BS EN 13674-1:2011+A1:2017

BSI Standards Publication

Railway applications — Track — Rail

Part 1: Vignole railway rails 46 kg/m and above

National foreword

This British Standard is the UK implementation of EN 13674-1:2011+A1:2017. It supersedes BS EN 13674-1:2011, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee RAE/2, Railway Applications - Track.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English Version

Railway applications - Track - Rail - Part 1: Vignole railway rails 46 kg/m and above

Applications ferroviaires - Voie - Rails - Partie 1 : Rails Vignole de masse supérieure ou égale à 46 kg/m

Bahnanwendungen - Oberbau - Schienen - Teil 1: Vignolschienen ab 46 kg/m

This European Standard was approved by CEN on 10 December 2010 and includes Amendment 1 approved by CEN on 25 December 2016.

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European foreword

This document (EN 13674-1:2011+A1:2017) 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of an identical text or by endorsement, at the latest by November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1 approved by CEN on 25 December 2016.

This document supersedes A1 EN 13674-1:2011 A1.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

This document has been prepared under a mandate given to CEN/CENELEC/ETSI by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

A1 Annex G A1 provides details of significant technical changes between this European Standard and the previous edition.

This part of EN 13674 is the first 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 standards for rails and corresponding welding processes, already published or under preparation, are:

— EN 14587-1, *Railway applications — Track — Flash butt welding of rails — Part 1: New R220, R260, R260Mn and R350HT 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 at a fixed plant*;

— prEN 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 and associated construction*;

— EN 15594, *Railway applications — Track — Restoration of rails by electric arc welding*;

— prEN xxxxx, *Railway applications — Track — Forged rail transitions*.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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.

Introduction

This Introduction provides an explanation of the concepts, and reasoning considered for this standard.

Whenever possible this part of EN 13674 is performance based, recognises 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.

This part of EN 13674 has two major divisions:

1) qualifying tests;

2) acceptance tests.

The qualifying tests take into account performance requirements. They also include typical results from relevant acceptance tests.

The acceptance tests control those characteristics of the rail steel and rail that are of relevance to the production of high quality rails including heat treated rails and the demands of the railway.

To ensure the supply of high quality rails, some restrictions on production processes are considered.

The performance based standard applies to all procurements falling inside the requirements of the European Procurement Directive (93/38/EEC of 14th June 1993), taking into account safety implications and at the same time addressing modern production technology and the requirements of high-speed railways. As a result of the Directive it was recognised that there would be few opportunities (and these would have to be for transparent safety considerations) for derogation from the standard to operate between the user and the manufacturer.

The standard 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. 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.

The standard includes a quality assurance and inspection clause as part of product integrity.

In order 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, this rail standard recommends that the manufacturers' quality assurance systems are at least equivalent to the requirements of 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.

1 Scope

This European Standard specifies Vignole railway rails of 46 kg/m and greater linear mass, for conventional and high speed railway track usage.

Nine pearlitic steel grades are specified covering a hardness range of 200 HBW to 440 HBW and include non heat treated non alloy steels, non heat treated alloy steels, and heat treated non alloy steels and heat treated alloy steels .

There are 23 rail profiles specified in this standard.

Two classes of rail straightness are specified, differing in requirements for straightness, surface flatness and crown profile. Two classes of profile tolerances are specified.

2 Normative references

〚A1〛 The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. 〚A1〛

EN 10163-1, *Delivery requirements for surface condition of hot-rolled steel plates, wide flats and sections — Part 1: General requirements*

〚A1〛 *deleted text* 〚A1〛

CEN/TR 10261, *Iron and steel — Review of available methods of chemical analysis*

EN 10276-1, *Chemical analysis of ferrous materials — Determination of oxygen in steel and iron — Part 1: Sampling and preparation of steel samples for oxygen determination*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2005)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2009)*

EN ISO 14284, *Steel and iron — Sampling and preparation of samples for the determination of chemical composition (ISO 14284:1996)*

ISO 1099, *Metallic materials — Fatigue testing — Axial force-controlled method*

ISO 4968, *Steel — Macrographic examination by sulfur print (Baumann method)*

ISO 12108, *Metallic materials — Fatigue testing — Fatigue crack growth method*

ASTM E399, *Standard test method for linear-elastic plane-strain fracture toughness KIc of metallic materials*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
heat
liquid steel melt tapped out of a converter or electric arc furnace which includes after continuous casting a given number of blooms relating to the weight of the heat and the extension of the mixing zone. In the case of sequence casting the blooms belonging to the mixing zone should be clearly defined