National Technical Approval

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Applicant:
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Generic type of construction product:
Temporary corrosion protection using ROSTSCHUTZ 310 for bonded bar tendons

The aforementioned construction product is herewith granted national technical approval.
This National Technical Approval comprises seven pages and one annex.
This National Technical Approval replaces the National Technical Approval No. Z-13.6-137 dated 9 May 2012.

GENERAL PROVISIONS

1 This National Technical Approval is proof of the usability and applicability of the aforementioned construction product in accordance with German federal state building regulations.

2 Provided the National Technical Approval specifies requirements regarding the specialized professional expertise and experience of the personnel responsible for the production of the construction products and application of construction methods in accordance with federal state regulations according to § 17 article 5 Model Building Regulation, it is noted that this expertise and experience may also be proven by equivalent verifications by other Member States of the European Union. This also applies, where required, to equivalent verifications submitted within the scope of the European Economic Area (EEA) Treaty or other bilateral agreements.

3 This National Technical Approval does not replace the statutory permissions, licences and certificates for the execution of construction products.

4 This National Technical Approval is granted without prejudice to third party rights, in particular private property rights.

5 Irrespective of further provisions laid down in the “Specific Provisions” section, the manufacturer and supplier of the aforementioned construction product shall provide users and appliers of the construction product with copies of the National Technical Approval and inform them that the National Technical Approval must be available at the construction site. On request, copies of the National Technical Approval shall be submitted to all authorities involved.

6 Reproduction of this National Technical Approval shall be in full. However, partial reproduction can be made with the written consent of the Deutsches Instituts für Bautechnik. Texts and drawings of advertising brochures shall not contradict the National Technical Approval. Translations of the National Technical Approval shall include the note “Translation from the German original text not certified by the Deutsches Institut für Bautechnik”.

7 This National Technical Approval is not granted irrevocably. The provisions of the National Technical Approval may be subsequently amended or modified, particularly if made necessary as a result of new technical developments.

II SPECIFIC PROVISIONS

1. Definition of product and intended use

1.1 Definition of the construction product

This National Technical Approval applies to temporary corrosion protection using ROSTSCHUTZ 310 for post-tensioning bars and prefabricated tendons using post-tensioning bars.

1.2 Intended use

If the time periods specified in DIN 1045-3, section 2.7.14 (NA.2) cannot be met, ROSTSCHUTZ 310 may be used in accordance with DIN 1045-3, section 2.7.14 (NA.3) for the bar tendons of bonded post-tensioning bar systems with a valid national technical approval.

Thereby, it is assumed that moisture ingress or accumulation within the ducts is being prevented. In accordance with the principles of DIN EN 13670 in combination with DIN 1045-3, the ducts shall be sealed off to prevent the ingress of moisture.

2 Provisions for the construction product

2.1 Characteristics and composition

2.1.1 Corrosion inhibitors

Only ROSTSCHUTZ 310 according to Annex 1 and/or the specification deposited with the Deutsches Institut für Bautechnik may be used. It may only be applied as an emulsion with water.

2.2 Production, transport, storage, and marking

2.2.1 Production – Application of the corrosion inhibitor

For application, the post-tensioning bars must be clean and may at most show only light flash rust according to DIN 1045-3, section 2.7.3 (NA.2).

The workable emulsion shall be composed of one volume fraction of ROSTSCHUTZ 310 and four volume fractions of water. The mixing water shall comply with the requirements of DIN EN 1008, section 4.3. The oil-water mixture shall be emulsified using appropriate agitators. The emulsified mixture must be free of streaks Should streaks occur, the mixture may no longer be used.

The post-tensioning bars are factory-coated by a single immersion process or by spray-coating with the emulsion. Thereby, the emulsion must cover the post-tensioning bars without any gaps. Following coating, the post-tensioning bars must be completely dried.

In addition to the Specific Provisions, the “work rules for the application of ROSTSCHUTZ 310 for the temporary corrosion protection of bar tendons” shall be observed, the currently valid version of which has been deposited by the applicant with the Deutsches Institut für Bautechnik and the surveillance body monitoring the production of the post-tensioning bars.

2.2.2 Production, transport

Following coating, the post-tensioning bars and prefabricated tendons using post-tensioning bars shall be stored in dry conditions. Installed tendons shall be sealed against the ingress of water.

2.2.2 Marking

Labels shall be affixed onto the bundles of post-tensioning bars and prefabricated tendons using post-tensioning bars. Both the delivery notes and labels shall include the information that the post-tensioning bars have been coated with ROSTSCHUTZ 310 in compliance with this approval.

2.3 Attestation of conformity

2.3.1 General

To attest the conformity of the construction product (post-tensioning bars with corrosion protection) with the provisions of this National Technical Approval a certificate of conformity shall be issued for each manufacturing plant based on factory production control and external surveillance at regular intervals including initial type-testing of the construction product in accordance with the following provisions.

The manufacturer of the construction product shall involve an approved certification body to issue the certificate of conformity and an approved monitoring body to perform external surveillance including product inspection.

The certification body shall submit a copy of the issued certificate of conformity to the Deutsches Institut für Bautechnik.

2.3.2 Factory production control

Each manufacturing plant shall establish and implement a factory production control system. A manufacturing plant may be a PT-system manufacturing plant, a manufacturing plant of prefabricated tendons or an appropriately fitted on-site manufacturing plant.

Factory production control entails the permanent internal control of production exercised by the manufacturer in order to ensure that the construction products produced by him are in conformity with the provisions of this National Technical Approval.

Factory production control shall include at least the following measures:

- Compliance of ROSTSCHUTZ 310 with the specifications as defined in Annex 1 and as deposited with the Deutsches Institut für Bautechnik shall be verified by an inspection certificate “3.1” according to DIN EN 10204,
- Assessment of the condition of the post-tensioning bars (see section 2.2.1),
- Monitoring of the coating process.

The results of factory production control shall be recorded and evaluated. The records shall include at least the following information:

- Identification of the construction product or raw material and components
- Type of control or test
- Date of production and testing of the construction product or raw material or components
- Results of controls and tests and, where applicable, comparison with requirements
- Signature of the person responsible for factory production control.

The records shall be kept for at least five years and shall be submitted to the monitoring body responsible for external surveillance. On request, these records shall be submitted to the Deutsches Institut für Bautechnik and the relevant supreme building control authority.

In case of unsatisfactory test results, the manufacturer shall take immediate measures to eliminate the deficiency. Construction products that do not comply with the requirement shall be handled in such a way that they cannot be mistaken for products complying with the requirements. After elimination of the deficiency the respective test shall be immediately repeated as far as is technically possible and necessary to verify that the deficiency has been eliminated.

2.3.3 External surveillance

Factory production control of each manufacturing plant shall be verified by external surveillance at regular intervals, at least however every 6 months. Within the scope of external surveillance, initial type testing shall be performed, and in addition, samples may be taken for random sample testing. Sample taking and testing shall be carried out by the accredited monitoring body.

External surveillance of the factory-applied temporary corrosion protection shall be carried out by the surveillance body monitoring the production of the post-tensioning bars.

External surveillance of the temporary corrosion protection applied at the manufacturing plant of prefabricated tendons or at the on-site manufacturing plant shall be carried out by the surveillance body monitoring the production of the accessories and of the post-tensioning systems' prefabricated tendons according to section 1.2.

The surveillance body shall be informed in sufficient time of the date of application of the ROSTSCHUTZ 310 coating onto the post-tensioning bars.

The results of certification and external surveillance shall be kept for at least five years. On request, they shall be submitted by the certification body or monitoring body to the Deutsches Institut für Bautechnik and the relevant supreme building control authority.

3 Provisions for design and detailing

3.1 General

Application of the ROSTSCHUTZ 310 temporary corrosion inhibitor shall be stated in the static calculations and execution plans.Geben Sie hier eine Formel ein.

3.2 Bond between tendon and concrete

The ratios ξ according to DIN EN 1992-1-1 and DIN EN 1992-1-1/NA, section 6.8.2, Table 6.2, to calculate ξ according to DIN EN 1992-1-1 and DIN EN 1992-1-1/NA, section 7.3.2, equation (7.5) shall be reduced by the factors listed in the table below.

Type of post-tensioning bar	Steel coated with ROSTSCHUTZ 310	Steel coated with ROSTSCHUTZ 310 and rinsed with water
Smooth post-tensioning bars	0.35	0.65
Threaded post-tensioning bars	1.0	1.0

3.3 Friction coefficient

Smooth post-tensioning bars coated with ROSTCHUTZ 310 may have an approx. 20% lower friction coefficient than specified in the national technical approval of the post-tensioning system.

3.4 Time periods prior to grouting

The time periods according to DIN 1045-3:2012-03, section 2.7.14 (NA 2) may be extended to the following periods:
Between tendon installation and grouting up to 24 weeks, up to four weeks of which in prestressed condition.

4 Provisions for installation

4.1 Qualified companies

Application of the temporary corrosion protection may only be carried out at the PT-system manufacturing plant, at the manufacturing plant of the prefabricated tendons or at the on-site manufacturing plant.

4.2 Removal of the corrosion inhibitor

The corrosion inhibitor ROSTSCHUTZ 310 may remain on the post-tensioning bars. The higher bond values (see section 3.2) of smooth post-tensioning bars may only be exploited if the corrosion inhibitor ROSTSCHUTZ 310 has been rinsed off prior to grouting. Only tendons expressly approved for rinsing may be treated in this way. The rinsing water used must meet the requirements of DIN EN 1008, section 4.3. In order to attain a sufficient cleaning effect, the rinsing water shall either be heated up to 50 to 60º C or mixed with 0.5% Renex 30.

Rinsing shall be continued until the exiting rinsing water is largely oil-free. Following rinsing, the tendon ducts shall be blown out with compressed air for ten minutes, unless the approval of the post-tensioning system allows for grouting against water.

4.3 Measures to check and safeguard the corrosion protection

Three days after concrete pouring, 10% of the tendons, at least however three tendons, shall be checked for water ingress by blowing out with compressed air (measurement of the humidity at the compressed air's entrance and exit points). If water is detected, all tendons shall be examined. The water must be removed.

The effectiveness of the corrosion protection shall be checked at the latest four weeks after pouring of the concrete and subsequently every four weeks on two post-tensioning bars. For this, 1% of the post-tensioning bars, at least however two post-tensioning bars, shall be accessible for checking or an identical number of additional post-tensioning bars (so-called idle bars) shall be arranged under identical conditions within the structure for checking.

Such examinations hall be carried out by the specialist post-tensioning engineer in agreement with the building supervision and be recorded. If the examinations reveal corrosion, a qualified corrosion expert shall be consulted to assess the damage of the post-tensioning bar.

In this National Technical Approval reference is made to the following standards and documents:

DIN EN 1992-1-1:2011-01	Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings; German version EN 1992-1-1:2004+AC:2010
EN 1992-1-1/NA:2013-04	National Annex – Nationally determined parameters - Eurocode 2: Design of concrete structures – Part 1-1: General rules and rules for buildings

DIN EN 13670:2011-03	Execution of concrete structures; German version EN 13670:2009
DIN EN 1045-3:2012-03	Concrete, reinforced and prestressed concrete structures – Part 3: Execution of structures – Application rules for DIN EN 13670
DIN EN 1008:2002-10	Mixing water for concrete – Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete; German version EN 1008:2002
DIN EN 10204:2005-01	Metallic products – Types of inspection documents; German version EN 10204:2004

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Head of division

Parameter		Measuring method	Unit	Value
Density at 15 º C Viscosity at 40 º C		DIN EN ISO 12185:1997-11 DIN 51562-1:1999-01 DIN 51575:2016-06 DIN 51829:2013-03	Kg/m³ mm²/sec mass % mass %	850 – 950 39 – 60 1 – 2 0.5 – 0.7
Content of:	S-ions (copper strip test)	DIN EN ISO 2160:1999-04	No or slight discoloration, however not dark or grey	
	SCN-ions and CL ions	DIN 51576:2003-01	mass %	< 0.01
pH value (20% emulsion)		DIN 51369:2013-05		6.0 – 7.5

Temporary corrosion protection using ROSTSCHUTZ 310 for bonded bar tendons	Annex 1
Specification ROSTSCHUTZ 310	