

Foreword

The European community defined rules and regulations for railway applications, to ensure the safety of people, environment and operation addressed with due diligence. These rules are compulsory for all railway applications, and are largely enforced in within the European Union.

For the manufacture of welded assemblies, sub-assemblies or parts welded by any welding process, weather it is manual, partly mechanized, fully mechanized or automatic welding (as defined in EN ISO 4063), the European Standards Series EN 15085 is applicable.

The Germany EBA (Eisenbahn Bundesamt) is the government organization which enforces the rules and requirements for the design, manufacture, approval and operating permits within the Federal Republic of Germany (FRG). Based on the rules and requirements set by EBA, railway manufacturers are mandated to follow defined codes and standards, of which EN 15085 is one of them.

It is mandated that manufacturers of welded railway products achieve proper certification and approvals before doing so. Without this certification and approval, welded products are not going to be accepted for operation.

In general, the approval process according to EN 15085 entails:

- the certification of an implemented quality assurance system
- the approval of qualified personnel
- the certification and approval of welding processes and welders or welding operators
- auditing compliance with the requirements set down in the applicable codes and standards

Construction surveillance activities are going to be part of the process, which will progress throughout the manufacture of all defined products. Associated tests, approvals and recording of quality statuses will be implemented and executed. During the last 1/3 of the manufacturing process an official certification audit will be performed. In case of deviations, such will have to be addressed and corrective actions implemented, to achieve the proper certification prior completion of the project. It is imperative that all specialty companies (weld shops) have the required approval certificate, to allow the approval and hence operation of the railway vehicle/machine.

EN 15085 - Railway applications - Welding of railway vehicles and components

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: Quality requirements and certification of welding manufacturer

Part 3: Design requirements

Part 4: Production requirements

Part 5: Inspection, testing and documentation

- This series of standards applies to welding of metallic materials in the manufacture and maintenance of railway vehicles and their parts.
- With respect to the railway environment, this series of standards defines the certification and quality requirements for the welding manufacturer to undertake new building and repair work.
- It then provides an essential link between performance requirements defined during design, and achieves appropriate quality welds during production and the demonstration of the required quality by inspection.
- This link is achieved by defining a weld performance class during design, which is based on safety and stress factors relevant to railway operation.
- Quality levels of imperfections are assigned to weld performance classes to ensure a certain level of performance intended during design.
- Based on these weld performance classes, certification levels for production, as well as inspection and testing and qualifications for welding personnel of the manufacturer are specified.
- This standard deals with welding steel and aluminum alloys including castings
NOTE The principle of this standard may also be applied for welding of other parent materials (e.g. Cu, Mg).
- This standard applies to all assemblies, sub-assemblies or parts welded by any welding process, either manual, partly mechanized, fully mechanized or automatic welding as defined in EN ISO 4063.
- This series of standards does not deal with product qualification.

Consideration of national credentials

Implemented welding procedures that meet the AWS (American Welding Society) requirements will be approved according to the applicable European Norms and Requirements. A list of Norms (see below) includes the applicable welding standards.

Part of the project is a consistence monitoring of the fabrication process, considering the requirements according to EN 15085-2, ISO 3438 and EN 719.

The following items are (in the listed sequence) required for the EBA Approval according to EN 15085.

1. Manufacturers Approval according to

- 1.1. EN 15085 Part 1-5 – Welding of Rail Road Vehicles and Vehicle Parts;
some of the governing standards are:
 - 1.1.1. EN ISO 14731:2006, *Welding coordination - Tasks and responsibilities (ISO 14731:2006)*,
 - 1.1.2. EN ISO 3834 (all parts), *Quality requirements for fusion welding of metallic materials*
 - 1.1.3. DIN EN 12663 (Railway applications – Structural requirements of railway vehicles bodies)
 - 1.1.4. EN ISO 15609 (all parts), *Specification and qualification of welding procedures for metallic materials - Welding procedure specification*
 - 1.1.5. EN ISO 15614 (all parts)¹) *Specification and qualification of welding procedures for metallic materials – Welding procedure test* (Describes general rules for the specification and approval of welding for metallic materials. Refers to several other standards. Assumes the welding procedure specifications are used in production by competent welders. Applies when approval of the welding procedure is required. Covers normative references, definitions, specification of welding procedures and approval of welding procedure.),
 - 1.1.6. EN 287-1, *Qualification test of welders – Fusion welding – Part 1: Steels* (Describes essential requirements, ranges of approval, test conditions, acceptance requirements and certification for the approval testing welder performance for the welding of steels. During the approval test the welder should be required to show adequate practical experience and job knowledge. Applicable when the welder's approval testing is required by the purchaser, inspection authorities or other organizations. Applies to the approval testing welders for the fusion welding of steels. Includes those fusion welding processes which are designated as manual or partly mechanized welding. It does not cover fully mechanized for fully automatic processes (EN 1418.),
 - 1.1.7. EN ISO 9606-2, *Qualification test of welders - Fusion welding - Part 2: Aluminium and aluminium alloys (ISO 9606-2:2004) - Description equivalent to above EN 287*
 - 1.1.8. EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*
- 1.1. Engineering, Manufacturing, Testing, Inspection, Certification
- 1.2. QA + QC in Receiving, In-Process and Final