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Železniške naprave - Trenje na stiku kolo-tirnica - 2-3. del: Lastnosti in karakteristike - Lepilni materiali

Railway applications - Wheel/rail friction management - Part 2-3: Properties and Characteristics - Adhesion materials

Bahnanwendungen - Reibungsmanagement zwischen Rad und Schiene - Teil 2-3: Eigenschaften und Merkmale - Kraftschlusserhöhende Materialien

Applications ferroviaires - Gestion des frottements roue/rail - Partie 2-3 : Propriétés et caractéristiques - Matériaux pour restauration d'adhérence

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CEN/TS 15427-2-3

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English Version

Railway applications - Wheel/rail friction management - Part 2-3: Properties and Characteristics - Adhesion materials

Applications ferroviaires - Gestion du frottement roue/rail - Partie 2-3: Propriétés et Caractéristiques - Matériau d'Adhésion

Bahnanwendungen - Reibungsmanagement zwischen Rad und Schiene - Teil 2-3: Eigenschaften und Merkmale - Kraftschlusserhöhende Materialien

This Technical Specification (CEN/TS) was approved by CEN on 23 July 2023 for provisional application.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Page

European foreword

This document (CEN/TS 15427-2-3:2023) 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 15427-2-3:2021.

This document has been prepared under a Standardization Request addressed to CEN by the European Commission.

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 the following aspects:

— 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”;

— 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”;

— altering the level of adhesion at the interface between the top of rail and the wheel tread.

This document sets out requirements for the material to be used for adhesion management. It specifies requirements for the material, how to test it and how to approve it.

The adhesion material should be tested to confirm there is:

— compatibility with top of rail systems;

— no intolerable increased risk of fire;

— no harmful environmental effects;

— no incompatibility between the different materials in use, particularly between solid and fluid systems;

— satisfactory and consistent product quality and performance;

— no degradation to the safety of the railway (braking, signalling, derailment).

The main purpose of an adhesion material is to condition the wheel/ rail contact to either prevent the occurrence of slipping or sliding or to enable recovery of traction/ braking where slipping or sliding occurs.

1 Scope

This document specifies the requirements of adhesion materials intended to be applied to the interface between the wheel tread and the rail crown (active interface). It can be applied either directly or indirectly to the wheel tread or rail.

It outlines the information required for most approval procedures, the method of testing and routine control/monitoring of the material.

This document does not deal with Top of Rail materials. For Top of Rail materials see CEN/TS 15427-2-2:2023.

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 933-1, *Tests for geometrical properties of aggregates - Part 1: Determination of particle size distribution - Sieving method*

EN 1097-3, *Tests for mechanical and physical properties of aggregates - Part 3: Determination of loose bulk density and voids*

EN 1097-6, *Tests for mechanical and physical properties of aggregates - Part 6: Determination of particle density and water absorption*

EN 1097-5, *Tests for mechanical and physical properties of aggregates - Part 5: Determination of the water content by drying in a ventilated oven*

EN 1744-1, *Tests for chemical properties of aggregates - Part 1: Chemical analysis*

EN 13755, *Natural stone test methods - Determination of water absorption at atmospheric pressure*

ISO 2049, *Petroleum products - Determination of colour (ASTM scale)*

ISO 6072, *Rubber - Compatibility between hydraulic fluids and standard elastomeric materials*

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
adhesion material
substance that is used to either prevent the occurrence of slipping or sliding or to enable recovery of traction/ braking where slipping or sliding occurs

3.2
batch
entire content of a single identified production of material from the same manufacturing process

3.3
active interface
contact area between the wheel tread and the crown of the rail

Note 1 to entry: For more information on this definition, see CEN/TS 15427-2-3.

3.4
trainborne equipment
type of equipment that delivers product to the active interface installed on a train

3.5
trackside equipment
type of equipment that delivers product to the active interface installed on or adjacent to the track

3.6
customer
railway undertaking, infrastructure manager, manufacturer or buyer of railway products or subassemblies, or their representative

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

Note 1 to entry: A supplier might also be the manufacturer of the product.

3.8
product specification
document defining other or additional requirements not defined in this standard

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.

3.9
dry particles
conglomeration of discrete solid macroscopic particles with low moisture content

3.10
traction gel
traction enhancing product which can be pumped and applied as a fluid, and it consists of a suspension of solid traction enhancing particles in a liquid or gel

4 Adhesion material requirements

The adhesion material shall be designed to either reduce the occurrence of slipping or sliding or to enhance recovery of traction/ braking where slipping or sliding occurs.

Different materials may be used for traction/ braking.

When applied within the specified limits to the active interface the material shall not compromise the safety of the railway (e.g. braking distance, signalling systems, derailment).

NOTE 1 See Annex A.

NOTE 2 Specified limits are normally understood and agreed between relevant parties before use of material.

5 Technical specification and approval of product

5.1 Introduction

This section outlines the information required to gain approval on most railway networks. It does not cover its performance on the railway.

5.2 Product specification

The product specification shall be fully documented and shall include the following information:

a) Purpose of adhesion material;

b) Conformity to the applicable type tests as set out in Tables A.1 to A.3;

c) Conformance with other relevant local requirements (such as environmental, fire, toxicity, etc.);

d) Application data:

   1) including equipment it can be used with;

   2) operating temperatures.

e) Additional validation tests (see Table A.3);

f) Any previous relevant experience (i.e. use in other countries);

g) Conditions for packaging, storage and labelling (see Clause 8).

NOTE Legislation and regulations (European, national or local) can include requirements on ecological and environmental compatibility of materials (biodegradability, toxicity, etc.).

5.3 Technical file

A file of technical data showing compliance with the requirements in the product specification and the results of type tests and trials shall be provided. A technical datasheet shall also be provided (see Clause 7).

A material safety data sheet (MSDS) for the product in the language of the interested customer or country shall be included.

6 Control and monitoring of product

6.1 Manufacturing process

If the manufacturing process is changed in a way that may affect the chemical composition, geometric specification and/ or physical properties it shall be documented and the customer shall be notified.

NOTE In some cases, this leads to a new approval being required.

6.2 Composition of material

If the composition of the material is changed in any way, it shall be documented and the customer shall be notified.

NOTE In some cases, this leads to a new approval being required.

6.3 Routine tests

Routine tests ensure product consistency from batch to batch.

The routine tests are listed in Tables A1 to A3. If additional tests are required (such as those not included in the tables or a type test) this and the frequency can be agreed between the client and supplier.

The sample of material assessed for quality testing shall have been manufactured in a regular production batch. The entire sample of material used for the routine tests shall be taken from the same production batch and delivered in a single consignment.

The results of the routine tests shall be recorded.

6.4 Additional measures

Retention of test records and samples, witnessing of tests, calibration of test equipment shall be considered.

7 Technical datasheet

7.1 General

The technical datasheet shall include the individual identifying code or name of the material, a description of the product's field of use and typical means of application. For each material type, the information in the following subclauses shall also be included.

7.2 Dry particle material characteristics

The product shall be described by its geometric properties and/ or physical properties. Further technical data shall be provided as listed under the 'datasheet' column in Table A.1.

7.3 Traction gel characteristics

The material shall be described by its viscosity, its temperature range. Further technical data shall be provided as listed under the 'datasheet' column in Table A.2.

8 Packaging, labelling and storage

The packaging shall protect the contents from contamination and damage.