SLOVENSKI STANDARD
oSIST prEN 14587-3:2025

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Nadomešča:
SIST EN 14587-3:2012

Železniške naprave - Infrastruktura - Elektrouporovno varjenje tirnic - 3. del: Varjenje pri izdelavi kretnic

Railway applications - Infrastructure - Flash butt welding of rails - Part 3: Welding in association with crossing construction

Bahnanwendungen - Infrastruktur - Abbrennstumpfschweißen von Schienen – Teil 3: Schweißen im Zusammenhang mit Herzstückkonstruktionen

Applications ferroviaires - Voie - Soudage des rails par étincelage - Partie 3 : Soudure en association avec la construction des appareils de voie

Ta slovenski standard je istoveten z: **prEN 14587-3**

ICS:

25.160.10	Varilni postopki in varjenje	Welding processes
93.100	Gradnja železnic	Construction of railways

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

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Will supersede EN 14587-3:2012

English Version

Railway applications - Infrastructure - Flash butt welding of rails - Part 3: Welding in association with crossing construction

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 14587-3:2025) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14587-3:2012.

In comparison with the previous edition EN 14587-3:2012, mainly the following technical modifications have been made:

— clarification in how foot dimensions have to be measured, introducing a gauge and table for reference;

— introducing cleaner instruction for the testing sequence, more details for visual inspection;

— a better description of flat spots and clearer criteria for micro structure examination;

— criteria for cross acceptance of materials;

— added bend test requirements for high strength steels;

— a new annex as guidance for geometrical inspection of welded joints.

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 has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

This document is one of three parts in the EN 14587 series of standard “Railway applications – Track – Flash butt welding of rails”. The list of parts is as follows:

— Part 1: New R220, R260, R260Mn, R320Cr, R350HT, R350LHT, R370CrHT and R400HT grade rails in a fixed plant;

— Part 2: New R200, R220, R260, R260Mn, R320Cr, R350HT, R350LHT, R370CrHT and R400HT grade rails by mobile welding machines at sites other than a fixed plant;

— Part 3: Welding in association with crossing construction (the present standard).

Introduction

This part three of EN 14587 standard has four main topics:

— procedure approval for a fixed plant;

— requirements of a welding process;

— weld production following approval;

— approval of other rail profile or grades.

The European standard satisfies the needs of the railway authority. The manufacturer should achieve the specified requirements of this European standard.

1 Scope

This document specifies requirements for the approval of a welding process in a fixed plant, together with the requirements for subsequent welding production.

This document applies to new Vignole rails manufactured in accordance to EN 13674-1 and welded by flash butt welding to crossing components in a fixed plant, and intended for use on railway infrastructures.

This document applies to cast Manganese crossings manufactured to EN 15689, fabricated crossings manufactured from rail and crossings manufactured from forged/rolled premium steels.

NOTE EN 14587-1 is also used for the flashed butt welding of switches.

Sometimes special profiles exist in crossing construction, which are not rail profiles as defined in EN 13674 series (example: profile with machined off rail foot). In these cases, tests are defined by the railway authority in participation with the manufacturer.

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 13018, *Non-destructive testing — Visual testing — General principles*

EN ISO 3452-1, *Non-destructive testing — Penetrant testing — Part 1: General principles (ISO 3452-1)*

EN ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel (ISO 9712)*

EN 1371-1, *Founding — Liquid penetrant testing — Part 1: Sand, gravity die and low pressure die casting*

EN 13674-1, *Railway applications — Track — Rail — Part 1: Vignole railway rails 46 kg/m and above*

EN 13674-2, *Railway applications — Track — Rail — Part 2: Switch and crossing rails used in conjunction with Vignole railway rails 46 kg/m and above*

EN 13674-4, *Railway applications — Track — Rail — Part 4: Vignole railway rails from 27 kg/m to, but excluding 46 kg/m*

EN 14587-1:2018, *Railway applications — Infrastructure — Flash butt welding of rails — Part 1: R220, R260, R260Mn, R320Cr, R350HT, R350LHT, R370CrHT and R400HT grade rails in a fixed plant*

EN 17343, *Railway applications — General terms and definitions*

EN ISO 6507-1, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1)*

EN ISO 7500-1:2018, *Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system (ISO 7500-1:2018)*

EN ISO 11666, *Non-destructive testing of welds — Ultrasonic testing — Acceptance levels (ISO 11666)*

EN ISO 17638, *Non-destructive testing of welds — Magnetic particle testing (ISO 17638)*

EN ISO 17640, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment (ISO 17640)*

EN ISO 23278:2015, *Non-destructive testing of welds — Magnetic particle testing — Acceptance levels (ISO 23278:2015)*

EN ISO 23279, *Non-destructive testing of welds — Ultrasonic testing — Characterization of discontinuities in weld (ISO 23279)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 17343 and the following apply.

ISO and IEC maintain terminology 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
austenitic component
part made from high manganese steel and austenitic micro structure with a manganese content of (11,5 to 14,0) % and a carbon content of (0,95 to 1,3) %

3.2
insert
is an intermediate part between the rail and the crossing when the crossing is made from austenitic manganese steel

Note 1 to entry: The insert is compatible with the rail and the austenitic crossing material. It allows different welding procedures between the rail/insert weld and the insert/crossing weld. In general, the insert material is a stainless steel.

3.3
manufacturer
company that joins rails to rails, rails to crossings and rails to crossing components by flash butt welding in a fixed plant

3.4
purchaser
buyer of the flash butt welded crossings working in accordance with the requirements of the railway authority

3.5
railway infrastructure
permanent way of national or private railways

3.6
fixed plant
stationary machine for flash butt welding of rails to rails, rails to crossings and rails to crossing components

3.7
die burn
damage caused by localised overheating on the electrode contact surfaces (see Annex A)

3.8
upset
metal extruded around the rail profile as a result of forging

3.9
specimen
portion detached from a welded component or a welded joint and prepared as required for testing

3.10
profile finishing
operation by which the rail or relevant part of the component at the weld is returned to original profile, by removal of upset material

Note 1 to entry: This operation can be achieved by grinding, milling, planning or any other suitable means.

3.11
finished condition
welded and profile finished

3.12
flat spot
feature having a localised smooth texture when viewed in a vertical transverse section (see Figure A.1 and Figure A.2)

Note 1 to entry: When viewed longitudinally in macro this may appear as a lens-shaped feature.

3.13
lack of bond
area within the weld where there is no metal to metal contact (excluding flat spots and bright spots)

Note 1 to entry: This may appear as a linear discontinuity at the interfaces when examined in the finished condition or after sectioning.

3.14
welded zone
area of 50 mm on either side of the weld centreline

3.15
throat flare
wing entry flare (front) machining or setting of wings to give an entry flare into the throat

3.16
foundry method
system to produce a casting made of austenitic manganese steel

3.17
workpiece
crossing component, insert rail or rail leg-end extension

3.18
railway authority (RA)
either the railway regulator or the owner of the railway infrastructure or the custodian with a delegated responsibility for a railway infrastructure

3.19
as welded condition
rails that have been welded and/or trimmed only

3.20
bainitic component
part made from bainitic rail steel, whose chemical and mechanical properties are defined

4 Information to be supplied for approval of procedure

4.1 By the purchaser

The following information shall be supplied by the purchaser, agreed upon by the manufacturer, and shall be fully documented:

a) the rail profile and crossing geometrical details;

b) the rail and crossing grades/materials;

c) the profile class of the rail leg-end extension as specified in EN 13674-1, EN 13674-2 or EN 13674-4;

d) alignment class/classes of the flash butt welds (see Table 1);

e) the type of fatigue tests (if applicable) for approval;

f) tolerances at rail ends on the delivered crossing;

g) minimum length of the rail leg-end extension;

h) rail profile, number and frequency of production bend tests (see 13.7);

i) requirements of any track trials;

j) where applicable: Chemical and mechanical properties of rail steels not covered by EN standards (rail or crossing part).

4.2 By the manufacturer

The following information shall be supplied by the manufacturer, agreed upon by the purchaser, and shall be fully documented:

a) a qualified weld procedure;

b) traceability system of the welds;

c) type and identification number of machine being used.

5 Approval of the manufacturer

5.1 General

The manufacturer shall meet the approval requirements as defined in 5.2 to 5.7. The purchaser reserves the right to audit the manufacturer at any time.

5.2 Welding procedure

The manufacturer shall use welding procedures and flash butt welding machines that are approval by the RA.

5.3 Operators

The manufacturer shall maintain a system that ensures the competence of their welding operators by appropriate training and assessment.

5.4 Supervision

The manufacturer shall maintain a management and supervision system of flash butt welding that complies with the requirements of the purchaser.

5.5 Weld inspection

The manufacturer shall maintain a system of weld inspection according to the purchaser requirements. Instances of non-conformity found during these inspections shall be recorded in the traceability system.

5.6 Equipment

Equipment shall comply with the operating manual. Inspection and calibration equipment shall comply with those requirements as agreed between the manufacturer and the purchaser.

5.7 Quality assurance

The manufacturer shall apply a quality management system approved and verified by an independent body or any other organisational system of control accepted by the purchaser.

NOTE More information about quality management systems are provided by EN ISO 9001.

6 Requirements for the welding

6.1 General

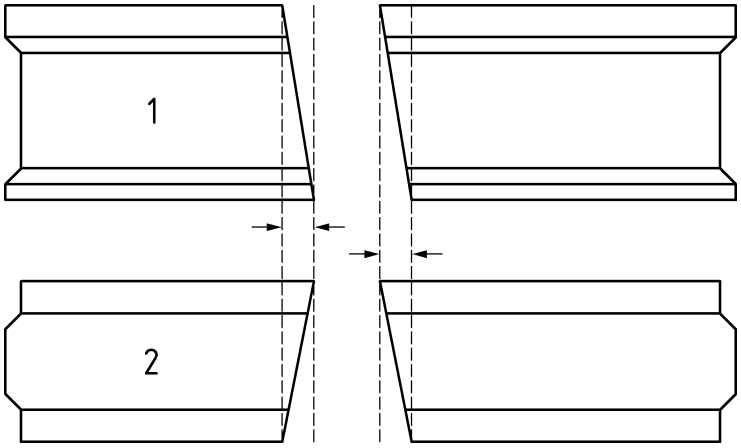
All welding shall be carried out on a flash butt welding machine using an automatic, programmed welding sequence using RA approved procedures.

6.2 Workpiece preparation

The crossing/insert/rail faces to be welded shall always be sawn, disc cut or machined prior to welding and shall conform to the tolerances given in Figure 1. Areas of electrical contact on the workpieces and the machine shall be clean and free of any deleterious materials that could affect current flow. The workpieces shall not be damaged by the cleaning operation.

The total mismatch of the two workpieces shall not exceed 2 mm and shall be corrected by grinding or machining prior to welding.

The crossing leg end profile has to be prepared in agreement with the casting supplier and the welding plant to allow welding.



Key

1	elevation
2	plan

Figure 1 — Tolerances for rail end squareness

6.3 Clamping force

Workpieces shall be secured in the flash butt welding machine by clamps of such a surface shape or contour, that when a clamping force is exerted on the workpieces, it shall not damage the workpiece. The clamping force shall be sufficient such that slippage does not occur.

6.4 Initial burn-off

The workpieces should undergo initial flashing to ensure full rail end contact during the subsequent preheating cycles.

6.5 Preheating

The fronts of the heating area shall progress such that at completion of preheating an even heat band is present in both workpieces. On completion of welding there shall be no evidence of localized melting on the ends of the workpieces.

6.6 Final flashing

Once initiated, final flashing shall be continuous.

6.7 Upsetting

Upsetting shall immediately follow flashing. Sufficient forging pressure shall be applied to ensure that voids are closed and oxides are expelled such that they are kept to a minimum at the weld interface. The weld interface shall extend into the upset.

The time between completion of upsetting and unclamping shall be sufficient to ensure required weld integrity. During this time, sufficient longitudinal force shall remain present to prevent damage to the weld.

6.8 Post-weld treatment

6.8.1 Before unclamping

Post-weld heating could be required for certain rail grades and alloyed steels.