



Leaflet

Conducting welding tests in accordance with DVS 1617 and 1620 at Deutsche Bahn AG

**(formerly *Welding design review and manufacturing validation by DB AG
in accordance with DB Guideline 951.0010 –
Schweißtechnische Bauweisenprüfung (STBP) durch die DB AG
nach der DB-Richtlinie 951.0010*)**

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Deutsche Bahn AG

Rolling Stock Parts Quality Assurance
and Product Qualification

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Brandenburg-Kirchmöser, March 2022

Terms and abbreviations

Abbreviation	Description
CL	Classification Level in accordance with EN 15085-2
CT	Class of Testing in accordance with EN 15085-3
DB	Deutsche Bundesbahn
DB AG	Deutsche Bahn AG
DR	Deutsche Reichsbahn
DVS	Deutscher Verband für Schweißen und verwandte Verfahren e. V. (German Welding Society)
STBP	Welding design review and manufacturing validation
RWC	Responsible welding coordinator in accordance with DIN EN 15085-2
QSL Bestellung	Order for a quality assurance service

Purpose

Contents of this Leaflet

This Leaflet describes how Deutsche Bahn AG tests welded components in accordance with DIN EN 15085 and leaflets DVS 1617 and DVS 1620 in the form of the welding design review and manufacturing validation (STBP).

The welding tests in accordance with leaflets DVS 1617 and DVS 1620 conducted by the design manager and the manufacturer form the basis of the STBP.

Based on DVS 1620, tests of welded components in classification levels CL 1 to CL 3 are conducted in accordance with DIN EN 15085-2. The DB AG welding design review and manufacturing validation usually includes components with classification level CL 1.

The DB AG welding tests in accordance with Guideline 951.0010 are divided into welding design review (STBP 1) and welding manufacturing validation (STBP 2).

Welding tests for DB AG orders must be conducted in accordance with contractual agreements. If agreed, Guideline 951.0010 shall be applied.

The authors of this Leaflet must be consulted regarding references in the text to regulations that change during the period of validity of this DB Guideline.

Source

This Leaflet and the other applicable *Leaflet on requirements for welded rail vehicles and parts (Anforderungen der DB AG nach der DB-Richtlinie 951.0010)* are available online in the Supplier Portal¹ of DB AG

¹ <https://lieferanten.deutschebahn.com/lieferanten/metanavi/Downloads-und-Support/Downloads-Dokumente>

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Change history

Valid as of	Changes made	Author
07/2019	Initial issue 07/2019	Frank Pickardt, Rainer Pietschmann
14 March 2022	Revision	Frank Pickardt, Rainer Pietschmann

1. Welding design review and manufacturing validation (STBP)

The STBP is an element of DB AG's quality assurance and part of the agreed service. The relevant contractual provisions apply.

STBP 1: Part 1 of the STBP comprises a review of the welding design documents in terms of plausibility and completeness based on the section headed *Reviewing welding design documents (Prüfung der schweißtechnischen Konstruktionsunterlagen)* in DVS 1620. The review also covers issues related to maintenance in DB AG depots.

The review is carried out by DB Systemtechnik before the start of production. It is required for rail vehicles and parts with major relevance to safety in classification level CL 1 in accordance with DIN EN 15085-2 as well as Guideline 951.0010Z01.

STBP 2: Part 2 of the STBP includes the review of supplier qualification in accordance with DVS 1617 and the tests of welded components in accordance with DVS 1620:

- Reviewing design documents before the start of production
- Tests prior to welding
- Tests during welding
- Tests after welding

Ancillary processes with a direct or indirect impact on welding production are included in an appropriate manner (e.g. ordering/procurement, storage, planning and execution of required tests).

DB AG's Quality Assurance department carries out the STBP 2 at the start of production in the form of an audit at the welding shop. The audit covers how design document specifications are implemented in production.

The audit must be agreed in a contract and, as a rule, is required for rail vehicles and parts with major relevance to safety in classification level CL 1 in accordance with DIN EN 15085-2 and Guideline 951.0010Z01, Table 2.

2. Welding design review (STBP 1)

2.1. Rules on placing orders for reviews

The welding shop responsible for design or DB AG's contractor must commission DB Systemtechnik GmbH to carry out the STBP 1.

Address: DB Systemtechnik GmbH
Fachberatungsstelle Schweißtechnik
Bahntechnikerring 74
14774 Brandenburg-Kirchmöser
Germany

Contact: Frank Pickardt
Tel: +49 (0) 571 393 5524
Mobile: +49 (0) 178 2 937 947
E-mail: Frank.N.Pickardt@deutschebahn.com

The STBP 1 is to be ordered informally by e-mail. The documents in accordance with Section 2.3 must be sent to the following e-mail address:

FBS.Schweisstechnik@deutschebahn.com

Responsibility for timely and complete delivery of the order documents lies with the responsible welding coordinator (RWC).

The reason for the STBP 1 must be stated with the order (e.g. Class xxx new vehicle project, Class xxx retrofit, Class xxx modernisation, Class xxx reproduction). If no class or type can be specified, the vehicle or component must be given a working title in the form of a unique designation.

The number of the vehicle procurement contract must always be stated for DB AG vehicle projects.

DB Systemtechnik also carries out STBP 1 welding design reviews on behalf of third parties (e.g. manufacturers, designers, operators) without an order from DB AG. Once the order has been received, the party placing the order receives an offer from DB Systemtechnik for performing the STBP 1.

2.2. Cost of STBP 1 welding design reviews

The costs depend on exactly what is being ordered.

2.2.1. Welding design reviews within the scope of DB AG procurement contracts

DB AG will bear the costs of the **initial** STBP 1 as part of the procurement project or the procurement of spare parts. The contract will make provisions for any variances.

For any STBP 1 that becomes necessary due to changes in the welding design (see Guideline 951.0010Z03) of an assembly that has already been tested, the party requesting the review shall bear the costs associated with it. The requesting party shall receive an offer upon resubmitting the documents.

2.2.2. STBP 1 welding design reviews outside DB AG procurement contracts (order for a service for a third party)

The party ordering the STBP 1 shall bear the costs.

2.3. Documents required for the STBP 1

2.3.1. Design documents

The welding drawings in accordance with EN 15085-3 must be submitted as design documents for the STBP 1. The review of the individual part drawings and weld preparation are not included in the STBP 1.

The welding drawings (drawing + bill of materials) must contain the required welding information in accordance with EN 15085-3 and Guideline 951.0010Z03 in an unambiguous form. If the drawings or bills of materials do not contain information on materials and welding consumables, a separate list of the materials must be submitted with assignment to the components (in electronic form, Word, Excel or PDF). The welds must be clearly marked so that it is apparent for each weld what base materials are to be welded with what welding consumables and in which performance class.

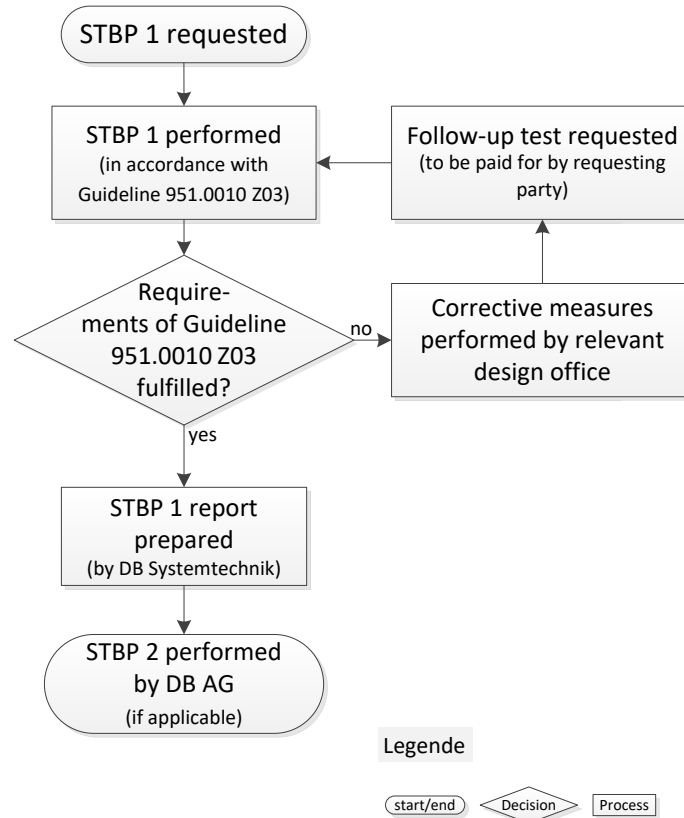
The welding drawings must be verifiably checked by the relevant welding supervisor or an equivalent deputy (welding test in accordance with DVS 1620, section *Reviewing welding design documents (Prüfung der schweißtechnischen Konstruktionsunterlagen)*).

2.3.2. Documents and verifications

With regard to the STBP 1, the following documents, verifications or information are required in addition to the welding drawings:

- The respective welding drawing **together** with the corresponding bill of materials in a **PDF file** (file name as per drawing). Any other formats must be agreed upon.
- Preliminary assignment of components to the classification levels in accordance with EN 15085-2. Where the design concerned is large-scale in nature (e.g. bodyshell, bogie), a list of drawings has to be submitted containing all welding drawings in classification level CL 1 as per EN 15085-2 to be reviewed. The drawing list must contain the following as a minimum:
 - Designation of the rail vehicle (e.g. Class xxx, IC xxx) or designation of the component or assembly (e.g. bogie type xxx, solebar for type xxx)
 - Classification level in accordance with EN 15085-2
 - Unique designation of the document (drawing number, version, drawing revision, date)
 - Materials with indication of the materials standard
- Welding consumables in accordance with EN 15085-4 indicating the corresponding standard
When joining non-alloy or low-alloy steels, for example, the minimum requirement placed on the weld material must be stated (e.g.: S355J2 → ISO 14341-A - 35 2).
- Verification of the classification level of the design company in accordance with EN 15085-2
- If changes are made to drawings, the reason for the change must be stated (e.g. by markings in the drawing, change notice, change description in the e-mail).

2.4. STBP 1 welding design review procedure



The procedure for STBP 1 **welding design reviews outside DB AG procurement contracts** (order for a service for a third party) is identical, ending with the welding design review report issued by DB Systemtechnik.

2.5. Documentation of the STBP 1

Once the STBP 1 has been completed, the result is documented in a **report**. The report includes, among other things, the inspected drawings with drawing revision and specifications on the necessity of a welding manufacturing validation (STBP 2). If necessary, it contains information on maintenance (e.g. for the use of special materials).

The report is created as a digital document and e-mailed to the person responsible for preparing the design documents. The report can be printed out and filed in digital form for future use. The valid version is always the version sent in digital form. In the event of any ambiguity, the version filed with DB AG shall apply.

Once the report has been submitted, the welding shop responsible for design must document the STBP 1 in verifiable form, preferably on the drawing. DB Systemtechnik's Welding Consulting Centre must be consulted regarding any other procedures. The report must always be archived together with the inspected drawings.

2.6. Period of validity of the STBP 1

In principle, the STBP 1 is valid for an unlimited period. It must be repeated if there are changes to the welding design (see Guideline 951.0010Z03, e.g. if there are changes affecting the position of the welds, the type of weld, the weld performance class or the materials). Any repetition not attributable to DB AG will be invoiced. The welding design review report must be kept available.

Note regarding DR, DB or DB AG drawings created, modified and checked **before 1 July 2001**:

These drawings were subjected to a welding inspection by the above-mentioned railways as part of the drawing inspection and are deemed to have been inspected even without verification.

Note regarding DR, DB or DB AG drawings created or modified **after 1 July 2001**:

These drawings must have been subjected to an STBP 1 by DB Systemtechnik. The STBP 1 is either documented on the drawing or a report is available. If there is no written record of the STBP 1, the drawings shall be deemed not to have been reviewed. In such cases, the DB AG contractor must commission the STBP 1 from DB Systemtechnik in accordance with Section 2.

3. Welding manufacturing validation (STBP 2)

3.1. Rules on placing orders within the framework of DB AG procurement contracts

The DB AG Quality Assurance department, Procurement of Rolling Stock and Rolling Stock Parts, must be commissioned with performing the STBP 2. This serves joint coordination, preparation and timely performance of the welding tests at the respective welding shops.

The basis for the commissioning and performance of the STBP 2 is the contract concluded with DB AG.

Responsibility for commissioning the STBP 2 lies with the DB AG contractor.

The STBP 2 **must be** commissioned from DB AG Quality Assurance with **sufficient advance notice** so that the audit can be carried out in the welding shop on schedule (see *EVV Qualitätssicherung Beschaffung – Supplementary contractual terms for quality assurance in procurement*).

DB AG's contractor must ensure that a binding schedule is agreed with the quality test engineer appointed by DB AG's Quality Assurance department (welding auditor) and the welding shop at least **20 working days** before the scheduled audit date.

An order must be placed for an STBP 2:

- If DB AG's contractor or a contractor in the supply chain subcontracts the supply of welded components to other suppliers (for the address see the EN 15085-2 online register at <https://en15085.jointcert.eu/?Sprache=1> or <https://en15085.jointcert.eu/?Sprache=2>).

- In vehicle procurement projects:

An order must always be placed for the contractually agreed STBP 2 regardless of whether the welding work is carried out by DB AG's direct contractor, within the contractor's corporate structure or by other manufacturers.

- For spare parts procurements by DB AG:

The requirement to perform an STBP 2 is included in the order. For example, an STBP 2 is required for all products marked "J" in the "STBP" position in the production and inspection information². The STBP 2 refers to a product's welded production component.

Following consultation with the relevant quality test engineer, the DB AG contractor is not required to place an order for an STBP 2 if the contractor itself is the direct manufacturer of the welded components (for the address see the EN 15085-2 online register).

The **order** (→ Section 3.1.1) together with the **annexes** (→ Section 3.1.2) must be submitted to the relevant quality test engineer or the project quality engineer responsible for the project.

The order and annexes must be complete to ensure rapid processing, planning and execution.

The relevant welding supervisor from the party submitting the request must be involved with regard to providing the specific information and documents required in connection with the order.

The respective quality test engineer or project quality engineer is responsible for passing on the order to DB AG Quality Assurance.

Once the order has been accepted, the requesting party will receive an order acknowledgement giving the name of the welding auditor who is to carry out the audit.

3.1.1. Information in the order

The *QSL Bestellung* order form must be used for the order. The form as well as instructions for completing it are available in the Supplier Portal on the DB AG web page³ (*Note: Supplier Portal → Helpful documents → Rail vehicles and parts → Organization of testing*).

² Explanation of new production and inspection information, see DB AG'S Supplier Portal

³ <https://lieferanten.deutschebahn.com/lieferanten/metanavi/Downloads-und-Support/Downloads-Dokumente>

3.1.2. Annexes and documents

The party ordering the STBP 2 must provide the following annexes and documents in such a way that the audit can be planned, prepared and executed as quickly as possible and without delays.

Mandatory annexes as part of the order:

1. The order with the subcontractor (supplying factory/trader/processor/welding shop)
2. Each DB AG order if welding for DB AG spare part orders is subcontracted (all technical and regulations-related information relevant to the STBP 2 must be legible)
3. The STBP 1 performed by DB (if contractually relevant)
4. The welding drawing(s) and associated bill(s) of materials of the welded main assembly or assemblies
5. The list of production sites (preferably with template 951.0010Z02V01) if welding and the STBP 2 are carried out at multiple production sites
6. The verification of certification from the EN 15085-2 online register for the production sites or the subcontractors with indication of the contact details of the responsible welding coordinator as a possible contact person (name, telephone number and e-mail address)
7. If work is subcontracted, a written record of the subcontractor's welding manufacturing validation in accordance with EN 15085 must also be enclosed (e.g. audit report in accordance with DVS 1617)
8. If the STBP 2 is repeated and invoiced in accordance with **Section 3.3.3** (first or second bullet point), the STBP 2 audit report with the result or status/requirements "Not fulfilled" following corrective measures must be attached to the audit order

Documents that are to be made available to the welding auditor in good time to allow audit preparation or upon commencement of the audit at the latest:

- a) Test plan

A test plan must be created and submitted for preparation for welds in the **CT 1** and **CT 2** classes of welding in accordance with EN 15085-3 as well as for welds requiring production weld test samples.

Note: A separate production weld test sample plan in accordance with DVS 1621 is required if the test plan does not contain assignment of the production weld test samples. A separate production weld test sample plan is always required for complex assemblies and components with a large number of production weld test samples (such as bodyshells or bogie frames).
- b) List of welders/operators

A list of all welders/operators used for the order with details of their welder/operator qualification tests in accordance with DIN EN ISO 9606 or DIN EN ISO 14732 must be submitted together with the required production weld test samples.
- c) STBP 2 audit report

If an STBP 2 has already been carried out for the component, the last audit report must be submitted.
- d) List of drawings

Where the design concerned is large-scale in nature (e.g. bodyshell, bogie), a valid list of drawings must be submitted. Reference to the STBP 1 performed by DB or to the welding design review performed by the manufacturer must be represented in an appropriately secured manner, depending on its relevance to the contract.

Note: The list of drawings must include:

 - A unique designation of the rail vehicle, assembly or component
 - The drawing number(s) with drawing revision and date
 - The classification level in accordance with DIN EN 15085-2
 - The date of the STBP 1 (only for CL 1 components)
 - The materials
- e) List of NDT testing staff

List of all persons performing and supervising order-related NDT procedures (activity, qualification as per DIN EN ISO 9712, visual inspections)

The following must be submitted: verification of qualification and certification as per DIN EN ISO 9712, verifications of adequate eyesight as well as briefings by the responsible welding coordinator (RWC) regarding the required quality criteria as per DIN EN 15085-3

3.2. Rules on placing orders outside the framework of DB AG procurement contracts

The DB AG Quality Assurance department, Procurement of Rolling Stock and Rolling Stock Parts, can be commissioned with performing the STBP 2.

As part of the order placement and associated quotation process, joint coordination takes place for the preparation and timely performance of the welding tests in the respective welding shops.

The requesting party **must** commission the STBP 2 from DB AG Quality Assurance with **sufficient advance notice** so that the audit can be carried out in the welding shop on schedule.

The commissioning party must ensure that a binding schedule is agreed with the quality test engineer appointed by DB AG's Quality Assurance department (welding auditor) and the welding shop at least **20 working days before** the scheduled audit date.

The STBP 2 can be ordered informally by e-mail. A clear order description with all required information, annexes and documents in accordance with Section 3.1.2 must be sent by e-mail to:

as-sfk@deutschebahn.com

Notes on the subject line:

The cover letter by e-mail should contain the identifier "STBP". To ensure rapid processing, it is recommended that "international" is added if the welding is not carried out in Germany.

3.3. Rules on expenses

3.3.1. Expenses within the scope of DB AG procurement contracts

The *EVB Qualitätssicherung Beschaffung – Supplementary contractual terms for quality assurance in procurement* shall apply as agreed in the contract (see EVB section *Expenses for quality assurance measures*). The contract will make provisions for any variances.

3.3.2. Expenses outside DB AG procurement contracts

Such expenses will be borne by the party ordering the STBP 2. Details will be included in the offer.

3.3.3. Expenditure for invoiced repetitions

The STBP 2 must be repeated and will be invoiced:

- If an audit result is "Requirements not fulfilled", status "red"
- If an audit result is "Requirements conditionally fulfilled" and requirements after corrective measures are "not fulfilled", status "red"
- If there is a change of production location attributable to DB AG's contractor or a subcontractor commissioned by the contractor
- If there is a change of responsible welding coordinator
- If there is a change of ownership/name
- If there are significant technological changes in welding production
- If there is an interruption in production for more than one year attributable to DB AG's contractor or a subcontractor commissioned by the contractor
- If there are variances in welding quality

If existing contract provisions with DB AG differ from the above, proof must be provided when ordering the STBP 2.

3.4. Conducting an STBP 2 and procedure

The following conditions must be fulfilled with regard to auditing of the welding shop:

- 1) The welding design review performed by the manufacturer or the STBP 1 performed by DB, if contractually relevant, has been completed, is valid and has been submitted.
- 2) A valid commission to carry out the STBP 2 has been issued (→ Section 3.1 or 3.2 in this Leaflet) and the documents or written records have been submitted in full (→ Sections 3.1.2).
- 3) The date of the STBP 2 has been mutually agreed.
- 4) The audit takes place immediately at the start of production. The finished state of the welded components has been agreed between the welding auditor and the welding shop.

- 5) The required tests in accordance with the applicable regulations have been planned and are ready to be executed. Details have been agreed with the welding auditor.

During the audit, the responsible welding coordinator must provide DB AG with proof that the welding rules have been implemented.

All required welding documents and verifications must be submitted (→ Section 3.1.2 of this Leaflet as well as DVS 1620 and DVS 1617).

The welding auditor evaluates the implementation of the contractually agreed welding rules and other applicable regulations in production, and documents this in an **audit report**.

3.5. Documentation of the STBP 2

The **result of the STBP 2** is determined by the welding auditor immediately after completion of the audit and documented in the audit report. The result is linked to a status. The following options are available:

- Requirements of the STBP 2 fulfilled → corresponds to the status "green"
- Requirements of the STBP 2 conditionally fulfilled → corresponds to the status "yellow"
- Requirements of the STBP 2 not fulfilled → corresponds to the status "red"

The **findings** contained in the audit report are addressed to the welding shop, to a responsible party in the order chain, to DB AG's contractor or to the party ordering the STBP 2. This is the basis for determining any **conditions** to be fulfilled by responsible parties with regard to eliminating the causes leading to the findings by means of suitable corrective measures by the specified **deadline** and with regard to providing verification of their elimination to the welding auditor.

If the result is "Conditionally fulfilled", the welding auditor documents as close as possible to the deadline the action taken to meet conditions or the performance of corrective measures by means of the **status of the STBP 2** in the audit report. The result is retained and is not changed.

The following options exist for the final evaluation:

Requirements following action taken to meet conditions Status (new)

- Requirements of the STBP 2 fulfilled → corresponds to the status "green"
- Requirements of the STBP 2 not fulfilled → corresponds to the status "red"

The audit report is created as a digital document and sent to the welding shop by e-mail. The audit report can be printed out and filed in digital form for future use. The valid version is always the version sent in digital form. In the event of any ambiguity, the version filed with DB AG shall apply.

3.6. Period of validity of the STBP 2

The STBP 2 is valid for the welding shop (address) specified in the audit report including the responsible welding coordinator for the railway vehicles and components (drawing numbers) specified in the report as well as for the validity period specified in the report.

According to DVS 1617, validity ends **three years** after the date of issue at the latest. It also expires in the event of any changes as per 951.0010Z04 (→ also Section 3.3.3 in this Leaflet, bullet points 3 to 8).

3.6.1. Updating the period of validity if supply contract is continued

With regard to STBP 2 welding manufacturing validations carried out within the scope of a procurement project or a spare parts procurement and whose validity expires before the end of the contract, DB AG's contractor must commission an audit for an update **three months** before the expiry of validity. This audit is usually free of charge. However, expenses for quality assurance measures may be incurred in accordance with the *EVB Qualitätssicherung Beschaffung – Supplementary contractual terms for quality assurance in procurement* (see Section 3.3.1 of this Leaflet).

With regard to welding manufacturing validations carried out as an order for third parties, an audit for an update must be commissioned **three months** before the expiry of validity if the ordering party wishes validity to continue. **This audit will be invoiced** (see Section 3.3.2 in this Leaflet).

If the order is placed on time, validity will be extended until the agreed audit date.

3.7. Contact persons for STBP 2 welding manufacturing validations

Contacts for general issues relating to welding manufacturing validations, questions on commissioning an audit as well as specific questions:

<u>Rainer Pietschmann</u>	Tel.:	+49 (0) 30 297 645 30
	Mobile:	+49 (0) 170 635 978 2
	E-mail:	rainer.pietschmann@deutschebahn.com
<u>Benjamin Obst</u>	Mobile:	+49 (0) 152 374 130 16
	E-mail:	benjamin.b.obst@deutschebahn.com

The test engineers named in the order acknowledgement are the contact persons for coordination and specific questions regarding a specific order.

Further contacts for specific questions regarding welding manufacturing validations:

<u>Bernd Winkler</u>	Mobile:	+49 (0) 160 974 658 45
	E-mail:	bernd.winkler@deutschebahn.com
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