SLOVENSKI STANDARD
oSIST prEN 15594:2025

01-april-2025

Železniške naprave - Infrastruktura - Obnova tirnic z električnim obločnim varjenjem

Railway applications - Infrastructure - Restoration of rails by electric arc welding

Bahnanwendungen - Infrastruktur - Aufarbeitung von Schienen durch elektrisches Lichtbogenschweißen

Applications ferroviaires - Infrastructure - Réparation des rails par soudage à l'arc électrique

Ta slovenski standard je istoveten z: **prEN 15594**

ICS:

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

oSIST prEN 15594:2025 **en,fr,de**

EUROPEAN STANDARD

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Will supersede EN 15594:2009

English Version

Railway applications - Infrastructure - Restoration of rails by electric arc welding

Applications ferroviaires - Infrastructure - Réparation des rails par soudage à l'arc électrique

Bahnanwendungen - Infrastruktur - Aufarbeitung von Schienen durch elektrisches Lichtbogenschweißen

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.

This draft European Standard was established by CEN 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.

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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 15594:2025) 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 15594:2009.

prEN 15594:2025 includes the following significant technical changes with respect to EN 15594:2009:

— normative references have been updated;

— additional rail steel grades have been included;

— microstructure and macrostructure requirements have been updated;

— an Annex ZA has been included.

The purpose of this document is to unify the restoration of rail electric arc welding across Europe. The document provides control systems for the approval and qualification of welding processes, welding procedures, welding consumables, contractors and welders for the successful delivery of welds into track.

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.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Introduction

Restoration of rails by electric arc welding is a special process requiring the co-ordination of welding and grinding activities to establish confidence and reliability of the weld deposit and safety of the line. Controls must be in place from the design phase through to inspection. Incorrect selection of materials, consumables or procedure can result in serious track welding failure.

It is important to strictly adhere to the correct application of the approved processes and the types of repairs permitted to be carried out on various rail components. Only consumables approved by the method described in this document should be used. The tasks and responsibilities of personnel involved in restoration, e.g. planning, executing, supervising and inspection should be clearly defined.

1 Scope

This document specifies restoration by electric arc welding and is limited to the head of the rails only.

This document describes the approval systems for consumables and procedures used in manual metal arc and flux cored metal deposit rail repair welding. This document includes the quality-related tasks and responsibilities of personnel involved in the electric arc repair welding of rails. This document applies to plain rail and switches and crossings manufactured from new Vignole railway rails R200, R220, R260, R260Mn, and R350HT grades rails of 27 kg/m and above as contained in EN 13674-1, EN 13674-2 and EN 13674-4.

The permitted welding processes are limited to Electric Arc (EA) in accordance with EN ISO 4063 and are by description Process No 111: SMAW (Shielded Metal Arc Welding) and Process No 114: FCAW (Flux Cored Arc Welding).

This document can be applied *in situ*, at line side or at out of track locations. The flash welded leg ends of austenitic manganese steel crossings are included in this document, except when located within 500 mm of manganese crossings. Where repairs are required within 500 mm, refer to EN 16725.

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 13674-1:2011+A1:2017, *Railway applications — Track — Rail — Part 1: Vignole railway rails 46 kg/m and above*

EN 13674-4:2019, *Railway applications — Track — Rail — Part 4: Vignole railway rails from 27 kg/m to, but excluding 46 kg/m*

EN 14700:2022, *Welding consumables — Welding consumables for hard-facing*

EN 17343:2023, *Railway applications — General terms and definitions*

EN ISO 544:2024, *Welding consumables — Technical delivery conditions for filler materials and fluxes — Type of product, dimensions, tolerances and markings (ISO 544:2024)*

EN ISO 3452-1:2021, *Non-destructive testing — Penetrant testing — Part 1: General principles (ISO 3452-1:2021)*

EN ISO 3580:2017, *Welding consumables — Covered electrodes for manual metal arc welding of creep-resisting steels — Classification (ISO 3580:2017)*

EN ISO 3834-2:2021, *Quality requirements for fusion welding of metallic materials — Part 2: Comprehensive quality requirements (ISO 3834-2:2021)*

EN ISO 6506-1:2014, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2014)*

EN ISO 6507-1:2023, *Metallic materials — Vickers hardness test — Part 1: Test method (ISO 6507-1:2023)*

EN ISO 9606-1:2017, *Qualification testing of welders — Fusion welding — Part 1: Steels (ISO 9606-1:2012 including Cor 1:2012 and Cor 2:2013)*

EN ISO 15607:2019, *Specification and qualification of welding procedures for metallic materials — General rules (ISO 15607:2019)*

EN ISO 15609-1:2019, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding (ISO 15609-1:2019)*

EN ISO 15613:2004, *Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test (ISO 15613:2004)*

EN ISO 17638:2016, *Non-destructive testing of welds — Magnetic particle testing (ISO 17638:2016)*

EN ISO 18276:2024, *Welding consumables — Tubular cored electrodes for gas-shielded and non-gas-shielded metal arc welding of high strength steels — Classification (ISO 18276:2024)*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in EN 17343:2023 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
railway authority
RA
either the railway regulator or the owner of a railway infrastructure or the custodian with a delegated responsibility for a railway infrastructure

3.2
contractor
company approved by a railway authority to carry out the restoration of rails by electric arc welding on that infrastructure

3.3
FCAW
flux cored arc welding

3.4
SMAW
shielded metal arc welding

3.5
preliminary welding procedure specification
Pwps
tentative welding procedure specification, which is assumed to be adequate by the manufacturer, but which has not been approved

Note 1 to entry: Welding of test pieces needed for approval of a welding procedure specification shall be carried out based on a preliminary welding procedure specification.

3.6
weld procedure specification
WPS
procedure approved to European standards and agreed by the RA for use on the railway infrastructure

3.7
training establishment
welder training organisation or centre approved by the railway authority or alternatively a welder training organisation or centre approved by and belonging to a railway authority

4 Consumable and WPS approval tests for SMAW electrodes and FCAW wires

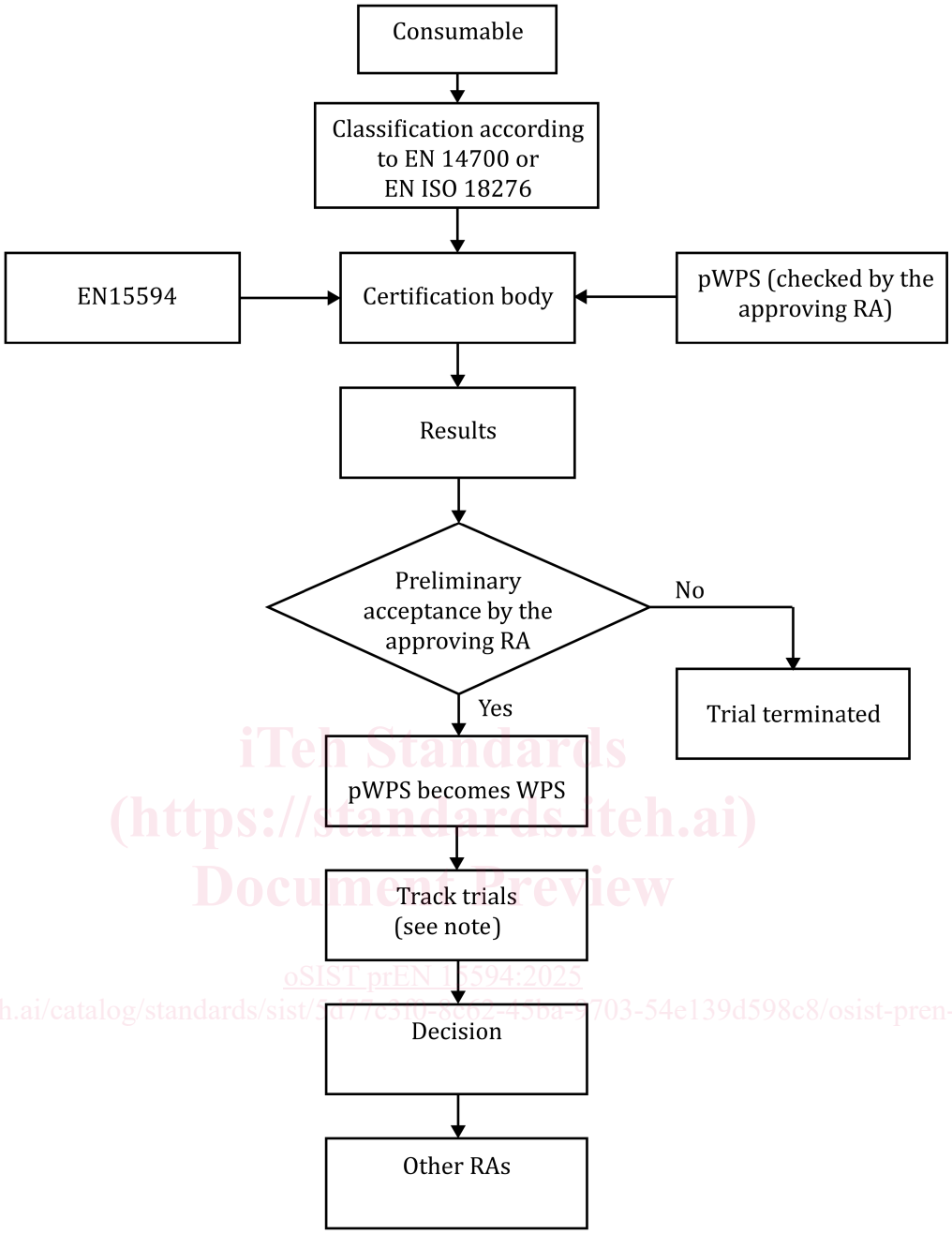
4.1 General

The approval of consumables and the related WPS shall follow the requirements of EN ISO 15613:2004.

Welding fume shall be removed from the welding environment by the means of local exhaust ventilation, where this is not possible approved respiratory protective equipment shall be used.

4.2 Consumable and WPS approval model

The following flow chart describes how a consumable and its related WPS shall be approved. WPS approval shall follow the principle of EN ISO 15613:2004 approval by a pre-production test.



NOTE These track trials are undertaken by the approving RA.

The approving RA shall issue an approval certificate upon successful outcome of track trial.

Other railway authorities may require further tests to verify suitability for special service/operational conditions or deposition techniques.

4.3 Information for the test

— toxicity threshold levels;

— SMAW electrode classification in accordance with EN ISO 3580:2017;

— wire electrodes classification in accordance with EN 14700:2022;