



SLOVENSKI STANDARD
oSIST prEN 15355:2017
01-oktober-2017

Železniške naprave - Zavore - Krmilni ventili in naprave za ločitev krmilnih ventilov od zavornega voda

Railway applications - Braking - Distributor valves and distributor-isolating devices

Bahnanwendungen - Bremsen - Steuerventile und Bremsabsperreinrichtungen

Applications ferroviaires - Freinage - Distributeurs de frein et robinet d'isolement

Ta slovenski standard je istoveten z: prEN 15355

ICS:

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

Railway applications - Braking - Distributor valves and distributor-isolating devices

Applications ferroviaires - Freinage - Distributeurs de frein et robinet d'isolement

Bahnanwendungen - Bremse - Steuerventile und Bremsabsperreinrichtungen

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COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Page

European foreword.....	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Symbols and abbreviations	13
4.1 Symbols.....	13
4.2 Abbreviations	13
5 Requirements to function, design and manufacturing.....	13
5.1 Functional requirements.....	13
5.2 Control volume (control chamber).....	13
5.3 Pilot volume	13
5.4 Auxiliary volume and brake cylinder size	14
5.5 Shock and vibration	14
5.6 Service life.....	14
5.7 Compressed air quality	14
5.8 Environmental conditions	14
5.8.1 General.....	14
5.8.2 Ambient temperature.....	14
5.8.3 Altitude	14
5.8.4 Humidity.....	15
5.8.5 Other environmental specifications.....	15
5.9 Design requirements regarding pressure stress.....	16
5.10 Tightness.....	16
5.11 Fire behaviour	16
6 Type tests	16
6.1 General.....	16
6.2 Test bench.....	17
6.3 Function requirements and tests	17
6.3.1 General.....	17
6.3.2 Tightness.....	17
6.3.3 Inexhaustibility.....	19
6.3.4 Compensation of output pressure during brake application.....	23
6.3.5 Operating pressure.....	24
6.3.6 Released and stand by position	24
6.3.7 Maximum output pressure in relation to input pressure reduction	27
6.3.8 Maximum output pressure and build-up and release times of an individual distributor valve.....	28
6.3.9 Release time within a train consist.....	29
6.3.10 Sensitivity	30
6.3.11 Insensitivity.....	31
6.3.12 Control sensitivity and hysteresis.....	31
6.3.13 Quick service function	32
6.3.14 Propagation speed	33
6.3.15 Inshot function	34
6.3.16 Manual release function	34

6.3.17	Distributor isolating device	37
6.3.18	Protection against input pressure overcharge	42
6.3.19	Initial charging of the brake system of a vehicle	44
6.3.20	Initial charging of the brake system of a train	46
6.3.21	Maximum supply pressure	46
6.3.22	Tests at different temperatures	46
6.3.23	Shock and vibration	48
6.3.24	Distribution dump valve	49
7	In-service assessment	50
8	Designation	50
9	Identification and marking	51
9.1	Distributor valve	51
9.2	Distributor-isolating device	51
Annex A	(normative) Test benches	52
A.1	General	52
A.2	Test bench Type A for single vehicle	52
A.3	Test bench Type B for train with 400 m length	54
A.4	Test bench Type C for train with 500 m length	54
A.5	Test bench Type D for train with 750 m length	54
A.6	Test bench Type E for train with 1 200 m length	54
Annex B	(normative) Handle for operating the distributor-isolating device	55
Annex C	(normative) In-service assessment	56
Annex ZA	(informative) Relationship between this European Standard and the essential requirements of EU Directive 2008/57/EC aimed to be covered	57
Bibliography	59

prEN 15355:2017 (E)**European foreword**

This document (prEN 15355:2017) 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 15355:2008+A1:2010.

This document has been prepared under a mandate 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, see informative Annex ZA, which is an integral part of this document.

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1 Scope

This draft European Standard applies to distributor valves and distributor-isolating devices.

The distributor valves contained in this European Standard are of graduated release type. Direct release types are not included.

Functionally they are regarded as not containing relay valves of any type, even if the relay valves are physically an integral part of the distributor valves.

This European Standard applies to both distributor-isolating devices mounted separate from the distributor valve and distributor-isolating devices integral with the distributor valve.

This European Standard specifies the requirements for the design, testing and quality assurance of distributor valves and distributor-isolating devices.

The distributor valve and distributor-isolating device are intended to be part of a brake system mounted in a vehicle with maximum length of 31 m and maximum brake pipe volume of 25 l taking into consideration brake pipe inner diameters between 25 mm and 32 mm.

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, *Railway applications - Braking - Requirements for the brake system of trains hauled by locomotives*

prEN 14478:2016, *Railway applications - Braking - Generic vocabulary*

EN 15611:2008+A1:2010, *Railway applications - Braking - Relay valves*

EN 16452:2015, *Railway applications - Braking - Brake blocks*

EN 45545-2:2013+A1:2015, *Railway applications - Fire protection on railway vehicles - Part 2: Requirements for fire behaviour of materials and components*

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)*

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 prEN 14478, EN 16452 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>.

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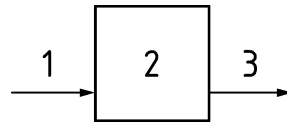
3.1 distributor valve

apparatus to control a pneumatic output pressure as an inverse function of the variation of the brake pipe pressure (input pressure)

[SOURCE: prEN 14478:2016, definition 4.11.3.6]

Note 1 to entry: See Figure 1 and Figure 2.

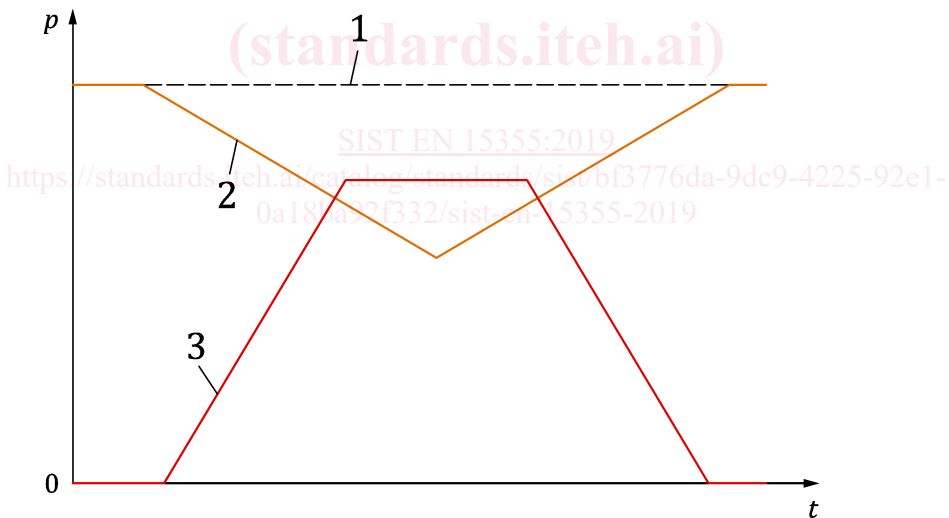
Note 2 to entry: For the purpose of this European Standard, input pressure is considered to be the brake pipe pressure and output pressure is considered to be the pilot pressure, which controls the brake cylinder pressure via a relay valve.



Key

- 1 input pressure
- 2 distributor valve
- 3 output pressure

Figure 1 — Distributor valve, main function and block diagram



Key

- 1 operating pressure level
- 2 input pressure
- 3 output pressure

Note 1 to entry: Some of the curves in this clause are simplified, not showing the real pressure development. This is considered to be sufficient for the purpose of this clause.

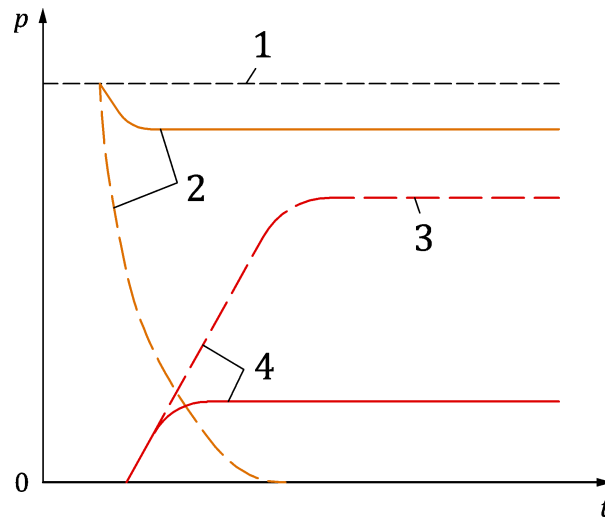
Figure 2 — Distributor valve, main function and pressure diagram

3.2

brake application

establishing a certain output pressure fed by the auxiliary (supply) reservoir, initiated by a drop of input pressure (brake pipe pressure)

Note 1 to entry: See Figure 3.



Key

- | | | | |
|---|-------------------------------|-------|-----------------------------|
| 1 | normal working pressure level | 4 | output pressure |
| 2 | input pressure | — | service brake application |
| 3 | maximum output pressure | - - - | emergency brake application |

Figure 3 — Service and emergency brake application

3.3

service brake application

establishing an output pressure less than the possible maximum, initiated by a drop of input pressure (brake pipe pressure) beginning at the operating pressure level down to a value between the minimum reduction and the level of input pressure necessary for full service braking (equivalent to “service braking” in prEN 14478)

Note 1 to entry: This pressure drop causes the distributor valve to establish a corresponding output pressure.

3.4

full service brake application

establishing maximum output pressure initiated by a defined drop of input pressure (brake pipe pressure), beginning from the operating pressure level down to the specific input pressure level (equivalent to “full service braking” in prEN 14478)

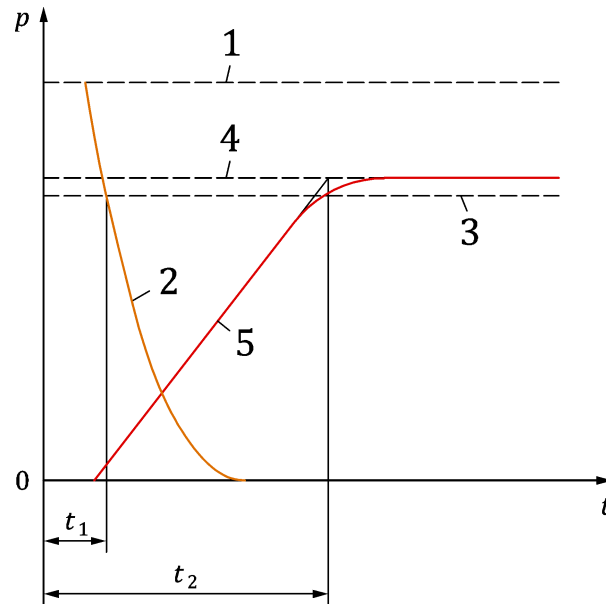
3.5

emergency brake application

increase of output pressure up to the maximum output pressure caused by a drop of input pressure starting with the value for operating pressure down to the level necessary for reaching the maximum output pressure in time t_1 , faster than the specified time for reaching the maximum output pressure, t_2 (equivalent to “emergency braking” in prEN 14478)

Note 1 to entry: This causes the distributor valve to operate at his maximum capacity, meeting the system requirements (see Figure 4).

Note 2 to entry: Usually during emergency braking the input pressure is reduced to 0.

**Key**

- 1 operating pressure level
- 2 input pressure
- 3 input pressure level necessary for reaching maximum output pressure
- 4 maximum output pressure
- t_1 time to reach the input pressure necessary to establish maximum output pressure
- t_2 time to reach the maximum output pressure

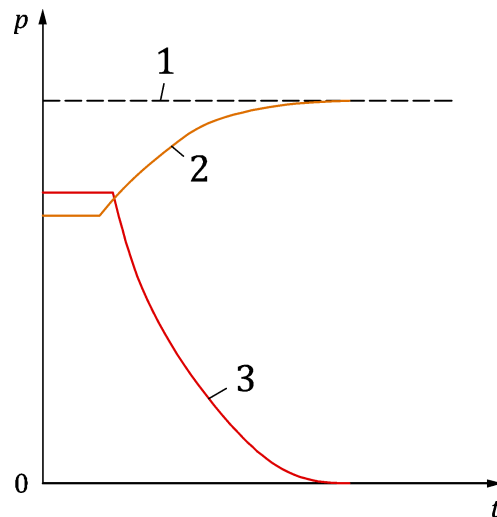
Figure 4 — Emergency braking (emergency brake application)

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3.6**brake release**

venting the output pressure to atmosphere, initiated by an increase of input pressure (brake pipe pressure) after a brake application (equivalent to “graduable application and release” in prEN 14478)

Note 1 to entry: See Figure 5.

**Key**

- 1 operating pressure level
- 2 input pressure
- 3 output pressure

Figure 5 — Brake release**3.7****full release**

complete venting of output pressure, initiated by an increase of input pressure (brake pipe pressure) after a brake application up to the operating pressure level

3.8**graduated release**

incremental reduction of output pressure initiated by an incremental increase of input pressure in the range of pressure from full service braking to full release (equivalent to “graduable application and release” in prEN 14478)

3.9**brake application time**

time for increasing output pressure from when it starts to rise from 0 bar up to 95 % of the maximum output pressure, when input pressure is reduced from operating pressure level down to 0 bar with a time of less than 2 s for the first pressure drop of 1,5 bar

3.10**release time**

time for reducing the output pressure from the moment when it starts to decrease to 0,4 bar, when input pressure is increased up to the operating pressure level, starting from 1,5 bar below it, in less than 2 s

3.11**manual release**

function which requires deliberate and intentional manual action in order to cancel brake application (to release the distributor valve) provided by one distributor valve

Note 1 to entry: Manual release function can be achieved in two ways (see 6.3.16).

prEN 15355:2017 (E)**3.12****automatic manual release**

operation, which requires manual action by the command element after which the release function is completed automatically

3.13**non-automatic release**

operation, which requires manual action by the command element during the entire process until the release function is completed

Note 1 to entry: Stopping action before complete release results in incomplete release.

3.14**stand-by position**

ready for operation

condition of the distributor valve in which braking can be initiated in compliance with all specifications

3.15**operating pressure**

reference input pressure in full released position (equivalent to “normal working pressure” in prEN 14478)

3.16**sensitivity**

ability of the distributor valve to supply an output pressure under certain conditions of input pressure reduction

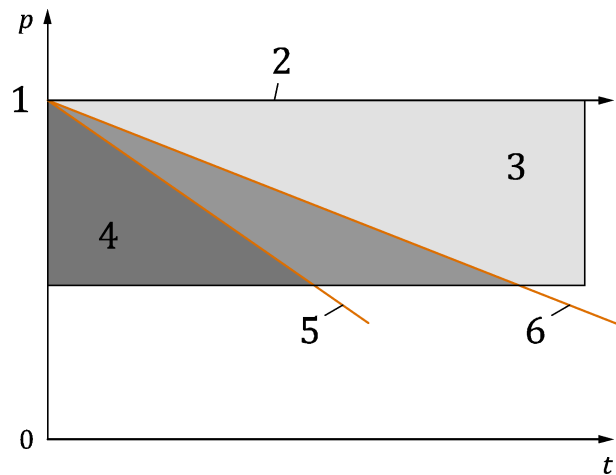
Note 1 to entry: See Figure 6.

Note 2 to entry: If a certain value is specified, it gives the minimum gradient of input pressure reduction which causes the distributor valve to react after a certain time.

3.17**insensitivity**

ability of the distributor valve to prevent establishing an output pressure under certain conditions of input pressure reduction

Note 1 to entry: If a certain value is specified, it gives the maximum (fastest) gradient of the input pressure reduction which will not cause the distributor valve to react.

**Key**

1	input pressure		distributor valve shall react
2	normal working pressure		distributor valve may react
3	insensitivity area		distributor valve shall not react
4	sensitivity area		
5	sensitivity limit		
6	insensitivity limit		

Figure 6 — Sensitivity respectively insensitivity areas and limits**3.18****quick service function**

function of a distributor valve which allows, when applying the brake from stand-by and released position, the local fast venting of brake pipe pressure by a certain specified amount and at a certain specified gradient, to provide pneumatic brake signal transmission through a train

3.19**propagation time**

time between the initiation of an emergency brake application by the driver's brake handle and the beginning of brake cylinder pressure build-up on the last vehicle of a train

3.20**propagation speed**

length of brake pipe divided by propagation time

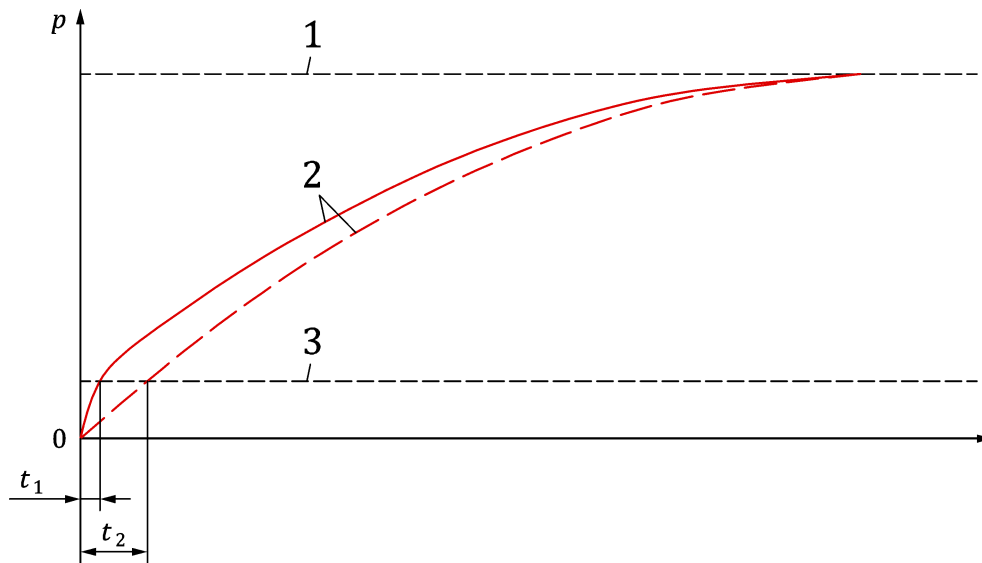
3.21**operating pressure overcharge**

build-up input pressure above normal working pressure to reduce the release time of a train and/or to adjust the distributors control reservoir pressure of all vehicles of a complete train (equivalent to "overcharge" in prEN 14478)

3.22**inshot function in brake mode G**

function of the distributor valve which allows, when operated in the brake mode "G" ("goods"), a faster increase of the output pressure at the beginning of brake application (t_1 against t_2 without inshot function)

Note 1 to entry: The purpose is the quick build-up of the necessary pressure for initiating the friction braking process (see Figure 7).

**Key**

- 1 maximum output pressure level
- 2 output pressure
- 3 pressure necessary for starting the friction process
- t_1 with inshot function
- t_2 without inshot function

Figure 7 — Inshot function, comparison between output pressure development with and without inshot function

3.23**auxiliary (supply) reservoir**

protected and dedicated source of compressed air for feeding the output pressure by the distributor valve

3.24**direct release**

complete reduction of brake cylinder pressure in one step initiated by a limited increase of the brake pipe pressure even if not reaching the operating pressure

3.25**graduuable (graduated) release**

reduction of output pressure in more than one step

3.26**maximum output pressure**

output pressure which is reached after an emergency braking and full service braking

Note 1 to entry: See Figure 3.

3.27**control sensitivity**

ability of the distributor valve to respond accurately and sensitively to input pressure modifications by delivering corresponding output pressure variations

3.28**distributor isolation device**

device which isolates the distributor valve from the brake pipe

3.29**normal litre**

Nl

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

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

3.30**distributor dump valve**

optional valve within or attached to the distributor valve to eliminate an overcharge in the control reservoir as the input pressure of the distributor valve is reduced to 0 bar and (optional) increased again up to service pressure

4 Symbols and abbreviations**4.1 Symbols**

t time

p pressure

4.2 Abbreviations

P Brake mode “passenger”

G Brake mode “goods” (freight)

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5 Requirements to function, design and manufacturing**5.1 Functional requirements**

Functional requirements to be met by the distributor valve and distributor-isolating device are specified in Clause 5.

5.2 Control volume (control chamber)

The control volume may be integral with the distributor valve or as a separate volume.

5.3 Pilot volume

The pilot volume may be integral with the distributor valve, a relay valve or as a separate volume. The timing chokes of the distributor valve shall be associated with the defined pilot volume. The pressure inside the pilot volume is the output pressure of the distributor valve. The pilot volume(s) and its tolerance(s) shall be defined by design documentation.