

SVENSK STANDARD

SS-EN 13674-4:2019



Fastställt/Approved: 2019-04-11

Publicerad/Published: 0001-01-01

Utgåva/Edition: 2

Språk/Language: engelska/English

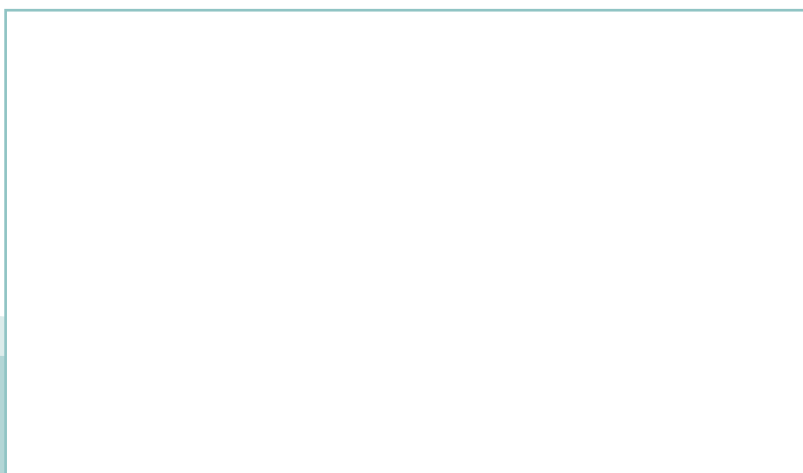
ICS: 14.540;45.020;45.080;93.100

Järnvägar – Spår – Räler –

**Del 4: Vignolräler från 27 kg/m och upp till, men ej inkluderat,
46 kg/m**

Railway applications – Track – Rail –

**Part 4: Vignole railway rails from 27 kg/m to, but excluding
46 kg/m**



Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

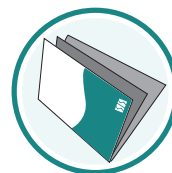
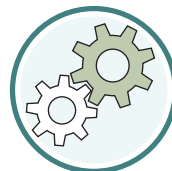
Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Europastandarden EN 13674-4:2019 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 13674-4:2019.

Denna standard ersätter SS-EN 13674-4:2006+A1:2009, utgåva 1.

The European Standard EN 13674-4:2019 has the status of a Swedish Standard. This document contains the official version of EN 13674-4:2019.

This standard supersedes the SS-EN 13674-4:2006+A1:2009, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Järnvägar, SIS/TK 254.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13674-4

April 2019

ICS 93.100

Supersedes EN 13674-4:2006+A1:2009

English Version

**Railway applications - Track - Rail - Part 4: Vignole railway
rails from 27 kg/m to, but excluding 46 kg/m**

Applications ferroviaires - Voie - Rails - Partie 4 : Rails
Vignole de masse comprise entre 27 kg/m et 46 kg/m,
46 kg/m non compris

Bahnanwendungen - Oberbau - Schienen - Teil 4:
Vignolschienen mit einer längenbezogenen Masse
zwischen 27 kg/m und unter 46 kg/m

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

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

Contents	Page
European foreword.....	4
Introduction	6
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 Information to be supplied by the purchaser	9
5 Steel grades	10
6 Dimensions, static properties, linear mass and tolerances.....	11
7 Manufacture	11
7.1 Product integrity	11
7.1.1 Factory production control	11
7.1.2 Best practice manufacture.....	11
7.2 Blooms.....	11
7.3 Rails.....	11
7.4 Identification	11
7.4.1 Branding.....	11
7.4.2 Hot stamping.....	12
7.4.3 Cold stamping.....	12
7.4.4 Other identification	12
8 Qualification of the manufacturer.....	12
9 Acceptance tests	13
9.1 Laboratory tests.....	13
9.1.1 General.....	13
9.1.2 Chemical composition	13
9.1.3 Microstructure	17
9.1.4 Decarburization.....	17
9.1.5 Hardness.....	17
9.1.6 Tensile tests	18
9.1.7 Retest procedures.....	19
9.2 Dimension tolerances.....	19
9.2.1 Profile	19
9.2.2 Straightness and twist	20
9.2.3 Cutting and drilling.....	20
9.3 Gauges	20
9.4 Inspection for internal quality and surface quality.....	21
9.4.1 Internal quality	21
9.4.2 Surface quality.....	23
9.4.3 Checking of automated testing equipment.....	24
Annex A (normative) Rail profiles	34

Annex B (informative) Comparison of steel designations referred to in this European Standard compared to those in EN 10027-2	66
Bibliography	67

SS-EN 13674-4:2019 (E)**European foreword**

This document (EN 13674-4:2019) 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 October 2019, and conflicting national standards shall be withdrawn at the latest by October 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 13674-4:2006+A1:2009.

This part of EN 13674 is the fourth one of the series EN 13674, *Railway applications — Track — Rail*, which consists of 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 published standards include the following:

- 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 14811, *Railway applications – Track – Special purpose rail – Grooved rails and associated construction profiles;*
- EN 15594, *Railway applications – Track – Restoration of rails by electric arc welding;*
- EN 16273, *Railway applications – Track – Forged rail transitions.*

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.

SS-EN 13674-4:2019 (E)**Introduction**

This Introduction provides an explanation of the concepts and reasoning used in the drafting of this document. Its inclusion also ensures that during future revisions, restrictions are removed where technology progresses and held where it does not, thus ensuring continued safety as new manufacturers, products and technologies are introduced.

The most commonly used standards of the world for the supply of railway rails have been reviewed during the preparation of this document. However, modern rail production technology within the European Union has demanded a completely new look at the philosophy and content of this part of EN 13674.

Whenever possible this part of EN 13674 is performance based, recognizes the European Quality System standard EN ISO 9001 and requires manufacturers to offer the latest proven technology to consistently satisfy the demanding quality of the required product.

Rail grading is based on hardness rather than tensile strength.

The acceptance tests have been designed to control those characteristics of the rail steel and rail that are of relevance to the production of high quality rails and the demands of the railway.

The steel grades covered by this part of EN 13674 reflect trends in railway usage and heat-treated rails are included. This document includes rail profiles for Vignole rails having a linear mass from 27 kg/m to, but excluding 46 kg/m.

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

This document supersedes national standards covered by the Scope. In addition CEN required, where possible, a performance based standard, taking into account safety implications and at the same time addressing modern production technology. It was recognized that there would be few opportunities (and these would have to be for transparent safety considerations) for derogation from this document to operate between the user and the manufacturer.

This document reflects this change in philosophy from the traditional content of rail standards. A review was undertaken of the most commonly used rail standards of the world. All relevant aspects important to both user and manufacturer were considered with the aim of ensuring that all of the content had specific usefulness and relevance. For example rail grading and much of this document has been based on hardness rather than tensile strength. While the two are directly related, hardness is very quick and cheap to carry out and provides more relevant guidance to the user particularly where properties vary in different parts of the profile.

Since many rail manufacturers would not have previously carried out proving trials, this document includes a prerequisite for all manufacturers to prove conformity against a set of qualifying test criteria at the time of tendering. The qualifying tests include all “normal” acceptance test results plus new ‘type-casting’ features such as fracture toughness, fatigue and residual stress (see EN 13674-1). To provide users with the necessary confidence, acceptance limits have been based on results from rail known to have performed well in demanding track installations.

One aspect of this document, which is a complete break from tradition, is the inclusion of quality assurance and inspection clause as part of product integrity.

So that quality management systems are consistent across all manufacturers and that users have the best assurance for the consistency of required product quality on this safety critical component of the track, the rail standard requires that the manufacturers' quality assurance systems are at least equivalent to the requirements of a quality management standard such as EN ISO 9001. The inclusion of this requirement also reduces the need to incorporate detailed method and calibration descriptions on items such as normal chemical composition determination and the need to define more extensive testing.

Ideally, manufacturing techniques should not be referenced in a product standard. However, some rail attributes are either not known in an exact manner or are not measurable with satisfactory statistical significance. In such cases best practice manufacturing techniques have been included as a last resort. The equipment specified is that which gives the best probability of achieving the required product for use in track. In the future new technology can add to, but preferably will reduce or delete such items.

Examples of areas where the technological state of the art renders the standard less than complete include:

- oxide/oxygen relationships;
- hydrogen test techniques;
- roller straightening effects on residual stresses;
- roller straightening effects on contact scrub;
- measurement and effect of residual stresses throughout the rail.