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**Železniške naprave - Zavore - Gumb za klic v sili**

Railway applications - Braking - Emergency push button

Bahnanwendungen - Bremsen - Notbremsschlagknopf

Applications ferroviaires - Freinage - Bouton poussoir d'urgence

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**ICS:**

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## Railway applications - Braking - Emergency push button

Applications ferroviaires - Freinage - Bouton poussoir  
d'urgence

Bahnwendungen - Bremsen - Notbremsschlagknopf

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

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**prEN 18141:2024 (E)**

## **European foreword**

This document (prEN 18141:2024) 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.

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## 1 Scope

This document specifies the requirements for the function, design, performance, and testing of emergency push buttons that are installed in train's driving's cab.

This document is applicable for emergency push button.

This document is not applicable for emergency handle.

## 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 14198:2016+A2:2021, *Railway applications - Braking - Requirements for the brake system of trains hauled by locomotives*

EN 45545-2:2020+A1:2023, *Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components*

EN 50121-3-2:2016,<sup>1</sup> *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 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 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 24478:2024, *Railway applications - Braking - General vocabulary (ISO 24478:2023, including corrected version 2024-04)*

EN ISO 6270-2:2018, *Paints and varnishes - Determination of resistance to humidity - Part 2: Condensation (in-cabinet exposure with heated water reservoir) (ISO 6270-2:2017)*

EN ISO 9227:2022,<sup>2</sup> *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*

<sup>1</sup> As impacted by EN 50121-3-2:2016/A1:2019.

<sup>2</sup> As impacted by EN ISO 9227:2022/A1:2024.

**prEN 18141:2024 (E)****3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN ISO 24478:2024 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

**3.1****emergency push button**

emergency brake demand device fitted with a red mushroom button for the driver that is independent and separated from other driver's brake demand device

Note 1 to entry: This device can also function as an emergency brake trainwide control device.

[SOURCE: EN ISO 24478:2024, 3.10.1.8, modified — admitted term “emergency handle” deleted, Note 1 to entry moved to definition.]

**3.2****mushroom button**

part of the emergency push button in interface with the driver with a shape of mushroom

**4 Symbols and abbreviations**

For the purposes of this document, the following symbols in Table 1 apply.

**Table 1 — Symbols**

Symbol	Description	Unit
$U_n$	Nominal voltage	V
DC	Direct current	—

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

Only two positions shall be possible for the emergency push button: “no emergency brake application demanded” and “emergency brake application demanded”. These two positions shall be notched.

Switching from “no emergency brake application demanded” to “emergency brake application demanded” shall be done by pushing on the mushroom button.

Switching from “emergency brake application demanded” to “no emergency brake application demanded” shall be done by pulling the mushroom button.

**5.1.2 Emergency push button as emergency brake demand device only**

The emergency brake demand signal shall be controlled directly by the position of the mushroom button.



The emergency brake demand signal controlled by the emergency push button shall be in accordance with the principle “deactivate-to-apply”, i.e. no signal shall mean “emergency brake application demanded”.

### **5.1.3 Emergency push button including emergency brake demand device and trainwide emergency brake control device**

The trainwide emergency brake control signal controlled by the trainwide emergency brake control device of the emergency push button shall be mechanically linked to the position of the mushroom button.

## **5.2 Operating conditions**

### **5.2.1 Shock and vibration**

The emergency push button shall be able to operate without restriction under shock and vibration conditions as specified in EN 61373:2010, category 1, class B, body mounted. This shall be tested in accordance with 6.3.4 and with 6.3.5.

### **5.2.2 Altitude**

The emergency push button shall be able to operate without restrictions up to an altitude of 2 000 m above sea level.

### **5.2.3 Ambient temperature**

The emergency push button 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:  $\leq 75$  % 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<sup>3</sup> 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 can 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 can 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.

To withstand the external corrosion due to normal atmospheric pollutants as specified in EN 50125-1:2014, the emergency push button shall be tested in accordance with 6.3.7.

### **5.2.5 Solar radiation**

Equipment design shall allow for direct exposure to solar radiation in accordance with the class R2 of EN 50125-1:2014, 4.9 for parts exposed (e.g. mushroom button).

**prEN 18141:2024 (E)****5.2.6 Pollution**

The effects of pollution shall be considered in the design of equipment and components. The effects of the kinds of pollution indicated in Table 2 shall be considered as a minimum.

**Table 2 — Pollution**

<b>Pollution</b>	<b>Requirements</b>
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
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.

**5.2.7 Specific requirements for pneumatic parts of emergency push buttons**

To respect the upper pressure limit of the compressed air supply of 10 bar, the emergency push button shall be able to withstand a hydraulic test with a pressure of 15 bar in accordance with 6.3.10.

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

When not activated, the loss of pressure of the emergency push button at 5,0 bar shall be less than 0,005 Nl per minute for temperature between 0 °C and 40 °C and less than a value defined linearly from 0,005 Nl to 0,10 Nl between 0 °C and -40 °C, and between 40 °C and 70 °C.

When used with degraded compressed air purity 3-6-4 [-25 °C; 50 °C] in accordance with ISO 4975:2022, the loss of pressure of the emergency push button at 5,0 bar shall be less than two times the one allowed with the air purity 3-3-4 [-25 °C; 50 °C] in accordance with ISO 4975:2022.

If emergency push button includes a pneumatic trainwide emergency brake control device, when activated, the emergency push button shall have the same exhaust performance as the emergency brake application of EN 14198:2016+A2:2021, Clause E.4 for both air purities 3-3-4 and 3-6-4. These performances shall be tested in accordance with 6.3.11.

**5.2.8 Specific requirements for electrical parts of emergency push buttons**

The electrical parts of emergency push buttons shall be in conformity with the requirements of EN 50155:2021 and EN 50121-3-2:2016<sup>1</sup>, if applicable. These performances shall be tested in accordance with 6.3.12 and 6.3.13

When the voltage supply is at upper and lower limit the emergency push button shall be able to withstand the temperature range in accordance with 6.3.3.

**5.3 Design requirements****5.3.1 External appearance**

The external surfaces of the emergency push button shall be free of sharp edges which could be a danger to those persons handling the emergency push button or to other equipment in the proximity of the emergency push button. This requirement shall be checked while testing the other constructional features in accordance with 6.3.2.