SLOVENSKI STANDARD
SIST-TS CEN/TS 15427-1-2:2023

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Železniške naprave - Trenje na stiku kolo-tirnica - 1-2. del: Oprema in uporaba - Zgornja površina tirnic

Railway applications - Wheel/Rail Friction Management - Part 1-2: Equipment and Application - Top of Rail

Bahnanwendungen - Rad/Schiene Reibungsmanagement - Teil 1-2: Ausrüstung und Anwendung - Schienenkopf

Applications ferroviaires - Gestion du Frottement Roue/Rail - Partie 1-2 : Équipements et application - Tête de Rail

Ta slovenski standard je istoveten z: **CEN/TS 15427-1-2:2023**

ICS:

45.040	Materiali in deli za železniško tehniko	Materials and components for railway engineering
45.080	Tračnice in železniški deli	Rails and railway components

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Supersedes CEN/TS 15427-1-2:2021

English Version

Railway applications - Wheel/rail friction management - Part 1-2: Equipment and application - Top of rail

Applications ferroviaires - Gestion du Frottement Roue/Rail - Partie 1-2 : Équipements et application - Tête de Rail

Bahnanwendungen - Reibungsmanagement zwischen Rad und Schiene - Teil 1-2: Vorrichtungen und Anwendung - Kraftschlussmodifikatoren

This Technical Specification (CEN/TS) was approved by CEN on 9 July 2023 for provisional application.

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

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European foreword

This document (CEN/TS 15427-1-2:2023) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

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 supersedes CEN/TS 15427-1-2:2021.

The 2023 edition has been updated with editorial changes following the feedback from the CEN/TS 15427-1-2:2021 edition. This mainly consists of corrections and clarifications and improved consistency with the other standards and technical specifications in the 15427 suite.

This document is part of the following series:

— EN 15427-1-1, *Railway applications - Wheel/Rail friction management - Part 1-1: Equipment and Application – Flange lubrication;*

— CEN/TS 15427-1-2, *Railway applications - Wheel/rail friction management - Part 1-2: Equipment and application – Top of rail materials;*

— CEN/TS 15427-1-3, *Railway applications - Wheel/rail friction management - Part 1-3: Equipment and application – Adhesion materials;*

— EN 15427-2-1, *Railway applications - Wheel/Rail friction management - Part 2-1: Properties and Characteristics – Flange lubricants;*

— CEN/TS 15427-2-2, *Railway applications - Wheel/rail friction management - Part 2-2: Properties and characteristics – Top of rail materials;*

— CEN/TS 15427-2-3, *Railway applications - Wheel/Rail friction management - Part 2-3: Properties and Characteristics – Adhesion materials;*

— CEN/prTR 15427-3, *Railway applications – Wheel/Rail friction management - Part 3: Rationale for requirements and further background information.*

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

Friction management using solid or fluid (oil, grease, etc.) substances at the wheel-rail interface is a complex subject and includes:

— lubrication of the wheel flange / rail gauge corner interface, commonly referred to as “flange or rail lubrication”;

— lubrication of the back of wheel / check rail face interface, commonly referred to as “check rail lubrication”;

— controlling the level of friction at the interface between the top of rail and the wheel tread, commonly referred to as “top of rail friction management”;

— applying materials to the wheel rail contact to increase (improve/ enhance/ recover) adhesion.

This document sets out the requirements for the equipment and application of the top of rail wheel/rail friction management. It describes systems fitted on board trains and on the track, as both systems may need to be deployed to achieve effective friction management of the wheel-rail interface. This document should always be used in conjunction with the accompanying document: CEN/TS 15427-2-2 *Railway applications - Wheel/rail friction management* - Part 2-2: Properties and characteristics - Top of rail materials.

Managing the wheel-rail interface effectively will reduce wear and other damage to both wheel and rail. When friction is managed effectively, noise levels, wear levels and the risk of flange climbing are reduced. Conversely, where not managed effectively, assets may require replacement prematurely before reaching their full economic potential.

There needs to be control in the application of top of rail materials such that there is:

— no loss of traction or braking performance;

— no adverse effect on signalling systems or track circuits;

— understanding of the increased risk of fire;

— no harmful environmental effect;

— no incompatibility between the different lubricants/ materials in use, particularly, between solid and fluid systems.

1 Scope

This document is limited to specifying the requirements when applying material to the active interface between the wheel tread and the crown of the rail and includes trainborne and track side equipment.

This document only covers the equipment and application of material to the active interface.

This document specifies:

— the characteristics of top of rail equipment for wheel-rail interface, together with applicable inspection and test methods to be carried out for verification;

— all relevant terminology which is specific to the application of top of rail materials at the wheel-rail interface.

This document applies to the mainline railway.

NOTE This document can also be used for other railways, e.g. urban rail.

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

CEN/TS 15427-2-2:2023, *Railway applications — Wheel/rail friction management — Part 2-2: Properties and characteristics — Top of rail materials*

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

EN 50238-1, *Railway applications — Compatibility between rolling stock and train detection systems — Part 1: General*

EN 61373, *Railway applications — Rolling stock equipment — Shock and vibration tests*

EN 62621, *Railway applications — Fixed installations — Electric traction — Specific requirements for composite insulators used for overhead contact line systems*

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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
active interface
contact area between wheel tread and the crown of the rail

Note 1 to entry: Contact also occurs between the wheel flange root and the rail gauge corner but this interface is not within the scope of this document.

Note 2 to entry: See Figures 1 and 2.

3.2
applicator
part of trackside/trainborne equipment that delivers the material to the active interface

EXAMPLE Nozzles or solid sticks

3.3
trainborne equipment
type of equipment that delivers product to the active interface installed on a train

3.4
trackside equipment
type of equipment that delivers product to the active interface installed on or adjacent to the track

3.5
railway undertaking
authority responsible for operating the train or their authorised representative

3.6
infrastructure manager
authority responsible for the infrastructure or their authorised representative

3.7
supplier
provider of equipment, material and/or support services

3.8
top of rail material
substance that controls the coefficient of friction of the wheel / rail interface

3.9
technical specification
document defining other or additional requirements not defined in this document

Note 1 to entry: Usually this is produced by and agreed between the customer and/or the supplier or even a railway undertaking or an infrastructure manager and can be an accompaniment to contractual requirements.

3.10
compatibility
state in which two or more materials can co-exist together without negatively affecting chemical or physical characteristics and performance

4 General

4.1 Purpose

The primary aim of the top of rail friction management is to achieve wheel/rail friction conditions that optimises asset life and reduces noise and vibration issues, as part of a wider wheel/rail management strategy without compromising the safe operation of the railway.

Top of rail friction management may be used to reduce:

— noise and vibration;

— the rate of wear of the wheel and rail;

— rate of corrugation growth;

— number of wheel and rail defects.

The specific purpose for the use of top of rail equipment and material shall be understood before deployment in order to achieve the desired outcome (e.g. reduction in wear).

4.2 Application

The trainborne/trackside top of rail equipment shall apply material to take effect in the active interface as set out in Clauses 5 and 6 of this document.

The trainborne/trackside top of rail equipment shall be designed to limit contamination of any other part of the train or infrastructure.

The effect of application on braking performance and signalling shall be understood, particularly where both trainborne and trackside top of rail equipment are being used concurrently (refer to Clauses 5 and 6), the effect of application should not be considered in isolation.

Other potential factors include:

— application strategy;

— product characteristics;

— rolling stock maintenance regime;

— infrastructure maintenance regime;

— operational conditions;

— environmental conditions.

Compatibility between flange lubricant, top of rail and adhesion material when used together shall be taken into account. Material properties and characteristics shall comply with the requirements set out in CEN/TS 15427-2-2.

The applicator shall be adjustable such that it can be returned to its correct working position (refer to 5.4) following wheel or rail reprofiling or other maintenance changes.

The top of rail material being applied to the active interface shall be approved for use by the relevant authorizing bodies (see Annex B). A method to determine when refilling of the top of rail consumable material is required shall be provided.

A method by which the equipment can be checked to ensure its functional status shall be provided.

Where there is any change to the approved design of the equipment, the customer shall be informed.

NOTE This may lead to the equipment requiring reapproval.

5 Requirements for trainborne equipment

5.1 General

The following general requirements shall be considered when designing and using the equipment:

— method of braking (e.g. tread, disc or other);

— position and number of applicator(s) on the vehicle;

— direction of travel;

— proximity of applicator to the wheel and the rail;

— speed of train;

— amount of product, frequency and geographical location of application;

— system control criteria.

The position and alignment of each applicator shall take into account:

— application strategy, target curves and bogie movement relative to the track alignment to ensure application of the material to the active interface in all conditions;

— suspension movements (can be neglected for unsprung mounted equipment);

— position on the vehicle relative to braking equipment and motorised bogies;

— the need to gain access for maintenance.

The trainborne equipment shall comply with the vehicle gauge as set out in the technical specification of the system.

5.2 Design of trainborne equipment

General considerations when creating a technical specification, designing and installing trainborne equipment shall include:

— ambient temperature range and climatic conditions (see EN 50125-1);

— equipment positioning - the design and location of the equipment shall factor in the consideration for quick and easy refilling capability;

— space constraints (e.g. static and dynamic);

— availability of necessary supplies (e.g. electrical, air, hydraulic, etc.);

— trainborne usable storage capacity for materials sufficient to align with desired maintenance intervals;

— interface with other on-board systems (e.g. braking);

— the type of material to be applied, its characteristics and its intended function;

— total life cycle cost and maintainability;