DB NETZE

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Reference: I.NPF 121(G)

April 29, 2020

Letter accompanying April 2020 draft of DBS 918 127, applicable from January 1, 2021

Ladies and gentlemen,

Draft DBS 918 127 dated April 2020 will replace the June 2010 version of DBS 918 127 and will apply from January 1, 2021.

The most important changes are as follows:

- Editorial and structural revision
- More extensive test instructions for rail fastenings with corrosion protection
- Assessment of surface quality
- Cathodic dip coating no longer permitted
- Products' vertical vibration displacement, minimum clamping force and distance between tilting protection and rail base added to DB engineering drawings

DBS 918 127 sets out the rules on qualification and quality assurance for rail clamps, tension clips and rail clips. This complements the performance requirements for rail fastening systems set out in DIN EN 13481.

Note:
With the introduction of draft DBS 918 127 (April 2020 draft, valid from January 2021), cathodic dip coating (CDC) will no longer be permitted for the production of permanent way parts. However, remaining stocks may be used up. In the event of contract award (for deliveries from January 1, 2021 onward), one-off corrosion protection tests must be conducted for coated rail fastenings in accordance with Section 3.9 of draft DBS 918 127 (April 2020). This will not involve fulfilling additional qualification criteria.

Tests should additionally be carried out in the event of significant changes to the manufacturing process.

DB NETZE

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Test reports should be sent by October 12, 2020 in PDF format to Deutsche Bahn AG Quality Assurance and to the individuals at DB Netz AG, I.NPF 121(G) with product line responsibility, who will then prepare a separate approval certificate for the respective coatings, provided that the product passes the tests applicable to coatings under the new DBS 918 127 (April 2020 draft).

The engineering drawings will be amended with regard to the specifications for coatings as of January 1, 2021 and the changes will apply from the same date.

Sincerely, DB Netz AG

p.p. Andreas Beck
Team leader I.NPF 121 (G)

p.p. Theresa Zimmermann
I.NPF 121 (G)

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DB Standard | Draft April 2020

Technical specification

Rail fastenings made of spring steel

Rail clamps, tension clips, rail clips

DBS 918 127

Supersedes June 2010 issue

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DB Netz AG, I.NPF 121(G), Theresa Zimmermann, theresa.t.zimmermann@deutschebahn.com, Tel.: +49 (0) 89

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Foreword

This DB standard was produced by DB Netz AG, Technik- und Anlagenmanagement Fahrbahn, I.NPF 121(G) Oberbautechnik (Management of Track Technology and Infrastructure, I.NPF 121(G) Permanent Way Technology) and DB AG Quality Assurance, based on DBS 918 127, June 2010 issue. It represents the interests of Deutsche Bahn AG. The following changes have been made:

- Editorial and structural revision
- More extensive test instructions for rail fastenings with corrosion protection
- Cathodic dip coating no longer permitted
- Assessment of surface quality
- Products' vertical vibration displacement, minimum clamping force and distance between tilting protection and rail base added to DB engineering drawings

Introduction

This DB standard complements the rules on qualification and quality assurance for rail fastening systems contained in DIN EN 13481 and 13146 in relation to fastenings made of spring steel.

1 Scope

This DB standard applies to the supply of spring steel rail fastenings for the usage conditions encountered at Deutsche Bahn AG. It is to be applied in connection with the qualification of new spring steel fastenings for the DB AG network (qualification testing) and in the context of quality assurance. In the following text, spring steel fastenings (rail clamps, tension clips, rail clips) are referred to as "products". Where necessary, please refer to the corresponding engineering drawings for product-specific requirements that go beyond the scope of this standard.

2 Normative references

This DB standard contains stipulations from other publications in the form of dated or undated references. These normative references are quoted at the relevant places in the text, and the publications are listed thereafter. In the case of dated references, subsequent amendments or revisions to these publications only belong to this 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 10132-1	Cold-rolled narrow steel strip for heat treatment – Technical delivery conditions – Part 1: General
DIN EN 10132-4	Cold-rolled narrow steel strip for heat treatment – Technical delivery conditions – Part 4: Spring steels and other applications
DIN EN 10089	Hot-rolled steel for quenched and tempered springs – Technical delivery conditions
DIN EN 10204	Metallic products – Types of inspection documents

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DIN EN 10221	Surface quality classes for hot rolled steel bars and rods – Technical delivery conditions
DIN EN ISO 9712	Non-destructive testing — Qualification and certification of NDT personnel
DIN EN ISO 6507-1	Metallic materials — Vickers hardness test — Part 1: Test method
DIN 50602, September 1985 version	Metallographic test methods – Microscopic examination of special steels using standard diagrams to assess the content of non-metallic inclusions
DIN EN ISO 9227	Corrosion tests in artificial atmospheres – Salt spray tests
DIN EN 13481	Railway applications – Track Performance requirements for rail fastening systems
DIN EN 13146	Railway applications – Track Test methods for fastening systems
DIN EN ISO 3887	Determination of the depth of decarburization
DIN EN ISO 7500-1	Metallic materials — Calibration and verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Calibration and verification of the force-measuring system
DIN EN ISO 9513	Metallic materials — Calibration of extensometer systems used in uniaxial testing
DBS 918 235	"Technische Lieferbedingungen – Elastische Zwischenlagen und Zwischenplatten" (Technical specification – Elastic rail pads and sandwich plates for rail fastening systems)
DIN EN ISO 12944	Paints and varnishes — Corrosion protection of steel structures by protective paint systems
DIN EN ISO 4628	Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance
DIN EN ISO 4892-2	Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps
VDA 233-102	Cyclic corrosion testing of materials and components in automotive construction
DIN EN ISO 20567-1	Paints and varnishes — Determination of stone-chip resistance of coatings — Part 1: Multi-impact testing
DIN 50969-1	Prevention of hydrogen-induced brittle fracture of high-strength steel

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	building elements — Part 1: Preventive methods
DIN 50969-2	Prevention of hydrogen-induced brittle fracture of high-strength steel building elements — Part 2: Test methods
DIN EN ISO 6270-2	Paints and varnishes — Determination of resistance to humidity — Part 2: Procedure for exposing test specimens in condensation-water atmospheres

3 Technical requirements

3.1 General

The DIN EN 13481 series of standards specifies the requirements for complete rail fastening systems. The areas of application of the products are defined in guideline 820.2010 "Ausrüstungsstandard Schotteroberbau für Gleise und Weichen" (Ballast track equipment standard for tracks and switches) and in guideline 820.2020 "Ausrüstungsstandard Feste Fahrbahn" (Slab track equipment standard).

Points 3.3 to 3.8 below apply only to uncoated products.

3.2 Material

A spring steel in accordance with DIN EN 10089 or DIN EN 10132-4 is to be used as the material as per the DB engineering drawing. An inspection certificate "3.1." in accordance with DIN EN 10204 shall serve as verification that the material used meets the properties specified in the contract. The purity of the material should be at least K3 ≤ 30 according to DIN 50602. DIN EN 10247 "Micrographic examination of the non-metallic inclusion content of steels using standard pictures" will not be applied. Macroscopic inclusions (e.g. exogenous slag) are not permissible. The quality of the material shall be verified on a melt-by-melt basis.

3.3 Surface quality

The maximum depth of isolated surface defects (e.g. scoring, scaling, scarring, overrolling, peeling or burrs) on the finished product must not exceed **0.2 mm**. Bending marks are permissible as long as they do not impair the functioning of the product.

The products must be inspected for cracks by qualified/regularly trained staff using an appropriate method – excluding visual inspection – (see DIN EN 10221). Cracks with a depth of ≤ 0.2 mm are permissible. For the chosen crack inspection method, the manufacturer must prepare a corresponding test instruction by a certified person belonging to the company (qualification at least level 2 according to DIN EN ISO 9712).

3.4 Decarburization

The permissible decarburization on the finished product is ≤ 0.2 mm, evidenced by microscopic examination in accordance with DIN EN ISO 3887.

3.5 Vickers hardness

The hardness test on the finished product must be carried out according to Vickers in line with DIN

EN ISO 6507-1. In the event of any disputes, the test according to HV 30 shall apply, whereby the surface at the test surface must be ground down by approximately 1 mm. Please see the engineering drawings for the required values for each material type.
Alternative test methods (e.g. Rockwell, Brinell) require the approval of the DB AG Quality Assurance department.

3.6 Shape and dimensions

The corresponding DB AG engineering drawings apply to the installation situation, shape and dimensions of the products.

3.7 Spring characteristic, clamping force

The spring characteristic of brand-new products as well as their permanent deformation and theoretical clamping force shall be determined and documented in accordance with Section 5.2. The product must adhere to the theoretical minimum clamping force according to the DB engineering drawing.

3.8. Fatigue resistance

Determining the fatigue resistance helps to assess a product's fitness for purpose throughout its useful life. The products' fatigue resistance shall be determined as described in Sections 5.3, 5.4 and 5.5. The required vibration displacement for each product can be found in the relevant DB engineering drawing. The products must achieve the required number of cycles to failure without damage. The difference to the theoretical clamping force prior to the fatigue test must not exceed 20%.

3.9. Corrosion protection

Unless otherwise agreed, products should not be supplied with corrosion protection. Any corrosion protection to be applied shall be specified in the order documents. Permitted corrosion protection coatings can be found in the DB engineering drawings.
Spring steel products may only be provided with corrosion protection if it is ensured that the requirements for rail fastenings under DBS 918 127 are not impaired when producing the coating and that this is verified as per Table 1.
The manufacturer must set limit values for coating thickness. The coating thickness of the samples must be documented.

3.9.1 Process-related hydrogen embrittlement

Verification of the prevention of process-related hydrogen embrittlement shall be provided based on DIN 50969-1 and -2. Alternatively, verification can also take the form of the manufacturer/supplier demonstrating that no hydrogen is produced by the chosen coating method or at any point in the coating process (including cleaning).

3.9.2 Hydrogen embrittlement due to operating conditions

Verification of the prevention of hydrogen embrittlement due to operating conditions must be maintained in accordance with Annex 1.

3.9.3 UV radiation

The corrosion protection effect must not be impaired by UV radiation. Durability must be verified once by the test in accordance with DIN EN ISO 4892-2 procedure A, table 3, cycle no. 1 (minimum duration 1000 h) and a subsequent salt spray test in accordance with DIN EN ISO 9227 (NSS)

over a period of at least 720 h without base metal corrosion. Afterwards, no corrosion (red rust) should be visible on the base material (based on DIN EN ISO 4628, rust grade Ri 0).

3.9.4 Salt spray test

The effectiveness of the corrosion protection method must be demonstrated to DB Netz AG, Technik- und Anlagenmanagement Fahrbahn (Management of Track Technology and Infrastructure) through one-time verification in the form of a neutral salt spray test (NSS test) in line with DIN EN ISO 9227 over a period of at least 720 h (based on corrosion protection category C5 medium in accordance with DIN EN ISO 12944-6). Afterwards, no corrosion (red rust) should be visible on the base material (based on DIN EN ISO 4628, rust grade Ri 0). In order to take damage to the coating into account (e.g. due to track ballasting), the coated products must be blasted with a chilled-iron abrasive in accordance with DIN EN ISO 20567-1 before the salt spray test.

3.9.5 Salt spray test under changing climatic conditions

A salt spray test under changing climatic conditions in accordance with VDA 233-102 must be conducted over at least four test cycles. In order to take damage to the coating into account (e.g. due to track ballasting), the coated products must be blasted with a chilled-iron abrasive in accordance with DIN EN ISO 20567-1 before the salt spray test.

3.9.6 Clamping force and fatigue resistance

On at least two products with corrosion protection, the clamping force shall be verified according to Section 5.2 and the vertical fatigue strength according to Section 5.3.

Table 1: Scope of one-time tests to verify corrosion protection

No.	Testing	Number of test pieces
1	Verification of coating thickness for coated products	10 products
2	Salt spray test in accordance with DIN EN ISO 9227 (NSS) over at least 720 h on products that have been blasted with a chilled-iron abrasive in accordance with DIN EN ISO 20567-1	10 products
3	Resistance to UV radiation in accordance with DIN EN ISO 4892-2 procedure A, table 3, cycle no. 1 (minimum duration 1000 h) and a subsequent salt spray test in accordance with DIN EN ISO 9227 (NSS) over a period of at least 720 h	10 products
4	Salt spray test under changing climatic conditions in accordance with VDA 233-102 on products that have been blasted with a chilled-iron abrasive in accordance with DIN EN ISO 20567-1	10 products
5	Verification of the prevention of process-related hydrogen embrittlement based on DIN 50969-1 and -2.	10 products
6	Verification of the prevention of hydrogen embrittlement due to operating conditions in accordance with Annex 1 and subsequent determination of clamping force in accordance with Section 5.2	10 products
7	Clamping force in accordance with Section 5.2 and vertical fatigue resistance in accordance with Section 5.3	2 products

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3.10. Identification mark

An identification mark should be imprinted on the products. This should consist of:
- Product code (e.g. 12, 14, 21)
- Manufacturer's identification mark
- Last two digits of the year of manufacture
- Batch identification (optional)

Example of marking:
14 H 18 XY (Skl 14 – Manufacturer – Year manufactured 2018 – Batch identification)

4 Qualification and quality assurance

4.1 Qualification of the manufacturer

Prior to the first delivery to DB AG, the manufacturer's ability to manufacture a product as specified in the contract shall be verified. This applies to every product and shall take the form of a "manufacturer-related product qualification" (MPQ). One component of the MPQ is the qualification testing according to Section 4.2.1 in the context of the initial delivery and, in case of a renewal of the MPQ, the results of the continuous quality assurance according to Table 3. The MPQ is conducted by the DB AG Quality Assurance department. The manufacturer/supplier shall bear the cost of the MPQ (see list of permanent-way products subject to quality inspection).

4.2 Qualification of the product

4.2.1.1 Qualification tests

Prior to the first delivery to DB AG, every product must undergo a qualification test. The qualification test may only be carried out by test centers recognized by DB AG. The vendor shall bear the cost of the qualification test.
All requirements described in Section 4 must be verified in this qualification test. See Table 2 for the required number of test pieces. The test results for each single tested product must meet the requirements.

Table 2: Scope of testing

No.	Test	Number of test pieces
1	Surface quality (see Section 3.3)	40 products
2	Shape and dimensions (see Section 3.6)	30 products from the test pieces in no. 1
3	Chemical analysis and purity of the material (see Section 3.2)	3 products from the test pieces in no. 1
4	Decarburization (finished product) (see Section 3.4)	2 products from the test pieces in no. 1
5	Spring characteristic, clamping force (mean value) (see Section 5.2)	10 products from the test pieces in no. 2

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6	Vertical fatigue resistance (see Section 5.3)	10 products from the test pieces in no. 5
7a	Horizontal fatigue resistance (lateral) (see Section 5.4)	4 products from the test pieces in no. 2
7b	Horizontal fatigue resistance (longitudinal) (see Section 5.5)	4 products from the test pieces in no. 2
8	Vickers hardness (see Section 3.5)	10 products from the test pieces in no. 1 or 5

DB AG may set additional requirements and tests. DB AG also reserves the right to waive tests if, for example, the product properties do not require certain tests or if properties are already well known.

4.2.1.2 Qualification tests in the context of MPQ renewal

According to GL 120.0381V15, an MPQ must be performed at least every six years. The scope of testing can be found in Table 2.
DB AG Quality Assurance reserves the waive tests or to coordinate the performance of tests with manufacturers. The performance of tests in the factory's own laboratories requires the approval of DB AG Quality Assurance. The chosen scope of testing shall be documented (justified) in the MPQ report.

4.2.2 Field testing

Before the first series delivery to DB AG, an approval from the Federal Railway Authority (EBA) must be submitted for each new product and field testing on a line specified by DB AG must be carried out

- for a period of at least one year, and
- a track load of ≥ 20 million load tonnes (tonnes = metric tons)

The competent unit at DB AG may waive field testing for minor product changes (e.g. coating, surface painting, etc.) that do not adversely affect the product's aging resistance

4.3 Quality assurance by the manufacturer

The manufacturer shall ensure the quality of the products by means of an appropriate statistical process control. The tests and scope of testing shown in Table 3 are minimum requirements. Notwithstanding the above, every product shall comply with the technical requirements according to Section 4. The unit responsible for technical aspects at DB AG may set additional tests.

Table 3: Minimum requirements for tests and scope of testing relating to quality assurance

Test	Minimum scope of testing
Decarburization (see Section 3.4)	1 product per batch
Surface quality (see Section 3.3)	1 product per 1,500 units

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Shape and dimensions (Functional dimensions) (see Section 3.6)	1 product per 1,500 units
Vickers hardness (see Section 3.5)	1 product per 1,500 units
Theoretical clamping force (see Section 5.2.2)	1 product per 1,500 units
Vertical fatigue resistance (see Section 5.3)	2 products per batch
Coating thickness for coated products	6 products per 5,000 units

The minimum requirements for tests and scope of testing may be changed in coordination with the DB AG Quality Assurance department. Compliance with the requirements set out in this DB standard shall be assured by means of test schedules and test plans and presented to DB AG on request.

5 Testing methods

5.1 General

For the tests described below, the measurement accuracy of the displacement transducers must correspond to at least Class 1.0 on the basis of the calibration process according to DIN EN ISO 9513, and the measurement accuracy of the force measuring equipment to at least Class 1.0 on the basis of the calibration process according to DIN EN ISO 7500-1.

5.2 Determining the spring characteristic, theoretical clamping force

5.2.1 Determining the spring characteristic

Ten load cycles consisting of a load from the lower load cycle Fu = 0.5 kN (initial load) to the upper load cycle Fo = 25 kN and subsequent load relaxation shall be performed for each individual product. The test equipment must be designed and set up in such a way as to reproduce the actual loads that will be experienced when the product is installed on the track.

In justified exceptional cases and in consultation with DB AG, the spring characteristic may be determined with a lower load cycle Fu = 0.5 kN (initial load) up to an upper load cycle individually determined for each product in relation to the respective design.

During qualification testing, the first and tenth load cycle shall be documented as well as the load cycle following the vertical fatigue resistance test according to 5.3.

The number of load cycles in the manufacturer's quality assurance may be reduced (e.g. from ten to five) in consultation with DB AG's Quality Assurance department

5.2.2 Determining theoretical clamping force

The theoretical clamping force is determined with the aid of the force-deflection graph recorded during the last load cycle under 5.2.1 (example see Fig. 1) and is based on the standard installation situation (e.g. design distance between tilting protection and rail base). The nominal dimensions of the rail fastening components in the regular installation situation are to be taken as a basis. The compression of any elastic components is to be taken into consideration when determining the This is a courtesy translation into English. In case of disputes, the original German version shall prevail.

distance between the product's tilting protection and the rail base in accordance with the DB engineering drawing.

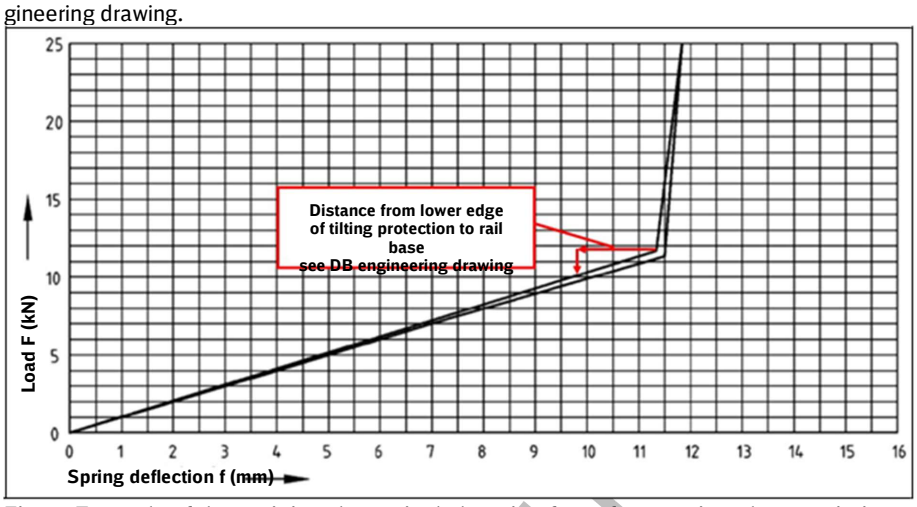

Fig. 1: Example of determining theoretical clamping force from spring characteristic

For the purposes of quality assurance in accordance with Table 2, the theoretical clamping force on individual manufactured products should be determined and documented during production.

5.3 Vertical fatigue resistance

Test pieces tested according to 5.2.2 shall be used to determine the vertical fatigue resistance. These are to be fastened in accordance with the respective engineering drawings in such a way as to reflect how they will be installed on the track. The areas of the fastening resting on the rail base are to be raised by the design-specific nominal amount for the rail fastening system concerned.

The required vibration displacement for each product can be taken from the respective DB engineering drawing and is based on the stiffness class according to DBS 918 235, which has a direct impact on the fastening.

Orientation values for vertical vibration displacement:

f = 1.4 mm for Cstat. > 200 kN/mm
f = 1.7 mm for Cstat. ≤ 200 and >60 kN/mm
f = 2.0 mm for Cstat. ≤ 60 and >40 kN/mm
f = 2.5 mm for Cstat. ≤ 40 and >22.5 kN/mm
f = 3.0 mm for Cstat. ≤ 22.5 kN/mm

Taking the respective installation situation as a basis, 10% of the required vibration displacement is to be implemented as fastening loading (taking lifting forces on the track into account) and 90% of the required vibration displacement as load relaxation on the fastening.

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When testing rail clips, the required vibration displacement results from a load relaxation on the fastening of 1.0 mm and loading on the fastening up to a stopping point specified in the design (e.g. mechanical limitation by means of an overload protection).

The required number of cycles to failure is:

$n = 5 \cdot 10^6$ for the qualification test (frequency: max. 18 Hz)

$n = 3 \cdot 10^6$ for quality assurance

Following the fatigue resistance test, the theoretical clamping force of the tested product is to be determined again in accordance with 5.2.2. The clamping force is then determined after the first load cycle after the fatigue test during which the force/deflection graph is to be recorded.

5.4 Horizontal fatigue resistance across the longitudinal direction of the rail

The horizontal fatigue resistance is to be determined on unloaded products in the direction of movement across the longitudinal direction of the rail. The products are to be fastened in accordance with the DB engineering drawing in such a way as to reflect how they will be installed on the track.
The required vibration displacement is f = ±0.4 mm and is to be initiated above the rail base with normal roughness.
The test shall be conducted at a frequency of 7–9 Hz. The required number of cycles to failure is $n = 3 \cdot 10^6$.
In the case of products whose design cannot absorb the required vibration displacement (e.g. rail clips), the vibration displacement is absorbed by the rail. At the end of the test, the wear on the product must be documented.

5.5 Horizontal fatigue resistance in the longitudinal direction of the rail

The longitudinal fatigue resistance is to be determined on unloaded products in the direction of movement in the longitudinal direction of the rail. The products are to be fastened in accordance with the DB engineering drawing in such a way as to reflect how they will be installed on the track.
The required vibration displacement is f = ±0.4 mm and is to be initiated above the rail base with normal roughness.
In the case of products whose design cannot absorb the required vibration displacement (e.g. rail clips), the vibration displacement is absorbed by the rail. At the end of the test, the wear on the product must be documented.
The test shall be conducted at a frequency of 7–9 Hz. The required number of cycles to failure is $3 \cdot 10^5$.

Annex 1:
Verification of the prevention of hydrogen embrittlement due to operating conditions

1. Test preparation

The products must be submitted to the corrosion test in a fastened condition. For this purpose, the products should be fastened using a suitable fastening device that simulates the load during use. The fastening device itself (including bolt and washer) must be constructed from a material that does not participate in the corrosion reaction. Coated steel is recommended. The coating should consist of a galvanic zinc-nickel layer, transparently passivated (with sufficient coating thickness of >6µm on the main surfaces) or a cathodic corrosion protection. If a section of a rail is used for the test, this section should not be coated. It is recommended that the fastening device should use the design shown in Fig. 2. Designs that deviate from the fastening device suggested in Fig. 2 should be discussed with the end customer and adjusted if necessary. Once the clamp force has been applied, the fastening device should be placed in the corrosion chamber in such a way as to reflect how the product will be installed on the track.

Kommentiert [A1]: Anmerkung des Übersetzers: Bitte überprüfen, dass wir richtig verstanden haben.

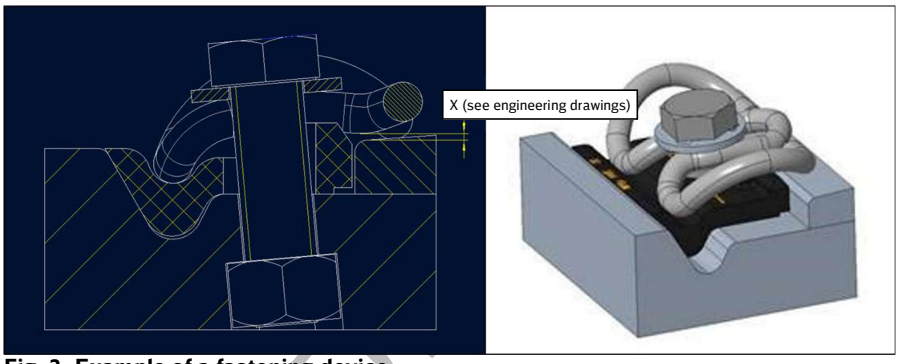

Fig. 2: Example of a fastening device

2. Test procedure

The corrosion test should take place under changing climatic conditions as follows:

- 4 h salt spray test, NSS test method based on DIN EN ISO 9227
- 4 h cooling phase at room temperature 18 - 28°C and 30 - 80% relative humidity
- 16 h warm, humid storage, test climate CH in accordance with DIN EN ISO 6270-2

Test duration is 25 cycles.
The test cycle for the salt spray test is based on DIN EN ISO 9227 but deviates from the normative specification for the test solution to be used.

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A brine mixture should be used as the test solution. This solution should be prepared from sodium chloride (purity level according to DAB 7) and calcium chloride (anhydrous, medium-fine grain size, pure) and deionized or distilled water (conductivity <2mS/m). The specified concentration of the solution is 40 ± 2 g/l NaCl and 10 ± 1 g/l CaCl2.
The pH of the solution should be adjusted to 3.5 ± 0.2 using hydrochloric acid. The measurement should be conducted by an electrometric method.

To achieve the maximum corrosion effect, it is important that dry, anhydrous air be introduced into the chamber during the 4 h cooling phase. It must be ensured that the compressed air used is free of oil and water. It is recommended that the compressed air be produced by oil-free compressors (e.g. dental compressors).

The minimum requirement for documentation is the recording of the time and temperature in the test chamber as well as images of the changes in the products. For this purpose, photos must be taken before and after the test.

At the end of the cycles and after the clamping force has been determined in accordance with Section 5.2, the samples should be evaluated by visual inspection (naked eye) for corrosion, cracks or breakages of the products. Cracks or breakages in the products are not acceptable. To improve the visibility of cracks, the product should be cleaned with water and a soft brush before inspection.