

Railway applications - Wheel/Rail friction management
- Part 2-1: Properties and Characteristics - Flange
lubricants

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 15427-2-1:2022 sisaldab Euroopa standardi EN 15427-2-1:2022 ingliskeelset teksti.	This Estonian standard EVS-EN 15427-2-1:2022 consists of the English text of the European standard EN 15427-2-1:2022.
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English Version

Railway applications - Wheel/Rail friction management - Part 2-1: Properties and Characteristics - Flange lubricants

Applications ferroviaires - Gestion des frottements
roue/rail - Partie 2-1: Propriétés et caractéristiques -
Lubrification des boudins de roues

Bahnanwendungen - Reibungsmanagement zwischen
Rad und Schiene - Teil 2 1: Eigenschaften und
Merkmale - Spurkranzschmierstoffe

This European Standard was approved by CEN on 17 January 2022.

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European foreword

This document (EN 15427-2-1:2022) has been prepared by Technical Committee CEN/TC 256 “Railway Applications”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2022, and conflicting national standards shall be withdrawn at the latest by November 2022.

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 EN 16028:2012.

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*

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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”;
- 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”;
- altering the level of adhesion at the interface between the top of rail and the wheel tread.

This document sets out requirements for the lubricant for flange or rail lubrication. It specifies requirements for the lubricant, how to test it and how to approve it.

Lubricants should be tested to confirm there is:

- compatibility with lubricating systems;
- no intolerable increased risk of fire;
- accordance with relevant environmental requirements;
- no incompatibility between the different lubricants 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).

The main purpose of the lubricant is to reduce friction and wear and reduce the risk of flange climb derailment.

1 Scope

This document specifies the properties and characteristics of lubricants applied to the interface between the wheel flange and the gauge face of the rail, and contact area between the check rail face and the back of the wheel (active interface), either directly or indirectly to the wheel flange or to the rail, and includes both trainborne and trackside solutions.

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

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 10130, *Cold rolled low carbon steel flat products for cold forming - Technical delivery conditions*

EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868)*

EN ISO 1183-1, *Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1)*

EN ISO 2592, *Petroleum and related products - Determination of flash and fire points - Cleveland open cup method (ISO 2592)*

EN ISO 3146, *Plastics - Determination of melting behaviour (melting temperature or melting range) of semi-crystalline polymers by capillary tube and polarizing-microscope methods (ISO 3146)*

EN ISO 3675, *Crude petroleum and liquid petroleum products - Laboratory determination of density - Hydrometer method (ISO 3675)*

EN ISO 7827, *Water quality - Evaluation of the "ready", "ultimate" aerobic biodegradability of organic compounds in an aqueous medium - Method by analysis of dissolved organic carbon (DOC) (ISO 7827)*

EN ISO 9408, *Water quality - Evaluation of ultimate aerobic biodegradability of organic compounds in aqueous medium by determination of oxygen demand in a closed respirometer (ISO 9408)*

EN ISO 9439, *Water quality - Evaluation of ultimate aerobic biodegradability of organic compounds in aqueous medium - Carbon dioxide evolution test (ISO 9439)*

EN ISO 10707, *Water quality - Evaluation in an aqueous medium of the "ultimate" aerobic biodegradability of organic compounds - Method by analysis of biochemical oxygen demand (closed bottle test) (ISO 10707)*

EN ISO 12185, *Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method (ISO 12185)*

EN ISO 20623, *Petroleum and related products - Determination of the extreme-pressure and anti-wear properties of lubricants - Four-ball method (European conditions) (ISO 20623)*

ISO 760, *Determination of water — Karl Fischer method (General method)*

ISO 2137, *Petroleum products and lubricants — Determination of cone penetration of lubricating greases and petrolatum*

ISO 2176, *Petroleum products — Lubricating grease — Determination of dropping point*

ISO 3733, *Petroleum products and bituminous materials — Determination of water — Distillation method*

ISO 22285, *Petroleum products and lubricants — Determination of oil separation from grease — Pressure filtration method*

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

ISO 6743-99, *Lubricants, industrial oils and related products (class L) — Classification — Part 99: General*

ISO 13737, *Petroleum products and lubricants — Determination of low-temperature cone penetration of lubricating greases*

DIN 51631, *Mineral spirits — Special boiling point spirits — Requirements*

DIN 51807-1, *Testing of lubricants — Test of the behaviour of lubricating greases in the presence of water — Part 1: Static test*

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

lubricant

substance designed to alter friction at the active interface

3.2

oil

liquid lubricant

Note 1 to entry: Oil can be mineral, natural or synthetic in origin and can have additives included.

3.3

grease

semi-solid lubricant

Note 1 to entry: Grease consists of a thickener and additives integrated in a lubricating oil.

3.4

stick

encapsulated solid lubricant

Note 1 to entry: Typically, the stick comprises a solid lubricant which is encapsulated in a polymeric binder/carrier. The product is designed for direct contact with a rotating wheel flange; the polymeric binder has a sufficiently high melting point such that it does not melt, but rather wears when in contact with the wheel flange to ensure dimensional stability.