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Railway applications - Welding of railway vehicles and
components - Part 3: Design requirements

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Railway applications - Welding of railway vehicles and components - Part 3: Design requirements

Applications ferroviaires - Soudage des véhicules ferroviaires et des pièces - Partie 3 : Exigences de conception

Bahnanwendungen - Schweißen von Schienenfahrzeugen und -fahrzeugteilen - Teil 3: Konstruktionsvorgaben

This European Standard was approved by CEN on 5 September 2022 and includes Amendment 1 approved by CEN on 1 February 2023.

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European foreword

This document (EN 15085-3:2022+A1:2023) 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of an identical text or by endorsement, at the latest by October 2023, and conflicting national standards shall be withdrawn at the latest by October 2023.

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 includes Amendment 1 approved by CEN on 1 February 2023.

This document supersedes A1 EN 15085-3:2022 A1.

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

This series of European Standards EN 15085 “Railway applications — Welding of railway vehicles and components” consists of the following parts:

- *Part 1: General*
- *Part 2: Requirements of the organization of welding manufacturer*
- *Part 3: Design requirements*
- *Part 4: Production requirements*
- *Part 5: Inspection, testing and documentation*
- *Part 6: Maintenance*

EN 15085-3:2022 includes the following changes with respect to EN 15085-3:2007.

- The weld performance class CP B has been divided into CP B1 and CP B2 (see Table 2);
- Terms and definitions have been updated;
- The following annexes have been reworked accordingly;
 - Annex H has been deleted and part of its content has been integrated into the main text (see 6.2 and 7.1);
 - Annex ZA has been added.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

Welding is a special process in the manufacture of railway vehicles and their parts. The required provisions for this process are laid down in the standards series EN ISO 3834. The basis of these provisions is the basic technical welding standards with respect to the special requirements for the construction of railway vehicles.

This series of standards applies to welding of metallic materials in the manufacture and maintenance of railway vehicles and their parts.

It describes the control for the welding process for railway vehicles and their components for new manufacture and maintenance.

With respect to the railway environment, this series of standards defines the quality requirements for the welding manufacturer to undertake new building and repair work.

Components, parts and subassemblies are assigned a classification level, based on their safety relevance.

According to these levels, qualifications for welding personnel of the manufacturer are specified.

This series provides an essential link between the weld performance class defined during design, the quality of the weld, and the demonstration of the required quality by inspection.

This series of standards does not deal with product qualification.

NOTE This series of standard can also be used by internal and external parties, including certification bodies, to assess the organization's ability to meet customer, regulatory and the organization's own requirements.

1 Scope

This document applies to welding of metallic materials in the manufacture and maintenance of railway vehicles and their components.

This document specifies applicable design and classification rules.

This document does not specify parameters for the dimensioning.

NOTE Requirements for structures can be found in other standards (e.g. EN 12663).

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 1011-2:2001, *Welding - Recommendations for welding of metallic materials - Part 2: Arc welding of ferritic steels*

EN 12663-1:2010+A1:2014, *Railway applications - Structural requirements of railway vehicle bodies - Part 1: Locomotives and passenger rolling stock (and alternative method for freight wagons)*

EN 12663-2:2010, *Railway applications - Structural requirements of railway vehicle bodies - Part 2: Freight wagons*

EN 13749:2021, *Railway applications - Wheelsets and bogies - Method of specifying the structural requirements of bogie frames*

EN 15085-1:—,¹ *Railway applications — Welding of railway vehicles and components — Part 1: General*

EN 15085-2:2020, *Railway applications - Welding of railway vehicles and components - Part 2: Requirements for welding manufacturer*

EN 15085-4:—,² *Railway applications — Welding of railway vehicles and components — Part 4: Production requirements*

EN 15085-5:—,³ *Railway applications — Welding of railway vehicles and components — Part 5: Inspection, testing and documentation*

EN 15085-6:—,⁴ *Railway applications — Welding of railway vehicles and components — Part 6: Maintenance welding requirements*

EN 15827:2011, *Railway applications - Requirements for bogies and running gears*

¹ Under preparation. Stage at the time of publication: prEN 15085-1:2021

² Under preparation. Stage at the time of publication: prEN 15085-4:2020

³ Under preparation. Stage at the time of publication: FprEN 15085-5:2021

⁴ Under preparation. Stage at the time of publication: FprEN 15085-6:2021

EN ISO 2553:2019, *Welding and allied processes - Symbolic representation on drawings - Welded joints (ISO 2553:2019, Corrected version 2021-09)*

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

EN ISO 4063:2010, *Welding and allied processes - Nomenclature of processes and reference numbers (ISO 4063:2009, Corrected version 2010-03-01)*

EN ISO 5817:2014, *Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections (ISO 5817:2014)*

EN ISO 6520-1:2007, *Welding and allied processes - Classification of geometric imperfections in metallic materials - Part 1: Fusion welding (ISO 6520-1:2007)*

EN ISO 6520-2:2013, *Welding and allied processes - Classification of geometric imperfections in metallic materials - Part 2: Welding with pressure (ISO 6520-2:2013)*

EN ISO 10042:2018, *Welding - Arc-welded joints in aluminium and its alloys - Quality levels for imperfections (ISO 10042:2018)*

EN ISO 10675-2:2021, *Non-destructive testing of welds — Acceptance levels for radiographic testing — Part 2: Aluminium and its alloys (ISO 10675-2:2021)*

EN ISO 13919-1:2019, *Electron and laser-beam welded joints - Requirements and recommendations on quality levels for imperfections - Part 1: Steel, nickel, titanium and their alloys (ISO 13919-1:2019)*

EN ISO 13919-2:2021, *Electron and laser-beam welded joints - Requirements and recommendations on quality levels for imperfections - Part 2: Aluminium, magnesium and their alloys and pure copper (ISO 13919-2:2021)*

EN ISO 13920:1996, *Welding - General tolerances for welded constructions - Dimensions for lengths and angles - Shape and position (ISO 13920:1996)*

EN ISO 14555:2017, *Welding - Arc stud welding of metallic materials (ISO 14555:2017)*

EN ISO 15614-1:2017,⁵ *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2017)*

EN ISO 15614-12:2021, *Specification and qualification of welding procedures for metallic materials - Welding procedure test - Part 12: Spot, seam and projection welding (ISO 15614-12:2021)*

EN ISO 17636-1:2022, *Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film (ISO 17636-1:2022)*

EN ISO 17637:2016, *Non-destructive testing of welds - Visual testing of fusion-welded joints (ISO 17637:2016)*

⁵ Document impacted by A1:2019.

EN ISO 17653:2012, *Resistance welding - Destructive tests on welds in metallic materials - Torsion test of resistance spot welds (ISO 17653:2012)*

EN ISO 17663:2009, *Welding - Quality requirements for heat treatment in connection with welding and allied processes (ISO 17663:2009)*

EN ISO 23277:2015, *Non-destructive testing of welds - Penetrant testing - Acceptance levels (ISO 23277:2015)*

EN ISO 25239-5:2020, *Friction stir welding - Aluminium - Part 5: Quality and inspection requirements (ISO 25239-5:2020)*

EN ISO 10447:2015, *Resistance welding - Testing of welds - Peel and chisel testing of resistance spot and projection welds (ISO 10447:2015)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15085-1:-¹ 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

stress factor

ratio of the calculated / measured fatigue stress to the admissible fatigue stress of the joint type, adjusted by the appropriate safety factor

3.2

admissible fatigue stress

maximum fatigue stress applicable to the welded joint according to the applicable standard / specification

4 Design requirements

4.1 General

All welded joints produced under the scope of the EN 15085 series shall be designed according to the requirements of this document unless more stringent product / project specific requirements are defined.

A stress assessment shall be done for new designs. For existing designs not according to EN 15085, the requirements of EN 15085-6:-⁴ shall apply.

Results of the stress assessment shall be used in combination with the safety category to define the weld performance class (CP) according to Table 2. The weld performance class for each weld shall be identified on the manufacturing drawing or associated technical documentation.

If the strength assessment procedure already considers the weld performance class (i.e. the quality levels for imperfections and the weld inspection class), and the safety category according to the definition given in this document, then Table 1 and 2 do not need to be applied.