SLOVENSKI STANDARD
oSIST prEN 15355:2005

01-november-2005

Železniške naprave - Zavore - Krmilni ventili

Railway applications - Braking - Brake distributor valve for rolling stock

Bahnanwendungen - Bremse - Steuerventile

Applications ferroviaires - Freinage - Distributeur de freinage

Ta slovenski standard je istoveten z: **prEN 15355**

ICS:

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

oSIST prEN 15355:2005 **en**

EUROPEAN STANDARD

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ICS

English Version

Railway applications - Braking - Distributor valves

Applications ferroviaires - Freinage - Distributeur de freinage

Bahnanwendungen - Bremse - Steuerventile

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (prEN 15355:2005) 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 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(s).

For relationship with EU Directive(s), see informative Annex ZA and ZB which are an integral part of this document.

— 96/48/EC of 23 July 1996 on the Interoperability of the trans-European high-speed rail system.[1)]

— Directive 2001/16/EC of the European Parliament and of the Council of 19 March 2001 on the interoperability of the trans-European conventional rail system[2)]

This draft contains requirements for the dimensions, materials, installation and acceptance testing of distributor valves.

1) Official Journal of the European Communities No L 235/6 of 17.09.96

2) Official Journal of the European Communities No L 110 of 20.04.2001

1 Scope

This document applies to distributor valves assessed according to TSI Specifications as interoperability components for air brakes of interoperable railway vehicles which are operated by compressed air.

The distributor valves contained in this document 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 may be physically an integral part of the distributor valves.

This document gives the requirements for the design, dimensions, testing and quality assurance of distributor valves. These requirements can not be written in sufficient detail to ensure good workmanship or proper construction. Each manufacturer is therefore responsible for taking every necessary step to make sure that the quality of workmanship and construction is such as to ensure accordance with good engineering practice.

2 Normative references

The following referenced documents are indispensable for the application 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.

prEN 14478, *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*

ISO 8573-1:2001, *Compressed air — Part 1: Contaminants and purity classes*

UIC 547:1989, *Brakes; air brake; standard programme of tests*

3 Symbols, abbreviations, terms and definitions

For the purpose of this European Standard the following symbols, abbreviations, terms and definitions, further to the definitions contained in prEN 14478 apply.

3.1 Symbols

t time

p pressure

3.2 Abbreviations

P Braking mode “passenger”

G Braking mode “goods” (freight)

3.3 Terms and definitions

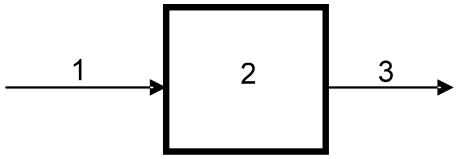
3.3.1 General

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.

3.3.2
distributor valve
comprehensive definition is given by prEN 14478

Apparatus the main function of which is to control a pneumatic output pressure as an inverse function of the variation of an input pressure (see Figure 1 and Figure 2)

NOTE Following the scope of the present document input pressure is considered to be the brake pipe pressure and output pressure is considered to be the brake cylinder pressure or the pilot pressure which controls the brake cylinder pressure via a relay valve.



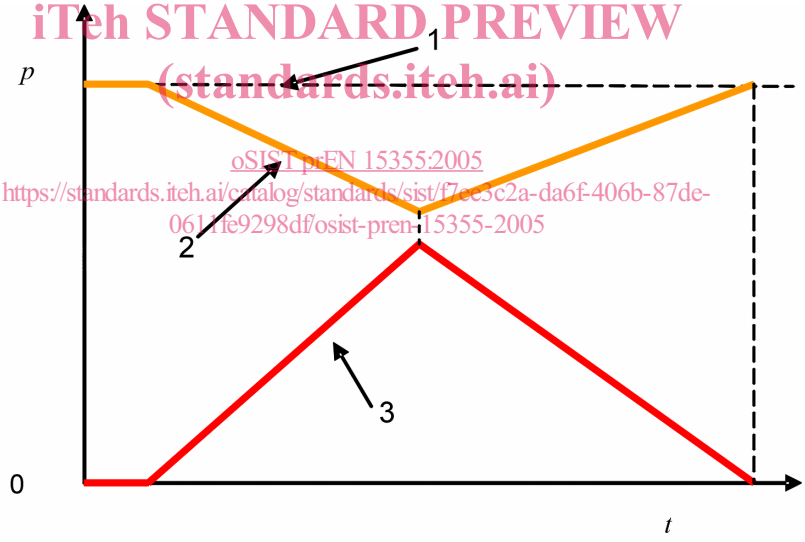
Key

1 input pressure

2 distributor valve

3 output pressure

Figure 1



Key

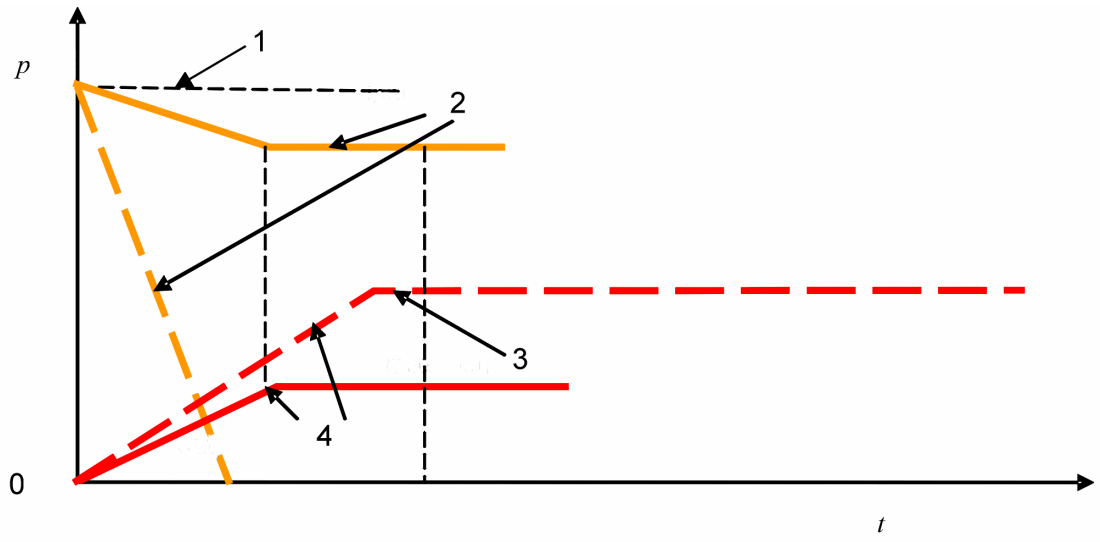
1 operating pressure

2 input pressure

3 output pressure

Figure 2

3.3.2
brake application
a defined drop of input pressure (brake pipe pressure) which causes the distributor valve to establish a corresponding output pressure level fed by the auxiliary (supply) reservoir (see Figure 3)



Key

1	operating pressure
2	input pressure
3	maximum output pressure
4	output pressure
———	service brake application
— — —	emergency brake application

Figure 3

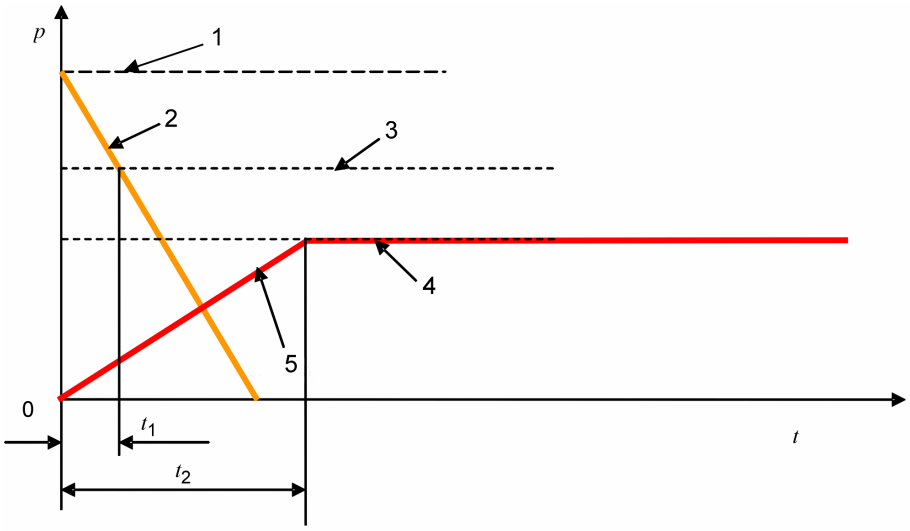
3.3.2.1
service brake application
a defined drop of input pressure (brake pipe pressure) beginning at the operating pressure level down between the level of operating pressure and the level of input pressure necessary for reaching maximum output pressure, which causes the distributor valve to establish a corresponding output pressure level between 0 and maximum output pressure

3.3.2.2
graduated braking
an incremental increase of the output pressure controlled by an incremental reduction of the input pressure in the range of pressure from released position to the pressure corresponding to a full service braking

3.3.2.3
full service brake application
a defined drop of input pressure (brake pipe pressure) beginning at the operating pressure level down to the input pressure level which causes the distributor valve to establish maximum output pressure

3.3.2.4
emergency braking (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 than in time t_1, faster the specified time for reaching the maximum output pressure, t_2. This causes the distributor valve to operate at his maximum capacity, meeting the system requirements (see Figure 4)

NOTE Usually during emergency braking the input pressure is reduced to 0 bar.



Key

1 operating pressure

2 input pressure

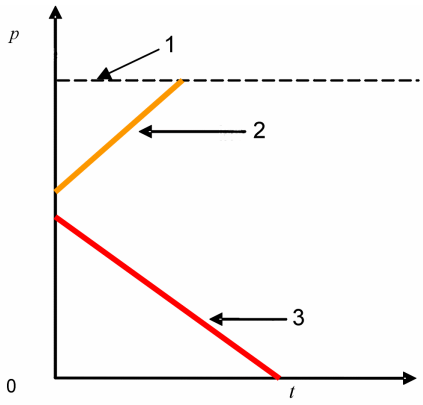
3 input pressure level necessary for reaching maximum output pressure

4 maximum output pressure

5 output pressure

Figure 4

3.3.3
brake release
the increase of input pressure (brake pipe pressure) after a brake application which causes the distributor valve to vent the output pipe to atmosphere (see Figure 5)



Key

1 operating pressure

2 input pressure

3 output pressure

Figure 5

3.3.3.1
full release
an increase of input pressure (brake pipe pressure) after a brake application up to the operating pressure level, causing the complete venting of output pressure

3.3.3.2
graduated release
an incremental reduction of output pressure by an incremental increase of input pressure in the range of pressure from full service braking to full release

3.3.4
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 gradient of less than 2 s for the first pressure drop of 1,5 bar

3.3.5
release time
time for reducing the output pressure from when it starts to fall from maximum down 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

3.3.6
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. Manual release function can be achieved in two ways:

3.3.6.1
automatic manual release
operation requires short action by the command element after which the release function is completed automatically

3.3.6.2
non-automatic manual release
operation requires action by the command element during the entire process until the release function is completed. Stopping action before complete release results in incomplete release

3.3.7
braking mode
categories of application and release times for the output pressure, which a distributor valve may be able to provide depending on the operating conditions

3.3.7.1
braking mode “passenger” (short form “P”)
braking mode characterized by fast brake application and release times specific for distributor valves used on trains for passenger traffic

3.3.7.2
braking mode “goods ”(“freight”) (short form “G”)
braking mode characterized by slow brake application and release times specific for distributor valves used on freight trains for slow speed

3.3.8
automatic braking
ability of the distributor valve to ensure the maximum output pressure in case of loss of input pressure

3.3.9
inexhaustibility
capability of the distributor valve to assure a certain significant level of output pressure under all operating conditions

3.3.10
stand by position/ready for operation
condition of the distributor valve in which braking can be initiated in compliance with all specifications

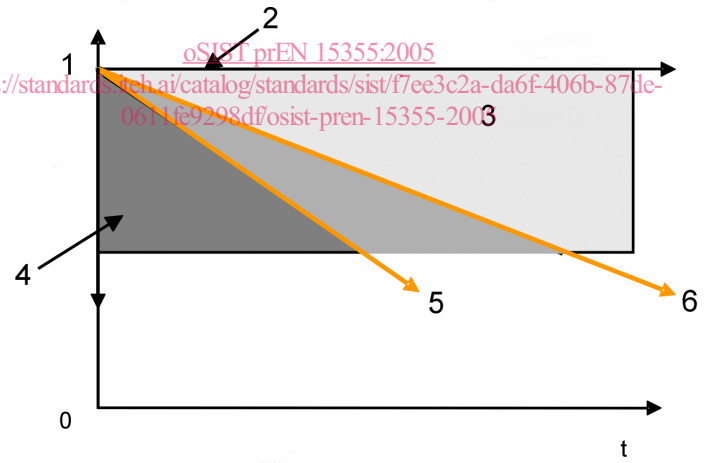
3.3.11
operating pressure
the reference input pressure in full released position

3.3.12
sensitivity
the ability of the distributor valve to supply an output pressure under certain conditions of input pressure reduction (see Figure 6)

NOTE 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.

3.3.13
insensitivity
the ability of the distributor valve to avoid supplying an output pressure under certain conditions of input pressure reduction.

NOTE 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

- distributor valve shall react
- distributor valve shall not react
- distributor valve may react

1 input pressure
2 operating pressure
3 insensitivity area
4 sensitivity area
5 sensitivity limit
6 insensitivity limit

Figure 6

3.3.14
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

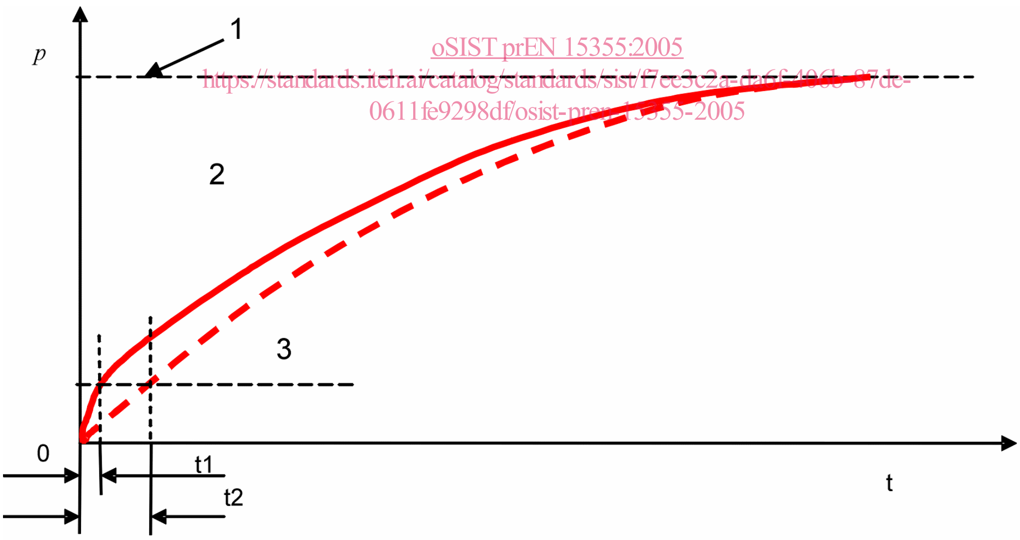
3.3.15
propagation time
the time between the initiation of a brake application by the driver's brake handle and the beginning of brake cylinder pressure build-up on the last vehicle of a train

3.3.16
propagation speed
propagation time related to the length of brake pipe.

NOTE The length of brake pipe is measured from the driver's brake valve to the end cock located at the end of the last vehicle of the train and does not take into consideration any branches.

3.3.17
operating pressure overcharge
build up of distributor input pressure above operating 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

3.3.18
inshot function
function of the distributor valve which allows, when operated in the braking mode "goods" ("freight"), a faster increase of the output pressure at the beginning of brake application (t_1 against t_2 without inshot function). The purpose is quick build up of the necessary pressure for initiating the friction braking process (see Figure 7)



Key

1 operating pressure

2 output pressure

3 pressure necessary for starting the friction process

t1 with inshot function

t2 without inshot function

Figure 7

3.3.19
released position (related to distributor valve)
the distributor valves position in which the output pressure is having a value which does not produce a brake force

3.3.20
auxiliary (supply) reservoir
protected and dedicated source of pressure energy for local brake actuation

[prEN 14478]

3.3.21
brake force
force generated by the brake and applied to the train

[prEN 14478]

3.3.22
brake pipe
pipe containing and conveying fluid usually air enabling train brake control

[prEN 14478]

3.3.23
brake system
combination of means (hardware and software) to achieve, with a chosen level of safety, the whole or part of the braking requirements of the train

NOTE 1 The brake system should act with a level of availability compatible with the operating requirements.
NOTE 2 A train may be equipped with one or more brake systems.

[prEN 14478]

3.3.24
control reservoir (control chamber)
container, (in a brake) employing air pressure, adapted by its volume to cause a desired pressure to be achieved to enable one or more (brake) control functions, e. g timing or pressure

[prEN 14478]

3.3.25
direct release
complete reduction of brake cylinder pressure in one step

[prEN 14478]

3.3.26
driver's brake valve
component or combination of components by which the driver's intent is converted to a train brake control signal

NOTE The driver's brake valve includes the brake handle.

[prEN 14478]

3.3.27
graduable (graduated [am]) release
reduction of brake cylinder pressure in more than one step

[prEN 14478]