



SLOVENSKI STANDARD

SIST EN 17069-1:2019

01-junij-2019

**Železniške naprave - Sistemi in postopki za spremembo tirne širine - 1. del:
Sistemi za samodejno spreminjanje širine**

Railway applications - Systems and procedures for change of track gauge - Part 1:
Automatic Variable Gauge Systems

Bahnanwendungen - Systeme und Verfahren zur Umspurung - Automatische
Umspursysteme

Applications ferroviaires - Systèmes et procédures de changement d'écartement de voie
- Systèmes à écartement variable automatique

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Ta slovenski standard je istoveten z: EN 17069-1:2019

ICS:

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

SIST EN 17069-1:2019

en,fr,de

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EUROPEAN STANDARD

EN 17069-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2019

ICS 45.040

English Version

Railway applications - Systems and procedures for change of track gauge - Part 1: Automatic Variable Gauge Systems

Applications ferroviaires - Systèmes et procédures de changement d'écartements de voie - Partie 1 : Systèmes à écartement variable automatique

Bahnanwendungen - Systeme und Verfahren zur Umspurung - Teil 1: Automatische Umspurssysteme

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Contents

	Page
European foreword.....	4
Introduction	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	7
4 Symbols.....	9
5 General requirements	9
5.1 Running gear dimensions	9
5.2 Functional requirement.....	13
6 Automatic Variable Gauge Systems	13
6.1 General.....	13
6.2 Functional requirements.....	13
6.2.1 Running gear.....	13
6.2.2 Axle.....	14
6.2.3 Wheel.....	14
6.2.4 Axle boxes / Bearings	15
6.2.5 Locking mechanism.....	15
6.2.6 Running gear frame.....	15
6.2.7 Braking equipment.....	16
6.3 Validation and acceptance of the design.....	16
6.3.1 General.....	16
6.3.2 The validation plan.....	17
6.3.3 Technical approval finalisation	20
6.3.4 Technical file.....	21
6.4 Facilities	22
6.4.1 General conditions.....	22
6.4.2 Operation of the gauge changeover facility	22
6.4.3 Maintenance of gauge changeover facilities.....	22
6.4.4 Track layout	22
6.4.5 Assessment of gauge changeover facilities.....	23
6.4.6 Start of operation	27
Annex A (normative) Interface with trackside Hot Axlebox Detectors (HABD) for nominal track gauges other than 1 435 mm	28
Annex B (informative) Recommendations for track layout.....	29
B.1 Typical longitudinal profile of track in the surroundings of a gauge changeover facility.....	29
B.2 Shunting track sections.....	29
Annex C (informative) Ancillary equipment on gauge changeover facilities and interfaces with other subsystems	30
C.1 Infrastructure elements.....	30
C.1.1 Pit of the gauge changeover platform.....	30
C.1.2 Cover building	30
C.1.3 Deicing system	30

C.1.4	Slab track	30
C.2	Interfaces with energy subsystem	30
C.3	Interfaces with control-command and signalling subsystem	31
C.4	Other ancillary equipment	31
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2008/57/EC aimed to be covered		32
Bibliography		37

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[SIST EN 17069-1:2019](https://standards.iteh.ai/catalog/standards/sist/7f619c8d-f1b0-4384-b981-ca3c2d9acc99/sist-en-17069-1-2019)

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EN 17069-1:2019 (E)**European foreword**

This document (EN 17069-1:2019) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2019, and conflicting national standards shall be withdrawn at the latest by October 2019.

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 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 Directive 2008/57/EC.

For relationship with Directive 2008/57/EC, 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 document: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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Introduction

For historical reasons, several track gauges are used on the rail networks in Europe. In order to cross the borders among these, passengers and goods need to be transferred.

In order to increase comfort of passengers by avoiding transshipments, and to reduce both the risk of damaging goods and the involved cost of transferring them, several systems and procedures for change of track gauge have been developed. Nowadays, there are three main possibilities to attain connection among rail networks with different track gauges:

- automatic variable-gauge systems;
- interchange of complete bogies;
- interchange of complete wheelsets.

The interfaces and the approval methods for such systems were defined in several UIC-leaflets and national regulations. This document is intended to set all related requirements together in a single document for automatic variable-gauge systems.

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EN 17069-1:2019 (E)**1 Scope**

This document defines the interfaces and gives guidance for the design of systems and procedures for change of track gauge. It defines also their assessment for technical approval, for the automatic variable-gauge systems.

The document is focused on the change of track gauge among the following nominal track gauges: 1 435 mm, 1 520 mm, 1 524 mm, 1 600 mm and 1 668 mm.

This document is not limited to the aforementioned nominal track gauges but the interfaces to change to/from other nominal track gauges can be different. The established assessment procedures can be used as well.

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 12080, *Railway applications – Axleboxes - Rolling bearings*

EN 12081, *Railway applications – Axleboxes – Lubricating greases*

EN 12082, *Railway applications – Axleboxes – Performance testing*

EN 13103-1, *Railway applications – Wheelsets and bogies – Part 1: Design method for axles with external journals*

EN 13260, *Railway applications – Wheelsets and bogies – Wheelsets – Product requirements*

EN 13261, *Railway applications – Wheelsets and bogies – Axles – Product requirements*

EN 13262, *Railway applications – Wheelsets and bogies – Wheels – Product requirements*

EN 13749, *Railway applications – Wheelsets and bogies – Method of specifying the structural requirements of bogie frames*

EN 13979-1, *Railway applications – Wheelsets and bogies – Monobloc wheels – Technical approval procedure – Part 1: Forged and rolled wheels*

EN 14363, *Railway applications – Testing and Simulation for the acceptance of running characteristics of railway vehicles – Running Behaviour and stationary tests*

EN 15273-1, *Railway applications – Gauges – Part 1: General – Common rules for infrastructure and rolling stock*

EN 15273-2, *Railway applications – Gauges – Part 2: Rolling stock gauge*

EN 15437-1, *Railway applications – Axlebox condition monitoring – Interface and design requirements – Part 1: Track side equipment and rolling stock axlebox*

EN 15437-2, *Railway applications – Axlebox condition monitoring – Interface and design requirements – Part 2: Performance and design requirements of on-board systems for temperature monitoring*

EN 15551, *Railway applications – Railway rolling stock – Buffers*

EN 15663, *Railway applications – Vehicle reference masses*

EN 15827, *Railway applications – Requirements for bogies and running gears*

EN 15839, *Railway applications – Testing for the acceptance of running characteristics of railway vehicles – Freight wagons – Testing of running safety under longitudinal compressive forces*

EN 15877-1, *Railway applications – Marking on railway vehicles – Part 1: Freight wagons*

EN 50126-1, *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) – Part 1: Basic requirements and generic process*

EN 50126-2, *Railway Applications – The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS) – Part 2: Systems Approach to Safety*

CLC/TR 50126-3, *Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) – Part 3: Guide to the application of EN 50126-1 for rolling stock RAM*

EN 50153, *Railway applications – Rolling stock – Protective provisions relating to electrical hazards*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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

nominal track gauge

single value which identifies the track gauge, but may differ from the design track gauge

Note 1 to entry: Definition in addition to the EN 15273 series. As example 1 435 mm.

3.2

gauge changeover technology

set of systems and devices specifically designed to perform the automatic gauge changeover process on certain types of compatible rolling stock fitted with variable-gauge running gear

3.3

automatic variable-gauge running gear

specific type of running gear designed to automatically switch between different track gauges when passing through a gauge changeover facility

Note 1 to entry: This process does not involve the removal or assembly of any component of the running gear.

EN 17069-1:2019 (E)**3.4****non-rotating axle**

axle fixed to bogie frame, that does not rotate and during the service, the wheel can freely-rotate, and lateral movement between wheels and axle is not possible

Note 1 to entry: Only during the automatic gauge changeover process, the wheels can move laterally to reach the corresponding track gauge position.

3.5**rotating axle**

axle not fixed to bogie frame, during service wheels rotate together with the axle and lateral movement between wheels and axle is not possible

Note 1 to entry: Only during the automatic gauge changeover process, lateral movements are possible to reach the corresponding track gauge position.

3.6**automatic gauge changeover process**

automatic change of track gauge in variable-gauge running gear, consisting at least of the following phases:

- unlocking of the rolling elements;
- displacement of the rolling elements while variable-gauge running gear is in the gauge changeover platform;
- safe locking of the rolling elements in their new position

3.7**gauge changeover facility**

facility where the automatic gauge changeover process is performed when passed through by trains at a given speed

Note 1 to entry: It includes the gauge changeover platform along with all ancillary systems that may be required to prepare the train for the automatic gauge changeover process (e.g. deicing system) and those for sheltering, if any.

3.8**gauge changeover platform**

core element of a gauge changeover facility in which all systems directly related to change of track gauge for variable-gauge running gear are installed

3.9**multi-mode gauge changeover facility**

gauge changeover facility where several gauge changeover technologies are implemented and thus more than one mode of change is allowed

3.10**mode of change**

configuration of a multi-mode gauge changeover facility for a specific gauge changeover technology

3.11**area of a gauge changeover facility**

area between the signals of entrance and exit of a gauge changeover facility, including the gauge changeover facility itself as well as switches and crossings of shunting track sections

3.12**surroundings of a gauge changeover facility**

track section before and after the area of a gauge changeover facility, the considered external limits of which are the entrance and exit signals of main tracks

3.13**nominal passage speed**

vehicle speed during the changeover process at which both the gauge changeover facility and the variable-gauge running gear are designed

Note 1 to entry: Nominal passage speed depends on the gauge changeover technology.

4 Symbols

For the purposes of this document, the following symbols apply.

Table 1 — Symbols

Symbol	Designation
a_1	Back to back dimension
a_2	Front-to-front dimension
e	Thickness of flange
h	Height of flange
qR	Face of the flange
d	Wheel diameter
Y_{TA}	Lateral position of the centre of the target area
W_{TA}	Lateral width in mm of the target area
L_{TA}	Longitudinal length in mm of the target area
Y_{PZ}	Lateral position of the centre of the prohibitive zone
W_{PZ}	Lateral width in mm of the prohibitive zone
L_{PZ}	Longitudinal length in mm of the prohibitive zone

NOTE Symbols given in Table 1 come from EN 15313 and EN 15437-1.

5 General requirements**5.1 Running gear dimensions**

Running gear shall comply with minimum and maximum values in Tables 2 and 3 and Tables 4 and 5 for any service condition. For 1 435 mm nominal track gauge, the values which are given in Tables 2 and 3 and Tables 4 and 5 are the same as in EN 15313.

Table 2 — Limit values for front-to-front and back-to-back dimensions for freight wagons

	Designation	Wheel diameter d [mm]	Minimum value [mm]	Maximum value [mm]
1 435 mm	Front-to-front dimension (a_2) $a_2 = a_1 + e_1 + e_2$	$330 \leq d \leq 760$	1 415	1 426
		$760 < d \leq 840$	1 412	1 426
		$d > 840$	1 410	1 426
	Back to back dimension (a_1)	$330 \leq d \leq 760$	1 359	1 363
		$760 < d \leq 840$	1 358	1 363
		$d > 840$	1 357	1 363
1 524 mm	Front-to-front dimension (a_2) $a_2 = a_1 + e_1 + e_2$	$400 \leq d < 840$	1 492	1 514
		$d \geq 840$	1 487	1 514
	Back to back dimension (a_1)	$400 \leq d < 840$	1 444	1 448
		$d \geq 840$	1 442	1 448
1 600 mm	Front-to-front dimension (a_2) $a_2 = a_1 + e_1 + e_2$	$690 \leq d \leq 1\,016$	1 573	1 592
	Back to back dimension (a_1)	$690 \leq d \leq 1\,016$	1 521	1 526
1 668 mm	Front-to-front dimension (a_2) $a_2 = a_1 + e_1 + e_2$	$330 \leq d < 840$	1 648 ^a	1 659
		$840 \leq d \leq 1\,250$	1 643 ^a	1 659
	Back to back dimension (a_1)	$330 \leq d < 840$	1 592	1 596
		$840 \leq d \leq 1\,250$	1 590	1 596

e_1 and e_2 are the thicknesses of each wheel.

^a Two-axle wagons with axle load up to 22,5 t the value shall be taken as 1 651 mm.