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Distribution list

DBS

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May 5, 2017

**Enactment IK 02/2017**  
**DB Standard**  
**New issue of DBS 918 125**

Dear Sir or Madam,

DBS 918 125 Technical Specifications

“Forged permanent way parts”

will come into effect on May 15, 2017.

This DBS is being newly introduced with the May 2017 issue and supersedes DBS 918 125, version February 2016.

DBS 918 125 specifies the requirements of Deutsche Bahn AG regarding manufacturing and delivery of forged permanent way parts on the basis of European standards.

Distribution of the DBS via

**DB Kommunikationstechnik GmbH; Elisabeth-Schwarzhaupt-Platz 1; 10115 Berlin**

will follow shortly. The same office will make the document available digitally (for internal users via [www.dbportal.db.de](http://www.dbportal.db.de) as a pdf file) in the Central Regulation Database (ZRWD).

The client of Deutsche Bahn AG is permitted to make the DBS available to external users as a pdf file.

...

When using pdf files, the user must make sure that the files contain the latest version of the DBS.

Sincerely,  
DB Netz AG

p.p. *[Signature]*  
Dr. Thomas Hempe  
I.NPF 11

p.p. *[Signature]*  
Dr. Manfred Zacher  
I.NPF 111



Supersedes DBS 918 125 Edition 02/2016

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## Foreword

This Deutsche Bahn Standard (DBS) was created by the Engineering department of DB Netz AG in cooperation with Quality Assurance of Deutsche Bahn AG and represents the interests of Deutsche Bahn AG. It supersedes the temporary edition of DBS 918 125 “Forged permanent way parts”, February 2016 edition.

## 1 Scope

This DB Standard governs the qualification and quality assurance of forged permanent way parts. It specifies and supplements the requirements of Deutsche Bahn AG regarding manufacturing and delivery on the basis of DIN EN 10293, DIN EN 1561 and DIN EN 1563 as well as the applicable European standards and national regulations.

## 2 Normative references

This Deutsche Bahn Standard contains dated and undated references and definitions from other publications. The normative references are cited at the respective areas in the text and the publications are listed below.

In the case of dated references, subsequent amendments or revisions to these publications only belong to this Deutsche Bahn Standard if they have been incorporated by means of amendment or revision. In the case of undated references, the latest version of the referenced publication (including amendments) applies.

DIN EN 10025	Hot rolled products of structural steels
DIN EN 10083	Steels for quenching and tempering
DIN EN 10204	Metallic materials - Types of inspection documents
DIN EN 10254	Steel closed die forgings - General technical delivery conditions DIN EN 10243-1 Steel die forgings - Tolerances on dimensions - Part 1: Drop and vertical press forgings
DIN EN 10243-2	Steel die forgings - Tolerances on dimensions - Part 2: Upset forgings made on horizontal forging machines
DIN EN 6892	Metallic materials - Tensile testing Part 1: Method of test at room temperature
EN ISO 6506-1	Metallic materials - Brinell hardness test
EN 10045-1	Charpy impact test on metallic materials
DIN EN 10228-1	Non-destructive testing of steel forgings - Part 1: Magnetic particle inspection
DIN EN 10228-2	Non-destructive testing of steel forgings - Part 2: Penetrant testing
DIN EN 10228-3	Non-destructive testing of steel forgings - Part 3: Ultrasonic testing of ferritic or martensitic steel forgings
DIN EN ISO 9712	Non-destructive testing - Qualification and certification of NDT personnel
VDA 2	Quality management in der automotive industry, quality assurance for supplies; production process and product approval (PPA)

### **3 Technical requirements**

#### **3.1 Material**

For the manufacturing process, the chemical composition and the material characteristic values of the forged permanent way parts, the specifications defined in the standards applicable to the respective material apply. The materials used are defined in the drawings and/or the ordering documents. The use continuous casting of pipes is not permissible. When using continuous casting, a minimum degree of deformation of 6 is required and must be verified.

Where the drawing specifications of the materials are not current, the recoding is governed by the standard. The new material labels must be added by 2018 at the latest in case of modification of the drawing or revision of the forging dies.

#### **3.2 Label**

Each forged part must be provided with the following labels at the locations specified in the drawings.

- Component designation as per drawing
- Company sign of forge (as per MPQ document)
- The last two digits of the year of manufacture
- Batch number or letter that ensures traceability

The forged label must be permanently legible.

On tie plates, the labeling must only be executed on the upper side of the ribs or on the upper side of the plate, but not recessed or recessed and raised on the functional surfaces. In special cases, agreement is required with the Engineering department.

#### **3.3 Quality**

The forged parts must meet the technical specification. The corresponding standards of the manufacturing process apply. All parts must be deburred.

#### **3.4 Mechanical processing of tie plates for rail fixing**

The plate underside and the rail pad surfaces of the plates must be machined to Rz 60.

#### **3.5 Weldings**

Weldings are impermissible.

#### **3.6 Heat treatment**

The forged parts must be cooled in a controlled manner after the forging production process. If the required material properties are not ensured, the forged parts must be subsequently subjected to heat treatment.

#### **3.7 Corrosion protection**

Corrosion protection for permanent way parts must be arranged on a case-by-case basis.

#### **3.8 Protection against mechanical damage during transport**

All parts must be packaged such that they are protected against damage during transport and that ensure they cannot slip on or in the transport container. Preferably, containers/pallets with Euro pallet dimensions are used.

## **4 Product approval procedure**

### **4.1 General requirements**

All forged permanent way parts are classified in test level II as per the "Permanent way product list" of the Deutsche Bahn AG. Before making the first delivery to DB Netz AG, the manufacturer must verify its ability to produce the forged parts to be delivered in the manner stipulated in the contract under the conditions of serial production in the form of a manufacturer-related product qualification (MPQ) (as per Corporate Guideline 120.0381 V15 "Products requiring quality inspection - permanent way material"). The MPQ is executed by the Procurement Quality Assurance department together with Engineering department of the DB Netz headquarters. The costs for the MPQ are borne by the manufacturer.

### **4.2 Type of approval**

The approval of forged parts for the permanent way must be performed:

- For the first time as part of the manufacturer-related product qualification (MPQ).
- For the first time when other material types are used, or
- For the first time when other production processes are applied

The contents and scope of the approval tests are defined in section 5.

For the delivery of new parts to DB Netz AG, the required approval testing scope must be agreed upon with the Procurement Quality Assurance department of Deutsche Bahn AG and the Engineering department of the DB Netz headquarters.

Destructive testing for product approval must be performed:

- a) By the manufacturer,
  - if the manufacturer has its own testing laboratory and the tests are performed in the presence of the responsible testing engineer of Quality Assurance of Deutsche Bahn AG,
- b) In an external testing laboratory,
  - that is accredited as per DIN EN ISO/IEC 17025 or that has been recognized by the Quality Assurance department of Deutsche Bahn AG.

### **4.3 Approval of products for delivery to Deutsche Bahn AG**

In the context of the manufacturer-related product qualification (MPQ), the following verifications and process instructions must be provided by the manufacturer:

- Compliance of the production technology with the applicable technical requirements for forged parts as per section 3 of this DBS and the geometric definitions as per the standard drawing
- Internal factory instructions for performing the quality testing

For the approval of the product, compliant results of the tests must be verified as per section 5.

The geometric, destructive and non-destructive tests as per section 5 for product approval must be performed using approved testing equipment.



The product and process quality must be documented with reference to parts in a first article inspection report by the manufacturer. The process of the first article inspection must be oriented on standard VDA 2. The first article inspection must be performed internally and presented to DB AG as needed.

Compliant results are the prerequisite for granting of the MPQ by Quality Assurance of Deutsche Bahn AG and, if applicable, for granting of a user approval at DB Netz headquarters, Engineering.

#### **4.4 Qualification of the manufacturer**

The manufacturer of forged permanent way parts must have been qualified by the Quality Assurance department of Deutsche Bahn AG.

##### **4.4.1 Requirements for the production technology**

The manufacturer must, on account of its technical equipment and personnel, be capable of manufacturing forged parts in accordance with the requirements of this DBS with consistent quality.

##### **4.4.2 Requirements for the test engineering**

To perform the testing, the manufacturer must have available the necessary technical equipment and personnel, and the testing personnel of the manufacturer must have the necessary qualifications.

### **5 Testing for product approval**

The manufacturer must verify the quality of the products based on the following tests for quality assurance of the component geometry and the material properties. If the sampling and the testing scope are not defined in a binding manner in a standard, this DBS shall govern all component-specific required testing (see section 6). Retesting must be performed according to the stipulations of the relevant standard.

#### **5.1 Requirements for the input raw material for melt or piece analysis**

The manufacturer must meet the requirements for the input raw material as per the drawing. The verification of the chemical composition must be confirmed in a 3.1 certificate as per EN 10204 by the raw material supplier.

#### **5.2 Tests and measurements of the component geometry**

The requirements for testing the finished parts, e.g. tolerances, surface characteristics and other aspects, must be taken from the respective standard drawings or the standards listed in section 2.

#### **5.3 Surface crack inspection of forged parts**

Forged parts must be subjected to a surface crack inspection (see section 2) that ensures that a representative cross section of the production volume is examined. At least 10% of the production batch must be inspected unless a larger volume has been defined. The surface crack inspection must be performed during production or as a final inspection. Cracking indications on processed surfaces are not permissible.

Cracking indications on the raw part are permissible.

- Within 2/3 of the machining allowance
- For the raw part surface, max. 0.3 mm

These regulations apply unless limiting specifications are contained in the standard drawings.

#### 5.4 Testing of the tensile strength/mechanical properties

The mechanical properties (tensile strength, notch impact energy) of the forged parts must be verified if this is required in the standard drawings or the material specifications. At least once per input raw material.

#### 5.5 Hardness testing

The Brinell hardness must be determined as per EN ISO 6506-1. The results must fulfill the values of the standard drawings or the material specifications. At least 1% of the manufactured parts must be tested. The test must be performed during production or as a final inspection.

### 6 Production tests

The manufacturer must provide verification of the compliant properties of the manufactured forged parts on the basis of the following tests with the testing frequency stipulated in this DBS and following specification by the manufacturer. The results of all tests must meet the requirements and be documented in an acceptance certificate 3.1 as per EN 10204.

In case of direct deliveries to DB Netz AG, a 3.1 certificate can be omitted if all verifications regarding the required tests exist with the manufacturer and can be requested. In this case, the delivery must be accompanied by the U-EBA reference. This reference can be found on the delivery note, on the part or on the packaging.

The results of table 1 are required for the forged parts:

Name of test	Frequency of test
Geometry of forged parts	All functional dimensions with a frequency that ensures a reliable process and dimensional stability
Chemical analysis	Per melt
Material properties	Per melt (tensile strength R <sub>m</sub> , yield strength R <sub>p0.2</sub> , elongation at break A, notch impact energy)
Brinell hardness test	Min. 1% of production volume is subjected to Brinell hardness test
Surface crack inspection	Min. 100% of production volume (larger scope as defined)

**Table 1: Production tests**

### 7 Verification for quality assurance

Adherence to the technical requirements and tests stipulated in this DBS must be verified to the Quality Assurance department of Deutsche Bahn AG through submission of the continuous recordings and records as per the quality and testing plans, testing follow-up plans.

This documentation must be retained by the manufacturer for at least 10 years, unless otherwise specified.

