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Railway applications - Welding of railway vehicles and components - Part 2: Quality requirements and certification of welding manufacturer

Applications ferroviaires - Soudage des véhicules et des composants ferroviaires - Partie 2: Exigences de qualité et certification du constructeur

Bahnanwendungen - Schweißen von Schienenfahrzeugen und -fahrzeugteilen - Teil 2: Qualitätsanforderungen und Zertifizierung von Schweißbetrieben

This European Standard was approved by CEN on 18 August 2007.

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Foreword

This document (EN 15085-2:2007) 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of an identical text or by endorsement, at the latest by April 2008, and conflicting national standards shall be withdrawn at the latest by April 2008.

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

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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 are the basic technical welding standards in respect of the special requirements for the construction of railway vehicles.

This standard is aimed at defining the terms of enforcement applicable to European Standards, it should not be construed as a substitute to these standards.

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

1 Scope

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

This part of the series defines the certification levels as well as the requirements for welding manufacturers and describes the procedure for the recognition of welding manufacturers.

2 Normative references

The following referenced documents are indispensable for the application 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 287-1, *Qualification test of welders – Fusion welding – Part 1: Steels*

EN 473, *Non destructive testing – Qualification and certification of NDT personnel – General principles*

EN 1418, *Welding personnel – Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials*

EN 15085-1:2007, *Railway applications - Welding of railway vehicles and components - Part 1: General*

EN 15085-3:2007, *Railway applications – Welding of railway vehicles and components – Part 3: Design requirements*

EN 15085-4:2007, *Railway applications – Welding of railway vehicles and components – Part 4: Production requirements*

EN ISO 3834 (all parts), *Quality requirements for fusion welding of metallic materials*

EN ISO 9606-2, *Qualification test of welders - Fusion welding - Part 2: Aluminium and aluminium alloys (ISO 9606-2:2004)*

EN ISO 14555, *Welding - Arc stud welding of metallic materials (ISO 14555:2006)*

EN ISO 14731:2006, *Welding coordination - Tasks and responsibilities (ISO 14731:2006)*

EN ISO 15607, *Specification and qualification of welding procedures for metallic materials - General rules (ISO 15607:2003)*

EN ISO 15609 (all parts), *Specification and qualification of welding procedures for metallic materials – Welding procedure specification*

EN ISO 15610 *Specification and qualification of welding procedures for metallic materials - Qualification based on tested welding consumables (ISO 15610:2003)*

EN ISO 15611, *Specification and qualification of welding procedures for metallic materials - Qualification based on previous welding experience (ISO 15611:2003)*

EN ISO 15612, *Specification and qualification of welding procedures for metallic materials - Qualification by adoption of a standard welding procedure (ISO 15612:2004)*

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

EN ISO 15614 (all parts)¹⁾ *Specification and qualification of welding procedures for metallic materials – Welding procedure test*

EN ISO 15620, *Welding - Friction welding of metallic materials (ISO 15620:2000)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15085-1:2007 apply.

4 Certification of welding manufacturers

The quality requirements for welding manufacturers, which carry out welding work on rail vehicles, components and sub-assemblies, are specified by the standard series EN ISO 3834. Dependant on the certification level, the requirements of EN ISO 3834-2, EN ISO 3834-3 or EN ISO 3834-4 shall be fulfilled in principle (see Annex A).

Welding manufacturers, which carry out welding work on railway vehicles, components and sub-assemblies, shall be certified according to this standard, if specified.

Compliance with the requirements shall be checked and certified by a recognised manufacturer certification body (see Clause 6).

Four certification levels (CL) are laid down for the certification of welding manufacturers (Level 1 to Level 4). Level 1 to Level 3 depends on the weld performance classes CP A to CP D of the welded joints specified in EN 15085-3:2007, Table 2.

Table 1 contains a description of the certification level and the allocation in the weld performance classes.

The required certification level depends on the following two items:

- 1) Table 1;
- 2) safety relevance of the components or sub-assemblies where the welded part is integral (see list beneath Table 1).

1) For railway applications, only EN ISO 15614-1, EN ISO 15614-2, prEN ISO 15614-3, EN ISO 15614-4, EN ISO 15614-7, EN ISO 15614-11, EN ISO 15614-12 and EN ISO 15614-13 are relevant.

Table 1 — Certification level

Description	Certification level (CL)
This level applies to welding manufacturers which manufacture welded railway vehicles or their welded parts with welded joints classified in weld performance classes CP A to CP D. Certification level CL 2 to CL 4 is included.	CL 1
This level applies to welding manufacturers which manufacture welded parts of railway vehicles with welded joints classified in weld performance classes CP C2 to CP D. Welded joints classified in weld performance class CP C1 are included if these welds are checked according to weld inspection class CT 1 according to EN 15085-5:2007, Table 1. Certification level CL 4 is only included according to welded joints of certification level CL 2 or CL 3.	CL 2
This level applies to welding manufacturers which manufacture welded parts of railway vehicles with welded joints classified in weld performance class CP D.	CL 3
This level applies to manufacturers which do not weld but design railway vehicles and parts of rail vehicles or buy and assemble or sell them. Certification not required for welding works of certification level CL 3.	CL 4

Because of their safety relevance the following components and sub-assemblies shall be welded by welding manufacturers with a certification level CL 1.

- bogie frames and bolsters;
- body shell components (e.g. under frames, structures);
- buffers and draw gear;
- wheel set components (e.g. wheel set mountings, axle boxes, spring supports);
- brake equipment (e.g. magnetic track brake, brake rods, brake triangles, brake cylinders, brake cross beams);
- supporting frames for heavy components (e.g. traction units, pantographs);
- welded components for drag transmission from bogie to vehicle;
- vibration dampers and their link between bogie and vehicle or between vehicles;
- finishing welding of castings within components indicated above;
- external fuel tanks.

Annex A contains information about possible classifications of the certification levels for further components and sub-assemblies of railway vehicles.

According to EN 15085-3:2007, certification level CL 1 to CL 3 necessary for the product shall be clearly indicated in the engineering documentation (e.g. on the drawings).

If required by the customer, the certification level shall be agreed with him respecting the national safety authority.

5 Quality requirements for the welding manufacturer

5.1 Staff requirements

5.1.1 Welders and welding operators

The welding manufacturer shall have welders and welding operators with qualification in accordance with EN 287-1, or EN ISO 9606-2 or with EN 1418.

Qualification shall cover each the welding processes, material groups, joint types and welding positions needed for production.

Such qualification should be carried out by either:

- accredited examining body,
- responsible welding coordinator of the manufacturer, recognised by the manufacturer certification body as specified in 5.1.2.

If fillet welds are done in production a fillet weld test piece is necessary.

5.1.2 Welding coordination

The welding manufacturer shall have suitably experienced welding coordinators with the relevant technical knowledge according to EN ISO 14731. The manufacturer shall clearly prove to the manufacturer certification body that the technical knowledge of the welding coordinator(s) is at the required level. Tasks and areas of competence of welding coordinators are given in Annex B.

For the purpose of this standard, three levels of welding coordinators are distinguished:

Welding coordinators with comprehensive technical knowledge (Level A)

Personnel with experience of welding supervision for the production of railway vehicles and/or components of at least three years and proof of comprehensive technical knowledge may be considered to satisfy the requirements.

Welding coordination personnel with the following qualifications or holding acceptable national qualifications may be also considered to satisfy the above mentioned requirements:

- Personnel with qualification according to Doc. IAB-002-2000/EWF-409 – International Welding Engineer (IWE) or European Welding Engineer (EWE);
- Personnel with qualification according to Doc. IAB-003-2000/EWF-410 – International Welding Technologist (IWT) or European Welding Technologist (EWT) with suitable experience in welding supervision and proof of comprehensive technical knowledge.

Welding coordinators with specific technical knowledge (Level B)

Personnel with experience of welding supervision for the production of railway vehicles and/or components of at least three years and proof of specific technical knowledge may be considered to satisfy the requirements.

Welding coordination personnel with the following qualifications or holding acceptable national qualifications may also be considered to satisfy the above mentioned requirements:

- Personnel with qualification according to Doc. IAB-003-2000/EWF-410 – International Welding Technologist (IWT) or European Welding Technologist (EWT);
- Personnel with qualification according to Doc. IAB-004-2000/EWF-411 – International Welding Specialist (IWS) or European Welding Specialist (EWS) with suitable experience in welding supervision and proof of specific technical knowledge.

Welding coordinators with basic technical knowledge (Level C)

Personnel with experience of welding supervision for the production of railway vehicles and/or components of at least three years and proof of basic technical knowledge may be considered to satisfy the requirements.

Welding coordination personnel with the following qualifications or holding acceptable national qualifications may also be considered to satisfy the above mentioned requirements:

- Personnel with qualification according to Doc. IAB-004-2000/EWF-411 – International Welding Specialist (IWS) or European Welding Specialist (EWS);
- Personnel with qualification according to Doc. IAB-005-2001/EWF-451 – International Welding Practitioner (IWP) or European Welding Practitioner (EWP) with suitable experience in welding supervision and proof of specific technical knowledge.

Depending on the certification level, the welding manufacturer shall have for each location site welding coordinators specified in Annex C. The number of welding coordinators depends on the extent of the welding production and the surveillance of subcontractors.

In general welding coordinators should be employed by the manufacturer.

The owners of firms, managers, works managers, production managers cannot be recognised as responsible welding coordinator for the certification level CL 1. For small welding manufacturers recognition is possible if a welding coordinator with comprehensive technical knowledge is available and a deputy is present in the production shop (at least with basic technical knowledge).

Recognition as deputy of the responsible welding coordinator is possible. For the certification level CL 2 recognition as responsible welding coordinator is possible.

NOTE Small welding manufacturer means welding manufacturer with a single welding shop.

Only recognised deputies with equal or higher qualifications are entitled to deputise without restriction for the responsible welding coordinator. Exceptions for small welding manufacturers are possible according to the footnotes in Annex C.

For welding manufacturers with several welding shops a further deputy with basic technical knowledge is required for each welding shop.

5.1.3 Subcontracted welding coordinator

In special cases subcontracted welding coordinators who are not employed by the welding manufacturer may be recognised as responsible welding coordinator if the following conditions are fulfilled:

- 1) Only one welding coordinator per location site shall be subcontracted.
- 2) At least one deputy who is employed by the manufacturer is available in the location site and recognised (see Annex C – for certification level CL 3 and CL 4 not required).

- 3) The welding coordinator shall be contractually tied to the welding manufacturer.
- 4) The minimal hours of work depends on the extent of the welding production and shall contractually be regulated. The evidence of this shall be recorded in a production log.
- 5) The subcontracted welding coordinator may work for more than one welding manufacturer. If he works for more than two welding manufacturers, agreement with all customers is required. Further subcontracted welding coordination shall be accepted by the customer. For certification level CL4, exceptions are allowed by agreement with the manufacturer certification body.

NOTE Responsible welding coordinator who are not employed by the welding manufacturer from an organisational point of view, but employed by another part of the same manufacturer (e.g. holding, head office, administration), are considered as subcontracted welding coordinators.

A person from an organization that approves the manufacturer shall not be acceptable as a subcontracted welding coordinator.

5.1.4 Inspection personnel

The welding manufacturer shall have sufficient qualified inspection personnel for:

- quality testing within the welding production facility. The welding personnel shall be instructed by the responsible welding coordinator or his nominee, e.g. on the visual weld inspection to verify that the requirements of EN 15085-3:2007, Clause 5 have been met.
- inspection required either by design or by the performance class of the weld. This inspection shall be carried out by personnel certified according to EN 473. The inspection personnel for PT, MT, ET, UT, RT shall have a procedure based qualification of at least level 1 and shall be instructed by the responsible welding coordinator or his nominee on the quality requirements according to EN 15085-3:2007, Clause 5. The testing evaluator shall be certified at least to level 2 of EN 473. Non-destructive tests may be done by external inspection personnel certified according to EN 473.

The supervision of inspection and testing is done under the responsibility of the welding coordinator of the manufacturer. Alternatively the supervision can be done by an IWIP or EWI, level 1, or personnel certified in accordance with EN 473, level 3 in the relevant process.

5.2 Technical requirements

The welding manufacturer shall have suitable technical equipment according to EN ISO 3834. Additionally for the welding of railway vehicles or components the following requirements are necessary as applicable:

- Roofed, dry, ventilated and sufficiently lit workshops and working places.
- Dry store rooms for welding fillers and ancillary supplies.
- If different materials are welded (e.g. aluminium and stainless steels), separate tools, machines and equipment shall be used for each material, or prior to processing, these have to be cleaned.
- Suitable power supply.
- If no suitable testing equipment is available, contract regulations have to be agreed with an external inspection body (test laboratory in accordance with EN ISO/IEC 17025).
- Lifting gear for transporting and turning parts.
- Work platforms.
- Turning devices or manipulators to facilitate welding in the flat position.

- Clamping devices for welding assemblies (e.g. floor, side, front wall and roof panels, underframes, bogies, containers, and fuel tanks).
- Devices for straightening.
- Protection when working with aluminium or stainless steel, to keep away dust, spatter, gases and fumes which might reduce the corrosion resistance of the parent metal or the quality of the weld.

5.3 Welding coordination organization

Responsible welding coordinators can only be recognised if they are involved in the organization of the welding manufacturer in such a way that they can accept their tasks and responsibility without reservation according to EN ISO 14731 and according to 5.1.2. For this purpose they shall have the authority to issue instructions and make decisions when there are technical problems independent of manufacturing pressures.

The responsibilities and competencies as well as the mutual relationships of all the staff employed by the welding manufacturer who carry out managerial, production or inspection work which influences the quality of the welding work shall be stated and documented in the organisational diagram of the manufacturer. The following items, in particular, should be specified and described:

- tasks of the welding coordinators (when there are several equal-graded welding coordinators, their work and responsibility areas shall be specified);
- rules for who deputises for the welding coordinator (also applies to recognised external welding coordinator);
- activities which require the attendance of the responsible welding coordinators;
- measures which are required if the welding coordinator is absent (deputising for the welding coordinator; welding work that is still permitted; cessation of welding work);
- involvement of the responsible welding coordinator in the internal process (e. g. preparation of quotations, design, sub-contracting).

5.4 Welding procedure specification

For welds which are classified in the weld performance classes CP A to CP C3, a welding procedure specification is necessary according to EN ISO 15607 and, depending on the welding process, according to series of standards EN ISO 15609, EN ISO 14555 or EN ISO 15620. For welds which are classified in the weld performance class CP D, a welding procedure specification is necessary only if it is demanded by the customer (see EN 15085-4:2007, 4.1.4).

5.5 Assignment of the requirements to certification level

The requirements for the welding manufacturer are assigned to certification levels as shown in Annex C.

6 Certification procedure

6.1 Audit for the certification

On the request of the welding manufacturer, the manufacturer certification body undertakes verification of compliance with the requirements of this standard, particularly:

- welding personnel (welding coordinators, welders, welding operators) requirements;

- welding coordinators shall be interviewed to demonstrate that they have the necessary technical knowledge on welding according to EN ISO 14731 and this series of standards;
- welding procedure specifications based on WPQR;
- qualification test of welders according to EN 287-1 or EN ISO 9606-2;
- qualification test for operators according to EN 1418;
- additional test specimens (mock-up), according to EN 15085-4;
- technical requirements and welding production.

If railway vehicles are welded in different work shops for maintenance and repair works, their technical equipment and welding production shall also be checked;

- welding quality requirements according to the relevant parts of EN ISO 3834 (see Table B.1).

6.2 Certificate

Upon verification, the manufacturer certification body issues a certificate to the welding manufacturer stating that the requirements of this standard are fulfilled. See Annex D for a model certificate.

The certificate shall indicate:

- name and address of certified welding manufacturer;
- certification level at which welding manufacturer is entitled to weld;
- field of application (e.g. new build, conversion or repair);
- range of certification (welding procedures, materials, sheet thickness, remarks);
- welding coordinators (first name, name, date of birth, qualification);
- remarks and extension of application (e.g. to maintenance and repair works of railway vehicles in a different work shop);
- validity;
- date of issue.

7 Validity

The validity of the certificate is limited to a maximum of 3 years.

Only the welding manufacturer named in the certificate (address of welding manufacturer) is a welding manufacturer certified according to this standard.

If modifications occur which affect the validity of the certificate, the manufacturer certification body shall be informed by the welding manufacturer immediately. The manufacturer certification body decides if the certificate is still valid after the modifications.

During the period of validity, the manufacturer certification body verifies annually compliance with the requirements of this standard as indicated in the certificate. As an alternative to the annual inspection audit, available reports of internal audits may be taken into account by the manufacturer certification body.

Before the certificate expires, the welding manufacturer may request a manufacturer certification body to renew it.

For the permission of welding work outside of the certified welding manufacturer the following applies:

- enable running for transfer purposes:
 - welding repair works outside of the workshop of the certified manufacturer are permitted to enable running for transfer purposes;
- in case of warranty or maintenance the certified welding manufacturer is permitted to carry out welding work on its own railway vehicles also in another workshop under the same conditions regarding personnel, technical and quality requirements;
- certified manufacturer, who performs only welding repair works, is permitted to carry out repair works in another work shop, only if the workshop is inspected in a verification procedure and the workshop is indicated in the certificate.

Annex A
(informative)

Possible allocation of parts and subassemblies of rail vehicles to the certification levels

Certification level	Parts classification
Level CL 1	<p>New build, conversion and repair of rail vehicles and their components</p> <p>Examples for components:</p> <ul style="list-style-type: none"> — bogies (headstocks, solebars, cross bearers, bogie frames); — underframes (extensions, solebars, cross bearers, assembly); — vehicle body (front walls, side walls, roof); — draw and buffering gear; — supporting frames for external equipment parts (e. g. tanks, electrical, air-conditioning and compressed air containers); — wheelset mountings, axleboxes, spring supports, shock absorbers, vibration dampers; — brake equipment (magnetic track brake, brake rods, brake triangles, brake cylinders, brake cross beams); — supporting frames for heavy duty vehicles including road/rail vehicles; — welded components for drag transmission from bogie to vehicle (bolster); — fuel tanks of vehicles; — finishing welding of castings within components indicated above; — pressure gas tanks, tanks and tank containers of rail vehicles with test pressure a; — containers for dangerous materials ^a.
Level CL 1 or Level CL 2	<p>New build, conversion and repair of rail vehicles and their components, depending on the weld performance class (CL 1 only for CP A, CP B or CP C1), e.g.:</p> <ul style="list-style-type: none"> — entrance doors, end doors; — self-supporting equipment boxes and underfloor containers (fresh water and waste-water containers); — external machine equipment parts (transformer, engine, transmission suspension); — roof construction (pantograph, panelling); — machine room equipment (transformer casing, transformer suspension, engine suspension, transmission suspension, attachment for traction motor, instrument racks); — power transmission parts (traction coupling, cardan shafts); — traversers (i.e. car wagon); — turning and tipping equipment; — obstacle deflectors; — stanchions and lashing rings;

Certification level	Parts classification
	<ul style="list-style-type: none"> — compressed-air reservoirs for rail vehicles ^a; — pressurised pipes.
Level CL 2	<p>New build, conversion and repair of non-pressurised containers without special test pressure, e.g.:</p> <ul style="list-style-type: none"> — payload container for non-dangerous materials; — other transport containers. <p>New build, conversion and repair of structural parts for rail vehicles, e.g.:</p> <ul style="list-style-type: none"> — internal parts of passenger coaches (partitions, walls, doors, panelling); — supporting frame for internal parts (electrical, air-conditioning and compressed air installations); — driving cab equipment; — lavatory parts and water containers with installations; — sliding doors in vehicles including runways; — fastenings for brake pipes; — non-self-supporting equipment boxes underneath the base frame (without supporting frame); — gearboxes and consoles for hand brake operation; — steps, hand rails (including handrails in entry areas) and railings external to the vehicle.
Level CL 3	<p>New build, conversion and repair production of simple attached parts for rail vehicles, e.g.:</p> <ul style="list-style-type: none"> — cranks and levers for various operations; — striking plates; — equipment boxes and switch cabinets in rail vehicles (including gearboxes and consoles for hand brake operation, without supporting frame); — holders for index plates; — wheel scotches; — covers for freight wagons (heat protection on tank wagons); — steps, handrails, railings on rail vehicles. <p>New build, conversion and repair of parts or trade supply parts for rail vehicles, for instance:</p> <ul style="list-style-type: none"> — seating frames; — window frames; — ventilation grilles.
Level CL 4	<p>This certification level is valid for manufacturers that do not carry out their own welding fabrication if welded components and parts are:</p> <ul style="list-style-type: none"> — designed; — bought and assembled.

^a The requirements of this standard will be superseded by specific product standards, e.g. EN 286, air reservoirs.

Annex B
(normative)

Tasks and areas of competence of the welding coordinator

Tasks and areas of competence of the Welding coordinator		Welding coordinator		
Related clause from EN ISO 14731:2006, Annex B	Tasks and areas of competence for rail vehicle building	Level A	Level B	Level C
B.1 Review of requirements	— product standard to be used, together with any supplementary requirements	X	(X)	(X)
B.2 Technical review	<ul style="list-style-type: none"> — parent material(s) specification and welded joints properties — joint location with relation to the design requirements — requirements for weld performance class — location, accessibility and sequence of welds, including accessibility for inspection and non-destructive testing — other welding requirements, e.g. batch testing of consumables, ferrite content of weld metal, ageing, hydrogen content, permanent backing, use of peening, surface finish, weld profile — dimensions and detail of joint preparation and completed weld 	X	(X)	(X)
B.3 Sub-contracting	With regard to sub-contracting, the suitability of any subcontractor for welding fabrication shall be ensured.	X	(X)	(X)
B.4 Welding personnel	With regard to welding personnel, the qualification of welders and welding operators shall be carried out (including training, instruction, performance and assessment)	X	X	(X)
B.5 Equipment	The suitability of welding and associated equipment shall be ensured.	X	X	(X)
B.6 Production planning	<ul style="list-style-type: none"> — reference to the appropriate procedure specifications for welding — allocation of qualified personnel 	X	X	X
B.7 Qualification of the welding procedures	<ul style="list-style-type: none"> — method and range of qualification with regard to the qualification of the welding procedures — performance and assessment of welding procedure qualification 	X	(X)	-
B.8 Welding procedure specifications	With regard to welding procedure specifications, the range of qualification shall be determined.	X	(X)	(X)
B.9 Work instructions	With regard to work instructions, the issuing and use of work instructions shall be determined.	X	(X)	(X)

Tasks and areas of competence of the Welding coordinator		Welding coordinator		
Related clause from EN ISO 14731:2006, Annex B	Tasks and areas of competence for rail vehicle building	Level A	Level B	Level C
B.10 Welding consumables	<ul style="list-style-type: none"> — compatibility — delivery conditions — any supplementary requirements in the welding consumables purchasing specifications, including the types of welding consumable inspection document — storage and handling of welding consumables 	X	X	(X)
B.11 Materials	<ul style="list-style-type: none"> — any supplementary requirements in the material purchasing specifications, including the types of inspection document for the material — storage and handling of the parent material 	X	(X)	(X)
B.12 Inspection and testing before welding	<ul style="list-style-type: none"> — suitability and validity of welder's and welding operator's qualification certificates — validity of the welding procedure specification — identity of the parent material and welding consumables — joint preparation, fit-up, jigging and tacking — any special requirements in the welding procedure specification (e.g. prevention of distortion) — suitability of working conditions for welding, including the environment — performance and assessment of mock-ups 	X	X	(X)
B.13 Inspection and testing during welding	<ul style="list-style-type: none"> — essential welding parameters — preheating/interpass temperature — cleaning and shape of runs and layers of weld metal — back gouging — welding sequence — correct use and handling of welding consumables 	X	X	X
B.14 and B.15 Inspection and testing after welding	<ul style="list-style-type: none"> — use of visual inspection — use of non-destructive testing — use of destructive testing — results and records of post-operations (e.g. post-weld heat treatment, ageing) 	X	X	(X)
B.16 Non-conformance and corrective actions	With regard to non-conformance and corrective actions, the necessary measures and actions (e.g. weld repairs, re-assessment of repaired welds, corrective actions) shall be determined.	X	(X)	(X)

Tasks and areas of competence of the Welding coordinator		Welding coordinator		
Related clause from EN ISO 14731:2006, Annex B	Tasks and areas of competence for rail vehicle building	Level A	Level B	Level C
B.17 Calibration and validation of measuring, inspection and testing equipment	The necessary methods and actions shall be determined.	X	X	(X)
B.18 Identification and traceability	The applicable actions shall be determined.	X	(X)	(X)
B.19 Quality records	Preparation and release of the necessary welding records and documents shall be carried out.	X	(X)	(X)

Explanations:

X fully authorised
(X) for manufacturer with certification level CL 2 and CL 3 fully authorised; for manufacturer with certification level CL 1 limited authorised with accordance after agreement with the responsible welding coordinator
– not authorised

Annex C
(normative)

Requirements for the welding manufacturer

	Certification levels			
	Level CL 1	Level CL 2	Level CL 3	Level CL 4
Manufacturer Certification	Required	Required	Not required	Required
Weld performance class	CP A to CP D	(CP C1) ^a , CP C2 to CP D	CP D	CP A to CP D
Quality requirements ^b	EN ISO 3834-2	EN ISO 3834-3	EN ISO 3834-4	EN ISO 3834-3
Welding coordinator	Level A	Level B or C	No requirement	For: level 1 welding work: Level A level 2 welding work: Level B or C
Deputy of the welding coordinator	Deputy: Level A ^c Further deputies: Level B or C ^d	Deputy: Level C	No requirement	No requirement
Welders and operators	Depending on the welding process and material group, qualified welders or welding operators are required according to EN 287-1 (for steels), EN ISO 9606-2 (for aluminium) or EN 1418 (for welding operators).			Not relevant
Testing personnel	<ul style="list-style-type: none"> — Testing personnel for welding quality tests; — testing supervisors for welding quality tests: responsible welding coordinator (not for CL 3); — non-destructive testing personnel: level 1 according to EN 473; — testing evaluator for non-destructive testing: level 2 according to EN 473. 			Not relevant

	Certification levels			
	Level CL 1	Level CL 2	Level CL 3	Level CL 4
Welding instruction	WPS according to the relevant parts of EN ISO 15609 or EN ISO 14555 or EN ISO 15620			
Welding instruction	WPS qualified by WPQR For CP D, only if specified in the contract.	the relevant parts of EN ISO 15610, EN ISO 15611, EN ISO 15612, EN ISO 15613, EN ISO 15614 ^e or EN ISO 14555 or EN ISO 15620 (for details see EN 15085-4)	WPS qualified by WPQR only if specified in the contract	Not relevant

^a See Table 1.
^b The requirements of the relevant part of EN ISO 3834 shall be met, but no certification according to EN ISO 3834 is required.
^c Level A deputy is not required for small welding manufacturers with a single welding shop.
^d For welding manufacturers with several welding shops a further deputy, Level C, is required for each welding shop.
^e For railway applications, only EN ISO 15614-1, EN ISO 15614-2, prEN ISO 15614-3, EN ISO 15614-4, EN ISO 15614-7, EN ISO 15614-11, EN ISO 15614-12 and EN ISO 15614-13 are relevant.

Annex D
(informative)

Welding of railway vehicles and components according to EN 15085-2

The company

And its welding manufacturer in

Location site (postal address of welding manufacturer):

Is certified to perform welding under certification level CL ...²⁾ according to EN 15085-2.

Field of application:

Range of certification:

Welding process according to EN ISO 4063	Material group according to CEN ISO/TR 15608	Dimensions	Remarks

Responsible welding coordinator:

Deputy of responsible welding coordinator:

Additional welding coordinators:

Remarks / Extensions ²⁾

Certificate No.:

Valid until:

Issued on:

.....
(Head of certification body)

2) Complete as appropriate

Bibliography

- [1] EWF Doc. IAB-002-2000/EWF-409 2nd Rev. *International Welding Engineer*³⁾
- [2] EWF Doc. IAB-003-2000/EWF-410 1st Rev. *International Welding Technologist*³⁾
- [3] EWF Doc. IAB-004-2000/EWF-411 1st Rev. *International Welding Specialist*³⁾
- [4] EWF Doc. IAB-005-2000/EWF-451 *International Welding Practitioner*³⁾
- [5] EN 286 (all parts), *Simple unfired pressure vessels designed to contain air or nitrogen*
- [6] EN ISO 4063, *Welding and allied processes - Nomenclature of processes and reference numbers (ISO 4063:1998)*
- [7] CEN ISO/TR 15608, *Welding - Guidelines for a metallic materials grouping system (ISO/TR 15608:2005)*
- [8] EN 15085-5, *Railway applications - Welding of railway vehicles and components - Part 5: Inspection, testing and documentation*

3) Documents to be obtained from: EWF-IAB/IIW Secretariat, c/o ISQ, Av. Prof. Dr. Cavaco Silva 33, TagusPark - Apartado 012, P-2780-994 Porto Salvo, Fax: (+351) 214228122, Email: ewf-iab@isq.pt.