

Railway applications - Track - Special purpose rail -
Grooved rails and associated construction profiles

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Railway applications - Track - Special purpose rail - Grooved rails and associated construction profiles

Applications ferroviaires - Voie - Rails spéciaux - Rails
à gorge et profils de construction associés

Bahnanwendungen - Oberbau - Spezialschienen -
Rillenschienen und zugehörige Konstruktionsprofile

This European Standard was approved by CEN on 14 December 2018.

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European foreword

This document (EN 14811:2019) 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of an identical text or by endorsement, at the latest by September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.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 supersedes EN 14811:2006+A1:2009.

This revision introduces new profiles, and technical changes on drawings and technical data.

Other standards on rails include:

EN 13674, *Railway applications — Track — Rail*, that comprises the following parts:

- *Part 1: Vignole railway rails 46 kg/m and above;*
- *Part 2: Switch and crossing rails used in conjunction with Vignole railway rails 46 kg/m and above;*
- *Part 3: Check rails;*
- *Part 4: Vignole railway rails from 27 kg/m to, but excluding 46 kg/m.*

Other standards for rails and corresponding welding processes, already published or under preparation, are:

- EN 14587-1, *Railway applications — Infrastructure — Flash butt welding of new rails — Part 1: R220, R260, R260Mn, R320Cr, R350HT, R350LHT, R370CrHT and R400HT grade rails in a fixed plant;*
- EN 14587-2, *Railway applications — Track — Flash butt welding of rails — Part 2: New R220, R260, R260Mn and R350HT grade rails by mobile welding machines at sites other than a fixed plant;*
- EN 14587-3, *Railway applications — Track — Flash butt welding of rails — Part 3: Welding in association with crossing construction;*
- EN 14730-1, *Railway applications — Track — Aluminothermic welding of rails — Part 1: Approval of welding processes;*
- EN 14730-2, *Railway applications — Track — Aluminothermic welding of rails — Part 2: Qualification of aluminothermic welders, approval of contractors and acceptance of welds;*
- EN 15594, *Railway applications — Track — Restoration of rails by electric arc welding;*
- EN 16273, *Railway applications — Track — Forged rail transitions;*
- EN 16725, *Railway applications — Track — Restoration and repair of manganese crossings;*
- EN 16771, *Railway applications — Infrastructure — Aluminothermic welding of grooved rails.*

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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

This Introduction provides an explanation of the concept and reasoning for preparing this document. Its description ensures that, during any future revisions, restrictions will be removed if technical progress has been made or will be kept if this is not the case in order that safety is maintained if new manufacturers, products and technologies appear.

The most commonly used delivery conditions in Europe for the supply of grooved rails and associated construction rail profiles have been reviewed during the preparation of this document. Modern rail production technology and the requirements of commuter railways within the European Union have demanded that the technical requirements for the products specified in this standard be reconsidered.

Whenever possible, this document is performance-based. It recognizes the European quality management standard EN ISO 9001 and requires manufacturers to offer the latest proven technology consistently to satisfy the demanding quality of the required product.

The steels are classified according to hardness and not to tensile strength.

The acceptance tests were developed in order to monitor the properties of the grooved rail steels and grooved rails and associated construction rail profiles that are of importance for the production of grooved rails and associated construction rail profiles and which comply with the demands of commuter railways.

The steel grades covered by this document reflect trends in commuter railway usage and heat-treated rails as well as associated construction rail profiles. This document contains profiles for grooved rails and associated construction rail profiles for grooved rail facilities having a linear mass of 42 kg/m and above.

To ensure the supply of high quality rails, some restrictions on production processes have been imposed.

This standard is applicable to all procurements covered by the European Procurement Directive (Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014). Additionally, CEN has requested a performance-based standard taking into account safety requirements and the application of the most recent technologies. With respect to the Directive, it is acknowledged that there are (and with respect to safety requirements also shall be) options to deviate from the standard upon agreement between purchaser and manufacturer.

This document reflects the change in philosophy compared with the traditional content of delivery conditions for grooved rails and associated construction rail profiles. The most frequently used delivery conditions in Europe for the supply of grooved rails and construction rail profiles have been reviewed. All the aspects that are important for the purchasers and manufacturers have been analysed to ensure that the overall contents are particularly appropriate and relevant for the document. For example, the classification of the steel grades of grooved rails and associated construction rail profiles and also other aspects of the document has been based on hardness, not on tensile testing. Whilst the two are directly related, hardness testing is very quick and inexpensive to carry out and provides more relevant guidance to the user, particularly where properties vary in different parts of the profile.

One new aspect of the document is the integration of a clause on quality management and testing in order to ensure the product integrity.

In order to ensure that the quality management systems are consistent for all manufacturers and that all purchasers can be sure about the consistency of the product quality of these safety-related components, this document recommends that the manufacturer operates a quality management system at least equivalent to the requirements of a quality management standard such as EN ISO 9001. This makes it possible to dispense with detailed requirements on tests and comprehensive testing.

Ideally, manufacturing methods should not be referred to in product standards. However, some rail properties are either not exactly known or cannot be determined with an adequately high statistical reliability. In these cases, as the final possibility, reference is made to manufacturing methods that correspond to best practice. Methods and requirements are specified that offer the maximum probability that the necessary product is obtained in the track. Future technological solutions can increase the list of these requirements but will preferably reduce them.

Examples of where today's technology is taken as the basis, but developments are progressing, are:

- determination of hydrogen content;
- minimum area reduction for rolling of grooved rails and associated construction rail profiles;
- roller straightening effects on contact scrub.

1 Scope

This document specifies requirements for grooved rails and associated construction rail profiles for grooved rail facilities with a linear mass of 42 kg/m and upwards for use in tram transport systems.

NOTE Grooved rails are also used for harbour and industrial tracks.

Five pearlitic steel grades are specified in a hardness range between 200 HBW and 390 HBW. The rails are either non-heat-treated or heat-treated and are made from non-alloyed (C-Mn) steel in both cases.

This document specifies 26 specific grooved rail profiles and 7 specific construction rail profiles. The grooved rail profiles can also be used as construction elements in switches and crossings.

Two grooved rail classes are specified differing in requirements for profile tolerances.

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 10027-1, *Designation systems for steels — Part 1: Steel names*

EN 10027-2, *Designation systems for steels — Part 2: Numerical system*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*

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>

3.1

heat

liquid steel melt tapped out of a converter or electric arc furnace which after continuous casting includes a given number of blooms relating to the weight of the heat and the extent of the mixing zone

Note 1 to entry: In the case of sequence casting, the blooms belonging to the mixing zone will be clearly defined.

3.2

sequence

number of heats of the same steel grade which undergo continuous casting in a new or repaired tundish

Note 1 to entry: Tundishes can be used in parallel if the caster has many strands.

3.3

heat-treated rail

rail that has undergone accelerated cooling from austenitizing temperature during the metallurgical transformation period