2016 apply.

5.2 Operating conditions

5.2.1 Shock and vibration

The brake indicator shall be able to operate without restriction under shock and vibration conditions as specified in EN 61373:2010, category 1, class B, body mounted or category 2, bogie mounted. This shall be tested in accordance with 6.3.9.

The brake indicator shall be able to withstand shocks and shall be tested in accordance with 6.3.10.

5.2.2 Altitude

The brake indicator shall be able to operate without restrictions up to an altitude of 2 000 m above sea level.

5.2.3 Ambient temperature

Brake component shall be able to operate within the temperature class TX as specified by EN 50125-1:2014, where the upper limit for TX is +70 °C external air temperature. This requirement shall be tested in accordance with 6.3.

5.2.4 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/m³ occurring in tunnels.

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

At cooled surfaces, 100 % relative humidity may occur, causing condensation on parts of equipment; this shall not lead to any malfunction or failure.

Sudden lowering of the air temperature local to the vehicle may cause condensation of water on parts of equipment with rate of 3 K/s and maximum fall in temperature of 40 K.

These conditions particularly occurring when entering or leaving a tunnel shall not lead to any malfunction or failure of the equipment.

5.2.5 Rain

Rain rate of 6 mm/min shall be taken into account. The effect of rain shall be considered depending on the possible equipment installation together with wind and vehicle movement.

5.2.6 Snow, ice and hail

Consideration shall be given to the effect of all kinds of snow, ice and/or hail. The maximum diameter of hailstones shall be taken as 15 mm, larger diameter can occur exceptionally. The effect of snow, ice and hail shall be considered depending on the equipment installation together with wind and vehicle movement.

prEN 15220:2023 (E)**5.2.7 Solar radiation**

Equipment design shall allow for direct exposure to solar radiation at the rate of 1 120 W/m² for a maximum duration of 8 h.

5.2.8 Pollution

The effects of pollution shall be considered in the design of equipment and components. Means may be provided to reduce pollution by the effective use of protection of the braking indicator. The severity of pollution can depend upon the location of the equipment therefore the effects of the kinds of pollution indicated in Table 1 shall be considered as a minimum.

Table 1 — Pollution

Pollution	Requirements
Chemically active substances	Class 5C2 of EN 60721-3-5:1997
Contaminating fluids	Class 5F2 (electrical engine) of EN 60721-3-5:1997 Class 5F3 (thermal engine) of EN 60721-3-5:1997
Biologically active substances	Class 5B2 of EN 60721-3-5:1997
Dust	Class 5S2 of EN 60721-3-5:1997
Stones and other objects	Ballast and other objects of maximum 15 mm diameter
Sand	Class 5S2 of EN 60721-3-5:1997
Sea spray	Class 5C2 of EN 60721-3-5:1997

Compatibility of a cleaning product should be considered in the design of equipment.

5.2.9 Specific requirements for pneumatic parts of brake indicators

To respect the upper pressure limit of the compressed air supply of 10 bar, it shall be able to withstand a hydraulic test with a pressure of 15 bar in accordance with 6.3.3.

It shall be possible to operate the pneumatic parts of brake indicators without restrictions with at least the compressed air purity 3-3-4 [-25 °C; 50 °C] in accordance with ISO 4975:2022.

5.2.10 Specific requirements for electrical parts of brake indicators

The electrical parts of brake indicators shall be in conformity with the requirements of EN 50155:2021 and EN 50121-3-2:2016.

To withstand the external ingress of dust and water as specified in EN 60529:1991+A1:2000+A2:2013, (code IP 55 for indicators with only pneumatic parts, IP 65 for indicators with electrical parts), the brake indicator shall be tested in accordance with 6.3.4.

To withstand the external corrosion due to normal atmospheric pollutants as specified in EN 50125-1:2014, the brake indicator shall be tested in accordance with 6.3.12. When the voltage supply is at upper and lower limit it shall be able to withstand the temperature range in accordance with 6.3.8.