



## CERTIFICATION SCHEME FOR WELDING OF RAILWAY VEHICLES AND COMPONENTS

# DOCUMENT CWRVC/1: SCHEME DESCRIPTION AND BENEFITS

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CWRVC is administered by TWI Certification Ltd  
The use of the UKAS Accreditation Mark indicates accreditation in respect of those activities covered by  
Accreditation Certificate No 0025

## **1 GENERAL BACKGROUND**

In quality terms, welding is identified as a 'Special Process' in the manufacture of railway vehicles and their components. The requirements for this process are described in the standards series EN ISO 3834.

This scheme sets the requirements, processes and procedures for assessment of manufacturers of railway vehicles and their components by welding for compliance with and certification in accordance with BS EN 15085-2.

## **2 OUTLINE OF THE CERTIFICATION SCHEME FOR WELDING OF RAILWAY VEHICLES AND COMPONENTS (CWRVC)**

BS EN 15085 applies to welding of metallic materials in the manufacture and maintenance of railway vehicles and their parts. It defines certification and quality requirements for the welding manufacturer to undertake new manufacture and repair work. BS EN 15085 consists of the following:

BS EN 15085 Railway applications – Welding of Railway Vehicles and Components

- Part 1: General
- Part 2: Requirements for the Welding Manufacturer
- Part 3: Design Requirements
- Part 4: Production Requirements
- Part 5: Inspection, Testing and Documentation
- Part 6: Maintenance Welding Requirements

Part 2 of these documents also make reference to BS EN ISO 14731 Welding Co-ordination, Tasks and Responsibilities.

The scheme is administered by the Welding Fabricator Certification Management Committee (WFCMC) on behalf of the Governing Board of TWI Certification Ltd.

Companies which meet the requirements of the Scheme are entered onto the Register of Certified Companies webpage. All registered companies receive a CWRVC Certificate and are able to use the scheme logo.

## **3 BENEFITS FOR REGISTERED COMPANIES**

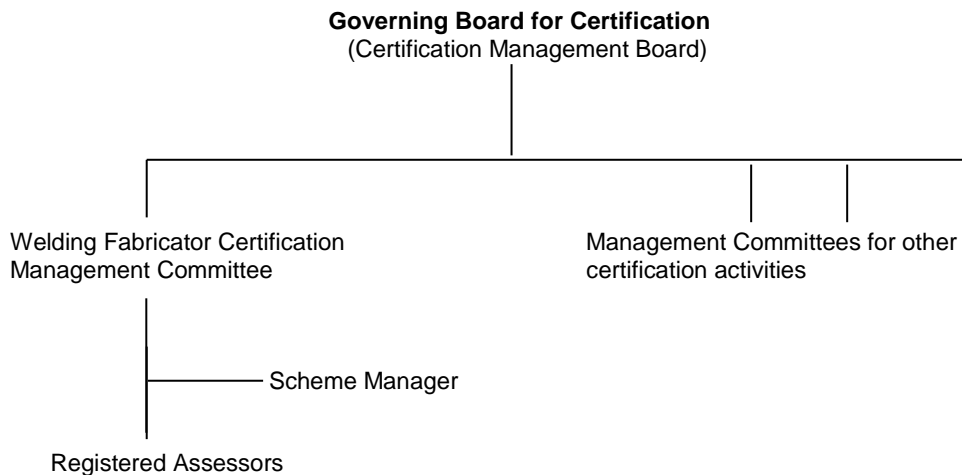
- Clear, high profile independent verification of its compliance with BS EN 15085 and UKAS requirements.
- Independent confirmation of competence for its welding and fabricating capabilities and staff in a defined scope of activity.
- Welding quality management and fabrication capability assessments carried out by specialist assessors registered by TWI Certification Ltd.
- Increased national and international business potential through demonstrated compliance with internationally recognised welding quality requirements.
- On request, European Committee for Welding of Railway Vehicles (ECWRV) membership

## **4 BENEFITS FOR CLIENTS OF REGISTERED COMPANIES**

- Expertly led, independent, vendor assessment.
- In-depth, authoritative evaluation of the manufacturer's capability.
- Consistent assessment.
- Uniform presentation of information and data.

## 5 ORGANISATIONAL STRUCTURE

The certification management structure of TWI Certification Ltd is as follows:



## 6 SCHEME OPERATION

Applicant companies are audited by assessment teams specifically approved by the Scheme Manager. Assessors have proven railway welding knowledge and experience, and this ensures that assessment is expertly directed and that the results are authoritative.

Following assessment of the applicant company, the Lead Assessor reports the findings and the results to the Scheme Manager. If successful assessment and approval is given, the data will be entered onto the Register of Certified Companies and ECWRV register, if this is a customer requirement. Registered companies are issued with a CWRVC Certificate.

## 7 LEVELS OF CLASSIFICATION

Classification Level (CL)	Description
CL 1	For welded railway vehicles and their welded components with high safety relevance.
CL 2	For welded components of railway vehicles with medium safety relevance. (Welded joints with high safety category according to EN 15085-3 are not permitted)
CL 3	For welded components of railway vehicles with low safety relevance. (Welded joints with high or medium safety category according to EN 15085-3 are not permitted)

## 8 STEPS TO CERTIFICATION

The process for applicant companies involves the following stages:

- a) Submission of the application form to TWI Certification Ltd.
- b) Customer returns the Assessment Questionnaire, rWC Summary Report, and the Roles and Responsibilities of the Welding Coordinators to TWI CL,
- b) Appointment/approval of Assessment Team by Scheme Manager.
- c) Preliminary assessment by the Lead Assessor to establish quality system status and scope and complexity of welding company facility [On-site or conducted remotely]
- d) Document Review completed by the Lead Assessor from the assessment documentation returned by the company.
- e) Planning of the assessment by Assessment Team
- f) Initial assessment is carried out by the approved Assessment Team. During the assessment, one-to-one discussions with shop floor personnel during the workshop walk around will be conducted, discussions will also be held during the assessment with the welding co-ordination personnel. Verification of company capability shall be obtained during the assessment process.

## 9 CERTIFICATION AND REGISTRATION OF APPLICANT COMPANIES BY TWI CL

### a) Registration

Lead Assessor will submit all relevant information to the Scheme Manager for inclusion on the Register. This may include the following information:

- Current product range
- Welding processes
- Materials and thickness ranges
- Forming, machining and cutting facilities
- NDT facilities
- Heat treatment facilities
- Maximum handling size and weight
- Transportation limitations
- Personnel
- Welding co-ordination personnel
- Training facilities
- Sub-contracting (relevant to fabrication)
- Major use and control of sub-contractors
- Special equipment/techniques available.

This information will be publicly available.

b) **Certification**

A company, which has demonstrated compliance with these requirements, shall be issued with a CWRVC Certificate identifying the relevant information.

c) **Surveillance of Registered Companies**

Surveillance visits will be performed at least once each year so that the Company can demonstrate ongoing compliance with the appropriate part of the standard. Desktop surveillances (no site visit), after the first year of surveillance assessment may be granted to customers with exceptional record, no corrective actions and no changes since the previous visit to their processes, materials, equipment, personnel, location etc.

d) **Reassessment**

Reassessment against BS EN 15085 is every three years.

## **10 NOTIFICATION OF CHANGE OF CAPABILITY**

The Registered Company shall notify the Scheme Manager immediately when there is any reduction in the facilities or capabilities assessed. Changes of welding co-ordination personnel shall be notified and any new appointees' documentation will be reviewed for adequacy.

## **11 SCHEME DOCUMENTATION**

CWRVC/1      Scheme Description and Benefits

## **12 FURTHER INFORMATION**

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## Appendix 1 – Table 1 from BS EN 15085-2:2020

### Defines the allocation of components to their classification level

Classification Level	Component
CL 1	<ul style="list-style-type: none"> <li>• New build, conversion and repair of rail vehicles and their components</li> <li>• Examples for components:               <ul style="list-style-type: none"> <li>— bogies (headstocks, solebars, cross bearers, bogie frames);</li> <li>— underframes of locomotives, passenger rolling stock and freight wagons (extensions, solebars, cross bearers, bolsters, assembly);</li> <li>— car bodies (end and side walls, roof, driver cabin, floor plate assembly, energy absorption modules, anti-climbers);</li> <li>— freight wagon assembly (e.g. floor plates of car transporters, load fixing elements);</li> <li>— draw and buffing gear;</li> <li>— supporting frames, brackets and tensioning straps for exterior equipment (e.g. tanks, electrical, air-conditioning and compressed air containers);</li> <li>— wheelset mountings, axleboxes, spring supports, shock absorbers, vibration dampers;</li> <li>— brake equipment (magnetic track brake, brake rods, brake triangles, brake cylinders, brake cross beams);</li> <li>— supporting frames for heavy duty vehicles including road/rail vehicles;</li> <li>— welded components for drag transmission from bogie to vehicle (bolster);</li> <li>— fuel tanks of vehicles;</li> <li>— entrance and end doors (locking systems and structural elements);</li> <li>— step frames, hand rails and railings on the outside of the vehicle or in entry areas;</li> <li>— exterior self-supporting equipment boxes and underfloor containers (fresh water and waste-water containers);</li> <li>— roof construction (pantograph, panelling); e.g. equipment (CL 2), frames (CL 1)</li> <li>— exterior traction and power equipment (transformer casing, transformer suspension, engine suspension, transmission suspension, attachment for traction motor, instrument racks);</li> <li>— power transmission parts (traction coupling, cardan shafts);</li> <li>— turning and tipping equipment (e.g. freight wagon);</li> <li>— obstacle deflectors and snow ploughs;</li> <li>— stanchions and lashing rings;</li> <li>— exhaust systems including pipes;</li> <li>— wheel scotches;</li> <li>— pressure gas tanks, tanks and tank containers of rail vehicles with test pressure<sup>a</sup>;</li> <li>— containers for dangerous materials<sup>a</sup>;</li> <li>— compressed-air reservoirs for rail vehicles<sup>a</sup></li> </ul> </li> </ul>
Level CL 2	<p>New build, conversion and repair of structural parts for rail vehicles, e.g.:</p> <ul style="list-style-type: none"> <li>— parts inside of passenger coaches (partitions, walls, doors, panelling);</li> <li>— supporting frame, brackets and tensioning straps for interior equipment (electrical, air conditioning and compressed air installations);</li> <li>— driving cab equipment;</li> <li>— lavatory parts and water containers with installations that are inside of the vehicle body;</li> <li>— interior doors and ramps;</li> <li>— fastenings for brake pipes;</li> <li>— underframe equipment boxes that are supported by another frame;</li> <li>— self-supporting gearboxes and consoles for hand brake operation;</li> <li>— interior traction and power equipment (transformer casing, transformer suspension, engine suspension, transmission suspension, attachment for traction motor, instrument racks);</li> <li>— seating frames;</li> <li>— pressurized air pipes.</li> </ul> <p>New build, conversion and repair of non-pressurized containers without special test pressure, e.g.:</p> <ul style="list-style-type: none"> <li>— payload container for non-dangerous materials;</li> </ul>

	— other transport containers.
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"> <li>— cranks and levers for various operations;</li> <li>— striking plates;</li> <li>— interior equipment boxes and switch cabinets (including gearboxes and consoles for hand brake operation that are supported by another frame);</li> <li>— holders for index plates;</li> <li>— covers for freight wagons (heat protection on tank wagons);</li> <li>— steps, handrails, railings inside of the vehicle.</li> </ul> <p>New build, conversion and repair of parts or trade supply parts for rail vehicles, for instance:</p> <ul style="list-style-type: none"> <li>— window frames;</li> <li>— ventilation grilles.</li> </ul>
If a harmonised standard for a specific product exists, e.g. EN 286 for compressed-air reservoirs or EN 14025 for containers for dangerous materials, it supersedes the requirements of this document.	

For welded joints between components with different classification levels, the higher classification level shall be applied to the entire welded assembly.

The classification level for finishing welding of cast parts shall be the same as the entire welded assembly.

**Appendix 2 – Table 2 from BS EN 15085-2:2020**

Defines types of activity

Type of activity	Indicator	Description
Design	D	Calculation, design and documentation for the production and maintenance of welded railway vehicles and components
Production	P	Manufacturing, modification and testing of welded railway vehicles and components (including replacement parts).
Maintenance	M	Repair of welded railway vehicles and components by welding (including testing).
Purchase and supply	S	Purchase and supply of welded components for new fabrication or maintenance activities without carrying out welding operations

## Appendix 3 – Annex A from BS EN 15085-2:2020

### Tasks and Areas of Competence of the Welding Co-ordinator

Table A.1 Defines the relationship between essential welding related tasks and the manufacturing phases to be performed

Tasks and Areas of Competence		Tasks and Areas of Competence				
Related clause from EN ISO 14731:2019, Annex B	Essential welding related tasks to be considered when appropriate	Contract analysis phase	Design phase	Work preparation phase	Production phase	Postproduction phase
B.1 Review of requirements	- product standard to be used, together with any supplementary requirements	A, (B,C)	—	—	—	—
B.2 Technical review	- parent material(s) specification and welded joints properties	—	A, (B,C)	—	—	—
	- joint location with relation to the design requirements	—	A, (B,C)	—	—	—
	- requirements for weld performance class	—	A, (B,C)	—	—	—
	- location, accessibility and sequence of welds, including accessibility for inspection and non-destructive testing	—	A, (B,C)	—	—	—
B.2 Technical review	- other welding requirements, eg batch testing of consumables, ferrite content of weld metal, ageing, hydrogen content, permanent backing, use of peening, surface finish, weld profile	—	A, (B,C)	A, (B,C)	—	—
	- dimensions and detail of joint preparation and completed weld	—	A, (B,C)	—	—	—
B.3 Sub-contracting	With regard to sub-contracting, the suitability of any sub –contractor for welding fabrication shall be ensured.	A, (B,C)	A, (B,C)	A, (B,C)	—	—
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)	A, (B,C)	A, (B,C)	A, (B,C)	—	—
B.5 Equipment	The suitability of welding and associated equipment shall be ensured	A, (B,C)	A, (B,C)	A, (B,C)	—	—
B.6 Production planning	- reference to the appropriate procedure specifications for welding	—	A, B, C	A, B, C	—	—
	- allocation of qualified personnel	—	—	A, B, C	—	—
B.7 Qualification of the welding procedures	- method and range of qualification with regard to the qualification of the welding procedures	—	A, (B, C)	—	—	—
	- performance and assessment of welding procedure qualification	—	A, (B, C)	A, (B, C)	—	—
B.8 Welding procedure specifications	With regard to welding procedure specifications, the range of qualification shall be determined	—	A, (B, C)	A, (B, C)	—	—
B.9 Work instructions	With regard to work instructions, the issuing and use of work instructions shall be determined	—	—	A, (B, C)	—	—



Tasks and Areas of Competence		Tasks and Areas of Competence				
Related clause from EN ISO 14731:2019, Annex B	Essential welding related tasks to be considered when appropriate	Contract analysis phase	Design phase	Work preparation phase	Production phase	Postproduction phase
B.10 Welding consumables	<ul style="list-style-type: none"> <li>- compatibility</li> <li>- delivery conditions</li> <li>- any supplementary requirements in the welding consumables purchasing specifications, including the types of welding consumable inspection document</li> <li>- storage and handling of welding consumables</li> </ul>	—	A, B, (C)	—	—	—
		—	A, B, (C)	A, B, (C)	—	—
		—	A, B, (C)	A, B, (C)	—	—
		—	—	A, B, C	—	—
B.11 Materials	<ul style="list-style-type: none"> <li>- any supplementary requirements in the material purchasing specifications, including the types of inspection document for the material</li> <li>- storage and handling of the parent material</li> </ul>	A, (B, C)	A, (B, C)	—	—	—
		—	—	A, (B, C)	A, (B, C)	—
B.12 Inspection and testing before welding	<ul style="list-style-type: none"> <li>- suitability and validity of welder's and welding operator's qualification certificates</li> <li>- suitability and validity of the welding procedure specification</li> <li>- identity of the parent material and welding consumables</li> <li>- joint preparation, fit-up, jiggling and tacking</li> <li>- any special requirements in the welding procedure specification (e.g. prevention of distortion)</li> <li>- Suitability of working conditions for welding, including the environment</li> <li>- Performance and assessment of mock-ups</li> </ul>	—	A, B, (C)	A, B, (C)	A, B, (C)	—
		—	A, B, (C)	A, B, (C)	—	—
		—	—	A, B, C	A, B, C	—
		—	A, B, C	A, B, C	A, B, C	—
		A, B, C	A, B, C	A, B, C	—	—
		—	A, B, C	A, B, C	A, B, C	—
		—	A, B, (C)	A, B, (C)	A, B, (C)	—
B.13 Inspection and testing during welding	<ul style="list-style-type: none"> <li>- essential welding parameters</li> <li>- preheating/interpass temperature</li> <li>- cleaning and shape of runs and layers of weld metal</li> <li>- back gouging</li> <li>- welding sequence</li> <li>- correct use and handling of welding consumables</li> </ul>	—	—	—	A, B, C	—
		—	—	A, B, C	A, B, C	—
		—	—	—	A, B, C	—
		—	—	—	A, B, C	—
		—	—	—	A, B, C	—
B.14 and B.15 Inspection and testing after welding	<ul style="list-style-type: none"> <li>- use of visual inspection</li> <li>- use of non-destructive testing</li> <li>- use of destructive testing</li> <li>- results and records of post operations (e.g. post-weld heat treatment, ageing)</li> </ul>	—	—	—	A, B, (C)	A, B, (C)
		—	—	—	A, (B, C)	A, (B, C)
		—	—	—	A, (B, C)	A, (B, C)
		—	—	—	—	A, (B, C)
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	—	—	—	A, (B, C)	A, (B, C)

Tasks and Areas of Competence		Tasks and Areas of Competence				
Related clause from EN ISO 14731:2019, Annex B	Essential welding related tasks to be considered when appropriate	Contract analysis phase	Design phase	Work preparation phase	Production phase	Postproduction phase
B.17 Calibration and validation of measuring, inspection and testing equipment	The necessary methods and actions shall be determined	—	—	A, (B, C)	A, (B, C)	—
B.18 Identification and traceability	The applicable actions shall be determined	A, (B, C)	A, (B, C)	A, (B, C)	A, (B, C)	A, (B, C)
B.19 Quality records	Preparation and release of the necessary welding records and documents shall be carried out	A, (B, C)	A, (B, C)	A, (B, C)	A, (B, C)	A, (B, C)
B.20 Health and safety and environment	With regard to health and safety and environmental issues, all relevant rules and regulations shall be considered	A, B, C	A, B, C	A, B, C	A, B, C	A, B, C

Key:  
A, B, C: fully authorised  
(B), (C): for manufacturer with CL 2 and CL 3 fully authorised according to Annex B; for manufacturer with CL 1 limited authorisation after agreement with the responsible welding coordinator  
—: not applicable.

**Appendix 4 – Annex B from BS EN 15085-2:2020**  
**Requirements for the welding coordination of manufacturers**

Table B.1 defines the minimum requirements for manufacturers.

Classification Level		CL1	CL 2	CL 3
	Type of activity (see Table 2)			
Manufacturer's evidence of compliance (see Clause 6)	P, M, D, S	Required	Required	Not required
Weld performance classes (CP) according to EN 15085-3	P, M, D, S	All	CP B2, CP C2, CP C3 and CP D	CP C2 and CP C3 with low safety category and CP D
Quality Requirement	P, M, D, S	EN ISO 3834-2 EN ISO 14554-1	EN ISO 3834-3 EN ISO 14554-2	EN ISO 3834-4 EN ISO 14554-2
Responsible welding coordinator, minimum level	P, D	Level A	Level B	Level C
	S	Level B	Level C	Level C <sub>b</sub>
	M	Level A <sub>a</sub>	Level B	Level C
1st deputy of the responsible welding coordinator, minimum level	D, S	Not required	Not required	Not required
	P	Level A	Level C	Not required
	M	Level A <sub>a</sub>	Level C	Not required
	P (Small Manufacturer) (see Annex C)	Level C	Welder with technical knowledge and experience in welding	Not required
	M (Small Manufacturer) (see Annex C)	Level C <sub>a</sub>	Welder with technical knowledge and experience in welding	Not required
Others deputies, minimum level	D,S	Not required	Not required	Not required
	P,M	Sufficient number of Level C, who can cover the welding activities and the possible shifts with welding	Sufficient number of Level C, who can cover the welding activities and the possible shifts with welding.	Not required
Welders and operators	P.M	Welders or welding operators shall be qualified according to EN 15085-4.		
Testing personnel	P,M,S	Testing personnel for welding quality tests shall be qualified according to EN 15085-5.		
Welding Instruction	P,M	Welding procedure specification (WPS) and / or welding procedure qualification record (WPQR) according to EN 15085-4.		

<sup>a</sup> In case of welding manufacturer (M = maintenance) with several sites, welding coordination activities may be managed as follows:

- One level A responsible welding coordinator for managing welding activities at all sites;
- One level A deputy welding coordinator;
- One level B deputy welding coordinator at each site. In case of "small" site (see Annex C) one level C deputy welding coordinator;
- Other level C deputies welding coordinators if necessary.

<sup>b</sup> Only required for weld performance classes CP C2 and CP C3.