



**SLOVENSKI STANDARD**  
**kSIST-TS FprCEN/TS 15427-1-2:2020**

**01-oktober-2020**

---

**Železniške naprave - Trenje na stiku kolo-tirnica - 1-2. del: Oprema in uporaba -  
Materiali za zgornjo površino tirnic**

Railway applications - Wheel/Rail friction management - Part 1-2: Equipment and  
Application - Top of Rail materials

Bahnanwendungen - Reibungsmanagement zwischen Rad und Schiene - Teil 1-2:  
Vorrichtungen und Anwendung - Behandlung der Schienenoberfläche

Applications ferroviaries - Gestion de la friction roue/rail - Partie 1-2 : Équipements et  
application - Matériaux de la surface du rail

[https://standards.iteh.ai/catalog/standards/sist/b76e44d1-e5af-4e7b-88ef-  
e92ed5989126/k-sist-ts-fprcen-ts-15427-1-2-2020](https://standards.iteh.ai/catalog/standards/sist/b76e44d1-e5af-4e7b-88ef-e92ed5989126/k-sist-ts-fprcen-ts-15427-1-2-2020)

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

---

**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

**kSIST-TS FprCEN/TS 15427-1-2:2020**      **en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[kSIST-TS FprCEN/TS 15427-1-2:2020](https://standards.iteh.ai/catalog/standards/sist/b76e44d1-e5af-4e7b-88ef-c92ed5989126/ksist-ts-fprcen-ts-15427-1-2-2020)

<https://standards.iteh.ai/catalog/standards/sist/b76e44d1-e5af-4e7b-88ef-c92ed5989126/ksist-ts-fprcen-ts-15427-1-2-2020>

TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

**FINAL DRAFT**  
**FprCEN/TS 15427-1-2**

July 2020

ICS 21.260; 45.080; 45.120

English Version

**Railway applications - Wheel/Rail friction management -  
Part 1-2: Equipment and Application - Top of Rail  
materials**

Applications ferroviaries - Gestion de la friction  
roue/rail - Partie 1-2 : Équipements et application -  
Matériaux de la surface du rail

Bahnanwendungen - Reibungsmanagement zwischen  
Rad und Schiene - Teil 1-2: Vorrichtungen und  
Anwendung - Behandlung der Schienenoberfläche

This draft Technical Specification is submitted to CEN members for Vote. It has been drawn up by the Technical Committee CEN/TC 256.

CEN members are the national standards bodies of 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, Turkey and United Kingdom.

(standards.iteh.ai)

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.

**Warning** : This document is not a Technical Specification. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a Technical Specification.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

<b>Contents</b>	<b>Page</b>
European foreword .....	4
Introduction .....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions.....	7
4 General.....	8
4.1 Purpose.....	8
4.2 Application .....	8
5 Requirements for trainborne equipment .....	8
5.1 General.....	8
5.2 Design of trainborne equipment.....	9
5.3 Installation of trainborne equipment .....	10
5.4 Operations, Inspection and maintenance .....	10
5.5 Application .....	10
5.6 Verification.....	12
6 Requirements for trackside equipment .....	12
6.1 General.....	12
6.2 Design of trackside equipment.....	12
6.3 Installation of trackside equipment.....	13
6.4 Operations, Inspection and maintenance .....	13
6.5 Application .....	14
6.6 Verification.....	14
Annex A (informative) Types of Trainborne and Trackside Equipment .....	15
A.1 Introduction.....	15
A.2 Trainborne Equipment.....	15
A.3 Trackside Equipment .....	15
Annex B (informative) Guidance on approvals testing and verification.....	16
B.1 General.....	16
B.2 System – Equipment and materials.....	16
Annex C (informative) Good Practice for trainborne equipment.....	19
C.1 Reasons for installing trainborne equipment .....	19
C.2 Determination of equipment position .....	19
C.3 Inspection and Maintenance.....	19
Annex D (informative) Installation and maintenance good practice for trackside equipment .....	21
D.1 Selecting locations for trackside equipment .....	21

<b>D.2</b>	<b>Determination of equipment position .....</b>	<b>21</b>
<b>D.3</b>	<b>Inspection and Maintenance .....</b>	<b>22</b>
<b>D.4</b>	<b>Records.....</b>	<b>22</b>
<b>Annex E (informative) Guideline braking tests for top of rail friction management (trainborne and trackside equipment) .....</b>		
<b>E.1</b>	<b>General .....</b>	<b>23</b>
<b>E.2</b>	<b>Choosing the right test vehicle.....</b>	<b>23</b>
<b>E.3</b>	<b>Trainborne equipment.....</b>	<b>23</b>
<b>E.4</b>	<b>Test conditions .....</b>	<b>23</b>
<b>E.5</b>	<b>Brake tests.....</b>	<b>24</b>
<b>E.6</b>	<b>Test parameters.....</b>	<b>24</b>
	<b>Bibliography .....</b>	<b>25</b>

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[kSIST-TS FprCEN/TS 15427-1-2:2020  
https://standards.iteh.ai/catalog/standards/sist/b76e44d1-e5af-4e7b-88ef-  
c92ed5989126/ksist-ts-fprcen-ts-15427-1-2-2020](https://standards.iteh.ai/catalog/standards/sist/b76e44d1-e5af-4e7b-88ef-c92ed5989126/ksist-ts-fprcen-ts-15427-1-2-2020)

**FprCEN/TS 15427-1-2:2020****European foreword**

This document (FprCEN/TS 15427-1-2:2020) 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 vote.

This document is part of the series EN 15427, Railway applications - Wheel/Rail friction management, which consists of the following parts:

- Part 1-1: Equipment and Application - Flange Lubrication
- Part 1-2: Equipment and Application - Top of Rail materials
- Part 1-3: Equipment and Application - Adhesion materials
- Part 2-1: Properties and Characteristics - Flange lubricants
- Part 2-2: Properties and Characteristics - Top of Rail materials
- Part 2-3: Properties and Characteristics - Adhesion materials
- Part 3: Rationale for requirements and further background information

**ITeH STANDARD PREVIEW**  
**(standards.iteh.ai)**

<https://standards.iteh.ai/catalog/standards/sist/b76e44d1-e5af-4e7b-88ef-c92ed5989126/ksist-ts-fprcen-ts-15427-1-2-2020>

## 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 flange/ check rail interface, commonly referred to as “check rail lubrication”;
- altering 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.

Managing the wheel-rail interface effectively will reduce wear of 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.

## FprCEN/TS 15427-1-2:2020

### 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 defines:

- the characteristics that systems of top of rail equipment for wheel-rail interface shall achieve, 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 of the wheel-rail interface.

This document only 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*

FprCEN/TS 15427-2-2:2020, *Railway application - 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 50121 (series), *Railway applications - Electromagnetic compatibility*

EN 50238-1, *Railway applications - Compatibility between rolling stock and train detection systems - 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 <http://www.iso.org/obp>
- IEC Electropedia: available at <http://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 standard.

#### 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**

system carried on the train that consists of one or more applicators, a storage unit and a means of control

#### 3.4

##### **trackside equipment**

system installed on or adjacent to the track that consists of one or more applicators, storage containers and a means of control

#### 3.5

##### **train operator**

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**

organisation responsible for supplying the equipment/ material

#### 3.8

##### **material**

substance designed to alter friction at the wheel/rail active interface

#### 3.9

##### **top of rail material**

substance that changes the rheology of the third layer body to lower friction

## FprCEN/TS 15427-1-2:2020

### 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;
- reduce the rate of wear;
- reduce rate of corrugation growth.
- reduce 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/tracksideside 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/tracksideside top of rail equipment shall be designed to limit contamination of any other part of the train or infrastructure.

Where both trainborne and tracksideside top of rail equipment are being applied concurrently, the effect to braking performance and signalling shall be understood.

Compatibility between different materials (such as flange lubricant and top of rail/adhesion material) in use shall be taken into account. Material properties and characteristics shall comply with the requirements set out in FprCEN/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.

A method to determine when refilling 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 1 This may lead to the equipment requiring reapproval.

NOTE 2 Ensure the material being applied to the active interface has been approved for use by the relevant authorizing bodies (see Annex B).

### 5 Requirements for trainborne equipment

#### 5.1 General

When applying to the active interface, the following shall be considered:

- method of braking (e.g. tread, disk 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;
- frequency and amount of application.

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

- suspension movements to ensure application of the material to the active interface in all conditions;
- the need to gain access for maintenance.

The trainborne equipment shall comply with the vehicle gauge.

## 5.2 Design of trainborne equipment

General consideration when 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...);
- options for system control and material regulation;
- interface with other on-board systems (e.g. braking);
- the type of material to be applied and its intended function;
- total life cycle cost and maintainability;
- length/ type of train;
- interface with infrastructure systems;
- intended design life and sustainability;
- safety and reliability requirements;
- vibration and shock loads requirements of EN 61373 and EN 13749 relevant to the position on the vehicle;
- protection of the equipment from flying objects eg track ballast;
- EMC standard (EN 50121);
- aerodynamic effects (e.g. Wind turbulence may affect the performance of a spray system which may be optimized by use of a windbreak);