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**DEUTSCHLAND**

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**Subject: Investigation of resistance to corrosion of dowels and tie bars of production in 1<sup>st</sup> half-year 2025 in neutral salt-spray test according to EN ISO 9227:2017**

By mandate of company *OTTO BRENTZEL – Stahlverarbeitung e.K.*, Germany, corrosion durability of dowels and tie bars was investigated by NSS-test (neutral salt-spray test) according to EN ISO 9227:2017.

Ten samples of dowels and ten samples of anchors from current production of 1<sup>st</sup> half year 2025 were delivered by the client for testing.

According to available draft of EN 13877-3 (prEN 13877-3, dated 24<sup>th</sup> April 2019), each three new samples of dowels and tie bars we placed in neutral salt spray for duration of 240 hours. Test samples were chosen randomly from delivered batch.

Conditions in salt-spray cabinet were as follows:

- Sodium-Chloride concentration: 5%
- Temperature in cabinet: +35°C
- Temperature of salt spray: +50°C

Accredited testing laboratory by DAKKS according to EN ISO/IEC 17025:2018  
The accreditation is valid only for the scope listed in the annex of the accreditation certificate D-PL-14063-08-00

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## NSS-Test on dowels and tie bars of production in 1st half-year 2025

The dowels of plain steel are completely plastic coated except one face end, which is covered with anti-corrosive paint (due to manufacturing process). The dowels show a nominal length of  $l = 500$  mm and a nominal diameter of  $\varnothing = 25$  mm.

The tie bars of ribbed steel are plastic coated in centre area at a length of  $l_{\text{coating}} = 250$  mm. The tie bars show a total nominal length of  $l = 800$  mm and a diameter of  $\varnothing = 20$  mm.

Coating thickness was determined with a magnetic layer thickness meter (Salu tron 06) on regarded dowels and tie bars (in area of the ribs) by several measurements at each three positions. See table 1 for measurement results.

Table 1: Mean thickness of coating on dowels and tie bars.

Probe	Thickness of plastic coating [ $\mu\text{m}$ ]		
	Pos. "top end"	Pos. "centrically"	Pos. "bottom end"
Dowels #1	387	413	444
Dowels #4	382	409	438
Dowels #7	385	397	460
Tie bar #1	480	480	510
Tie bar #2	496	452	568
Tie bar #3	591	452	535

According to table 1, requirement of prEN 13877-3 of a coating thickness not less than 0.2 mm and not more than 0.8 mm is met.

Complete dowels (length: 500 mm) and complete anchors (length: 800 mm) were placed in neutral salt-spray cabinet for corrosion test. According to prEN 13877-3, demanded minimum length of samples is 150 mm. Corrosion resistance test regards coating on lateral surface in the middle of such specimen on a length 100 mm. (Each 25 mm at both ends of dowels respectively 25 mm at both ends of coated area of anchors shall not be regarded.)

Before starting investigation, no rust was observed on sample surfaces. After duration of 240 hours at defined neutral salt-spray conditions, the samples were removed from test cabinet and visually inspected.

After 240 hours of salt-spray, plastic coating of **dowels** show an effective protection against corrosion. No rust spots were observed on total regarded area of plastic coating on lateral surface. See pictures 1 and 2 for view of dowels before testing and pictures 3 and 4 for condition after corrosion test.

NSS-Test on dowels and tie bars of production in 1st half-year 2025



Picture 1: Plastic coated surface of investigated dowels before corrosion testing.



Picture 2: Opposite surface of investigated dowels before corrosion testing.



Picture 3: Plastic coated surface of dowels does not show any rust in regarded area of lateral surface after 240 hours at neutral salt-spray.

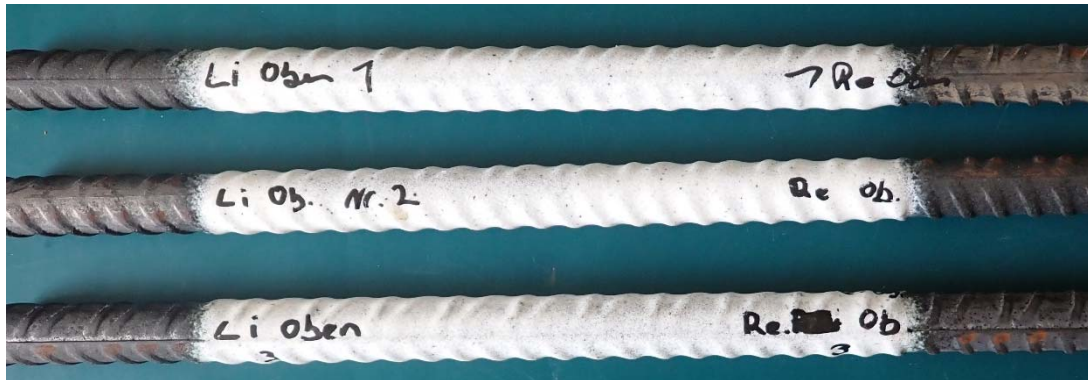


Picture 4: Opposite plastic coated surface of dowels without any rust in regarded area of lateral surface after 240 hours at neutral salt-spray.

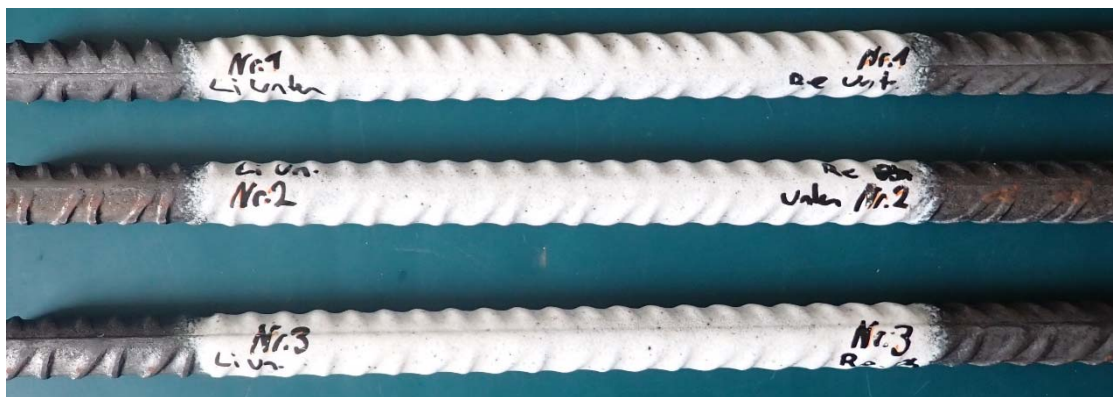
## NSS-Test on dowels and tie bars of production in 1st half-year 2025

**Tie bars** are plastic coated on a length of  $l_{\text{coating}} = 250$  mm in centre area.

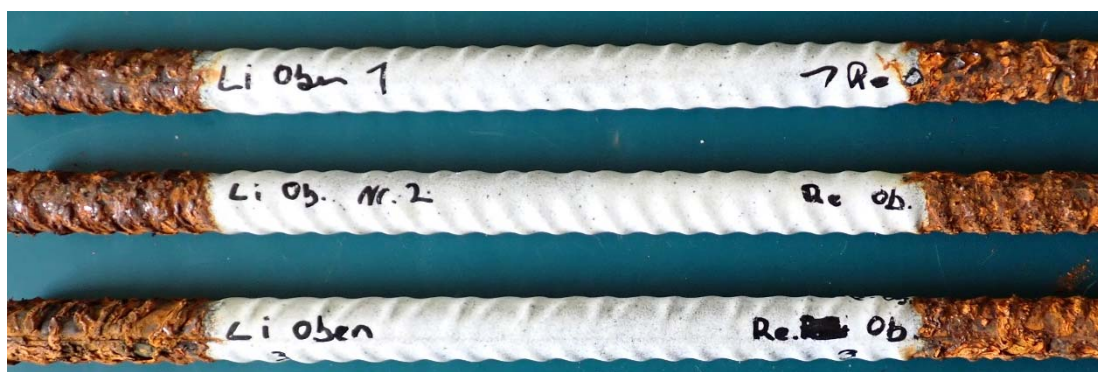
On all three investigated tie bars no rust was observed after 240 hours of neutral salt-spray in regarded area of lateral surface. See pictures 5 and 6 for view of tie bars before testing and pictures 7 and 8 for condition of tie bars after corrosion test.



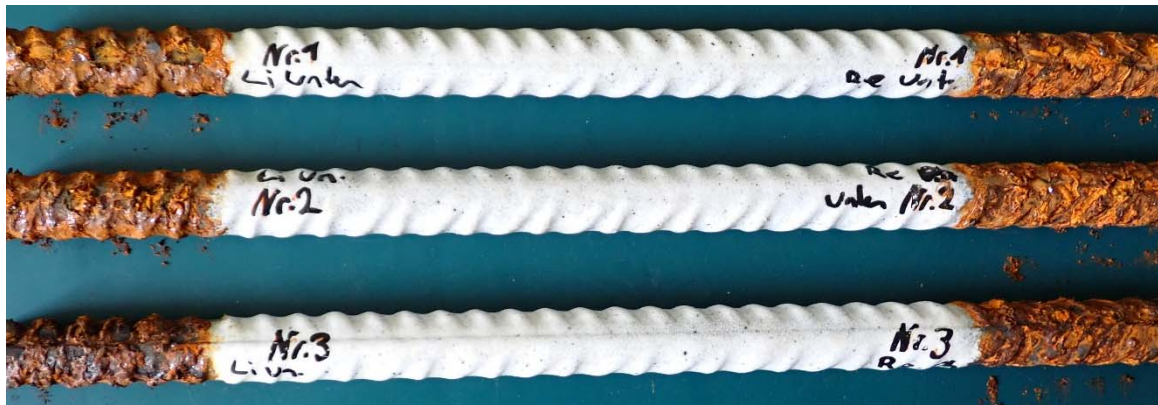
Picture 5: View of plastic coated area of tie bars before corrosion testing.



Picture 6: View of opposite side lateral surface of plastic coated area of tie bars before corrosion testing.



Picture 7: View of plastic coated area of tie bars after 240 hours salt-spray. No rust was observed in regarded area of lateral surface (200 mm in centre of tie bar).



**Picture 8: Opposite view of plastic coated area of tie bars after 240 hours salt-spray. As well, no rust was observed in regarded area of coated lateral surface.**

### Summary

By mandate of company *OTTO BRENTZEL - Stahlverarbeitung e.K.*, Germany, corrosion tests according to EN ISO 9227:2017 were executed on samples of dowels and tie bars of production in 1<sup>st</sup> half-year 2025, as demanded by recent draft of EN 13877-3 (prEN 13877-3, dated 24<sup>th</sup> April 2019). Tests were executed in May 2025.

Measurement of coating thickness showed, that investigated samples meet requirement of a minimum thickness of 0.2 mm and a maximum thickness of 0.8 mm.

After 240 hours of neutral salt-spray, no rust was observed on relevant area of coated lateral surface. Thus, requirement respect to corrosion resistance is met.

For execution of tests and reporting,

Dr.-Ing. Christoph Simon

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