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European Technical Assessment Body
for construction products



European Technical Assessment

ETA-24/1075
of 2 January 2025

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

RECOSTAL® COUPLER

Product family
to which the construction product belongs

Couplers for mechanical splices of reinforcing steel bars

Manufacturer

DYWIDAG-Systems International GmbH
Südstraße 3
32457 Porta Westfalica
GERMANY

Manufacturing plant

DYWIDAG-Systems International GmbH
Südstraße 3
32457 Porta Westfalica

This European Technical Assessment
contains

10 pages including 3 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 160129-00-0301

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Specific part

1 Technical description of the product

The RECOSTAL® Coupler is used as a mechanical, screwed system for connecting reinforcing bars in reinforced concrete components under static or quasi-static and fatigue loading.

The product description is given in Annex A.

The characteristic material values, dimensions and tolerances of the RECOSTAL® Coupler not indicated in Annex A shall correspond to the respective values laid down in the technical documentation^[1] of this European technical assessment.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the RECOSTAL® Coupler is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the RECOSTAL® Coupler of at least 100 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Resistance to static or quasi-static loading	See Annex C
Slip under static or quasi-static load	See Annex C
Slip after static or quasi-static load	See Annex C
Fatigue strength for $N = 2 \cdot 10^6$ load cycles	No performance assessed
Fatigue strength for S-N curve with k_1 and k_2 according to EN 1992-1-1	No performance assessed
Fatigue strength for S-N curve with specific k_1 and k_2	See Annex C
Resistance to low cycle loading (seismic actions)	No performance assessed

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1

^[1] The technical documentation of this European technical assessment is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD 160129-00-0301 the applicable European legal act is: 2000/606/EC.

The system to be applied is: 1+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

The following standards are referred to in this European Technical Assessment:

EN ISO 683-1:2018	Heat-treatable steels, alloy steels and free-cutting steels – Part 1: Non-alloy steels for quenching and tempering (ISO 683-1:2016)
EN 1992-1-1:2004 + AC:2010 + A1:2014	Eurocode 2: Design of concrete structures - Part 1-1: General rules and rules for buildings
EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
EN ISO 6789-2:2017	Assembly tools for screws and nuts - Hand torque tools – Part 2: Requirements for calibration and determination of measurement uncertainty (ISO 6789-2:2017)

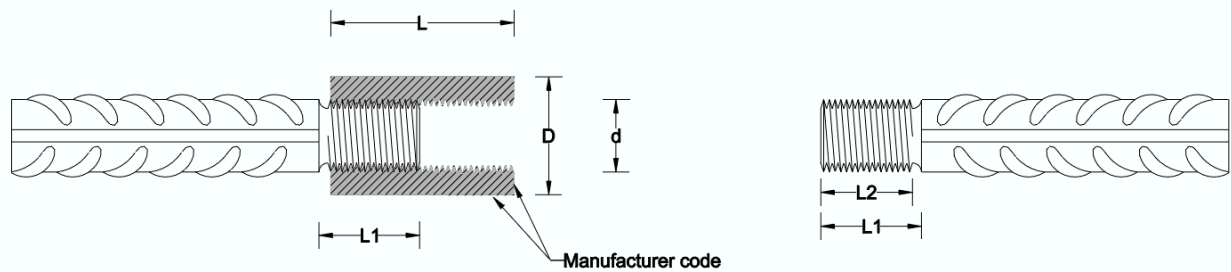
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Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Kisan

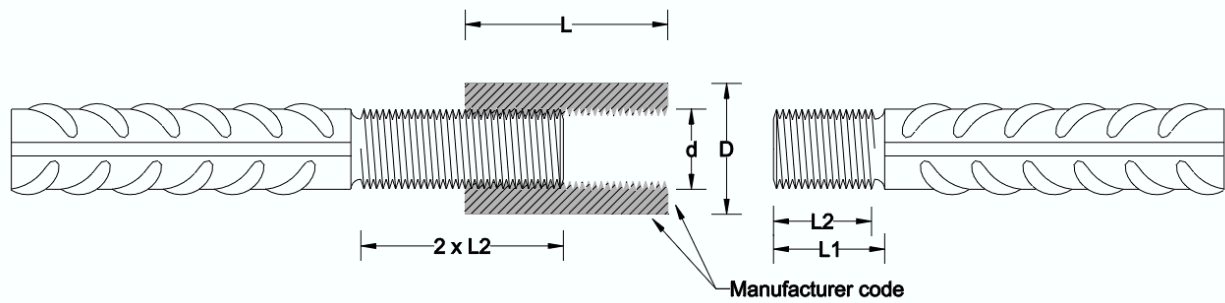
A.1 Overview RECOSTAL® Coupler

A.1.1 Standard Coupler



Rebar nominal diameter ϕ [mm]	Coupler external diameter D [mm]	Coupler length L [mm]	Peel length L1 [mm]	Thread length L2 [mm]	External thread d [mm]	Tightening torque M [Nm]
12	19	35	19	18.5	12.38	60
14	22	40	22.5	21.5	14.5	80
16	25	45	25	24	16.5	80
20	30	55	30	29	20.55	160
25	38	65	35.5	34.5	25.55	230
28	42	70	38	37	28.55	300

A.1.2 Positional Coupler



Rebar nominal diameter ϕ [mm]	Coupler external diameter D [mm]	Coupler length L [mm]	Peel length L1 [mm]	Thread length L2 [mm]	External thread d [mm]	Tightening torque M [Nm]
16	25	45	25	24	16.5	80
20	30	55	30	29	20.55	160
25	38	65	35.5	34.5	25.55	230

RECOSTAL® COUPLER	Annex A1
Product description – Type of Couplers	

A.2 Materials

Coupler steel: C35 / C45, 1.0501 / 1.0503 according to EN ISO 683-1, Class A1 according to EN 13501-1

Reinforcing steel: B500B or B500C, Class A1 according to EN 13501-1

RECOSTAL® COUPLER	Annex A2
Product description – Materials	

B.1 Conditions of use

RECOSTAL® Couplers are used as mechanical coupling in accordance with EN 1992-1-1 and annex C for reinforcing steel bars B500B and B500C with a nominal diameter of 12 to 28 mm in accordance with EN 1992-1-1, Clause C.1 for:

- Transmission of static or quasi static tension and compression loads according to EN 1992-1-1, clauses 8.7 and 8.8 (4),
- Limitation of slip according to EN 1992-1-1, clause 7.3,
- Transmission of high-cycle fatigue loads with fatigue resistance according to EN 1992-1-1, clause 6.8.4.

The rebar connection is primarily used for force transmission in construction joints.

The “RECOSTAL® Coupler system” allows the following rebar coupling variants:

- Standard connections where the connecting rebar can move along the axis and rotate freely
- Positional coupler where the movement of the connecting bar is restricted (e.g. cannot be rotated because bent or offset and/or cannot move along the axis)

The screw couplers have internal threads. The bar ends to be connected are provided with corresponding external threads.

The bar ends are screwed into the internal threads of the couplers and locked in the coupling threads to a specified torque to reduce the slip.

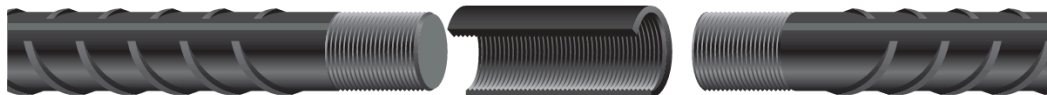
B.2 Installation requirements

- Joints may be subjected to 100% of the static and quasi-static tensile and compressive load in the same way as a non-lapped bar; DIN EN 1992-1-1, Section 8.7.2(4) applies).
- The same values as for non-lapped bars shall apply to the concrete cover over the outer edge of a coupler as well as to the clear distances between the outer edges of adjacent couplers in accordance with EN 1992-1-1, clauses 4.4.1 and 8.2. The spacing necessary for installation shall remain.
- In case of bent (pre-bent) bars, the planned bending shall not begin until a distance of at least 5ϕ from the end of the coupler (ϕ = nominal diameter of the bent bar). If coupling bars are bent at the manufacturing plant using a special equipment, the distance may be reduced to 2ϕ .
- The couplers shall only be installed by appropriately trained personnel in accordance with the manufacturer's instructions. These installation instructions are part of the accompanying documents.
- Only coupling elements that are marked in accordance with annex A shall be used.
- The coupler system shall be installed in accordance with the manufacturer's instructions, see installation manual Annex B2 and B3.
- The threads of the bars and coupling elements shall be free of rust and contamination.
- Only torque tools whose functionality and precision have been tested in accordance with EN ISO 6789-2 shall be used for tightening the screw coupler connections. The torque to be applied is given in annex A. The torque wrench shall be checked before and during use to ensure compliance with the requirements.

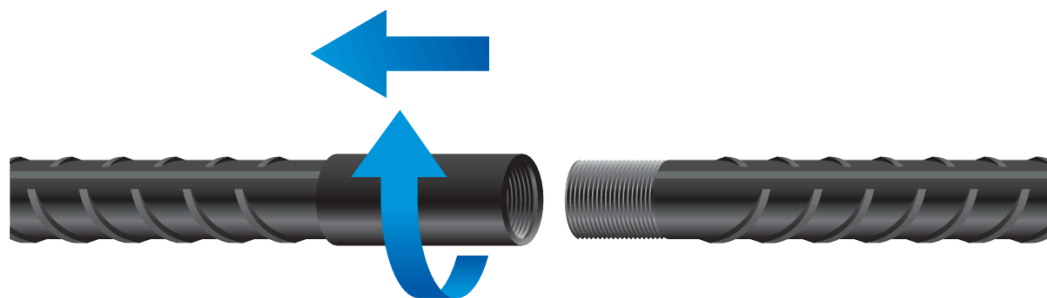
RECOSTAL® COUPLER	Annex B1
Intended use – Conditions of use and installation requirements	

B.3 Installation manual

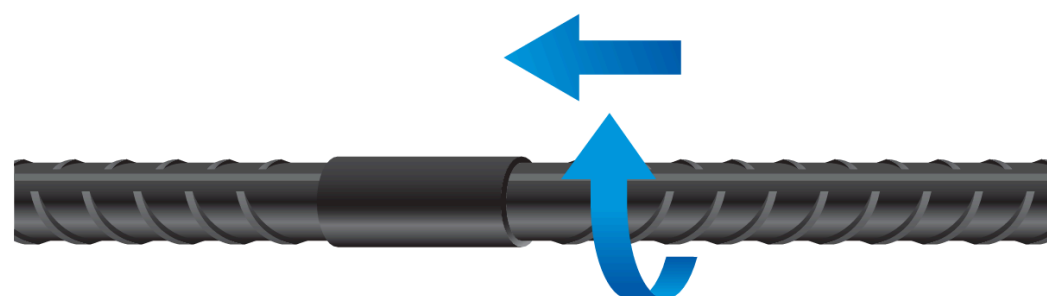
B.3.1 Standard coupler



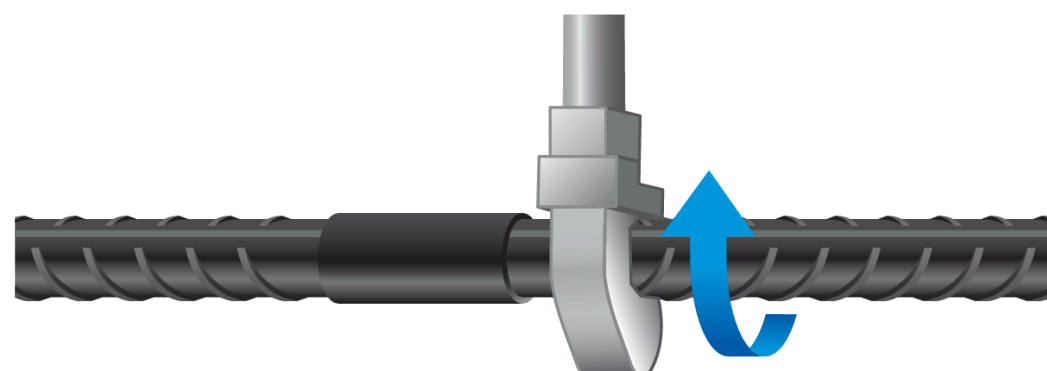
1. The ends of the bars are threaded for half the length of the coupler.



2. The coupler is screwed completely of the threaded bar and locked tight. The bar end should be central within the coupler.



3. The plastic cap is removed. Then the continuation bar is positioned and rotated in the initially screwed coupler.



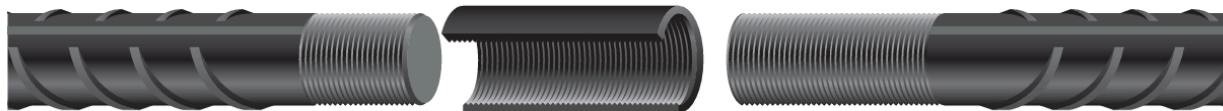
4. The joint is tightened using a wrench on the continuation bar to fully engage the coupler. After tightening there should be no more than 1 - 3 mm of thread exposed.

REcostal® COUPLER

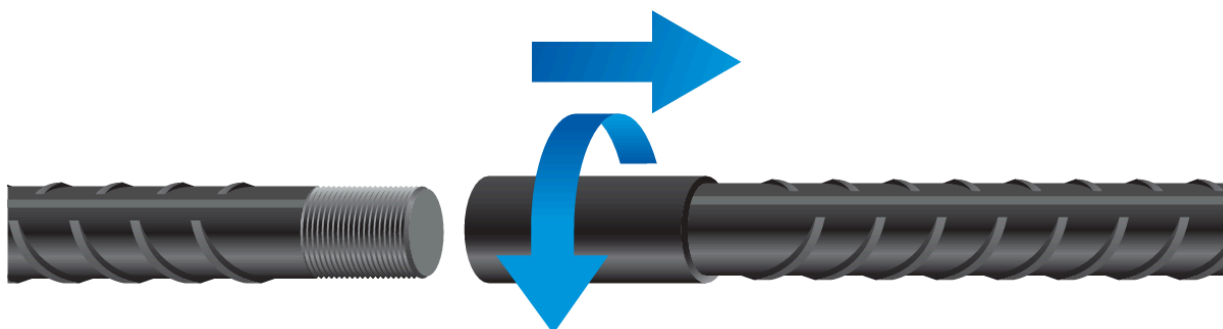
Intended use – Installation requirements for Standard coupler

Annex B2

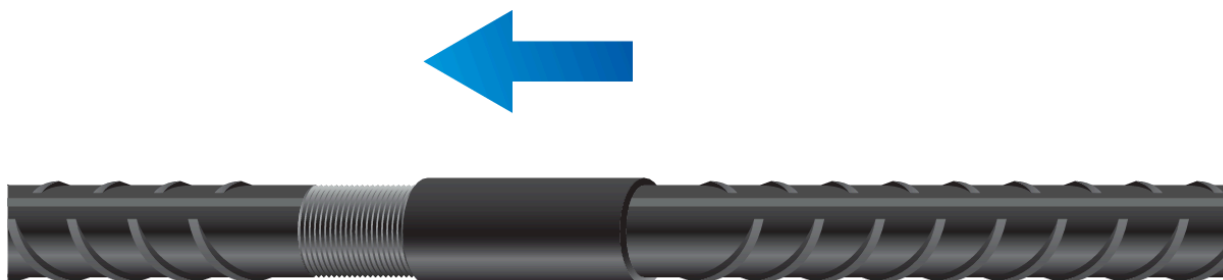
B.3.2 Positional coupler



1. If the connecting bar cannot be rotated, the connecting bar is threaded with a cold-rolled thread over the entire length of the coupler.



2. The coupler is screwed completely onto the connecting bar.



3. The plastic cap is removed. Then the continuation bar is positioned and rotated in the coupler.



4. The coupler is screwed completely over the thread length up to the last thread of the opposite bar and tightened with a torque wrench.

RECOSTAL® COUPLER

Intended use – Installation requirements for Positional coupler

Annex B3

C.1 Performance parameters

C.1.1 Standard coupler – Connection with reinforcing steel B500B/B500C

Rebar nominal diameter ϕ [mm]	Resistance to static or quasi-static loading (tension and compression) ¹⁾ B500B/B500C $f_{u,min}$ [N/mm ²]	Elongation (connection failure) $A_{gt,act}$ [%]	Slip under static or quasi-static loading ²⁾ s_1 [mm]	Slip after static or quasi-static loading ³⁾ s_2 [mm]	Fatigue strength for S-N curve with specific k_1 and k_2 with $N^*=10^7$		
					$\Delta\sigma_{Rsk}$ [N/mm ²]	k_1 [-]	k_2 [-]
12	540/575	3	0,1	0,1	75 ($N = 2 \cdot 10^6$)	3	5
14							
16							
20							
25							
28							

¹⁾ $f_{u,min} = f_{yk} \cdot 1,08$ with $f_{yk} = 500$ N/mm² for B500B

$f_{u,min} = f_{yk} \cdot 1,15$ with $f_{yk} = 500$ N/mm² for B500C

²⁾ Slip within the connection under loading measured at $0,6 \cdot f_{yk}$

³⁾ Slip within the connection under loading measured at $0,02 \cdot f_{yk}$

C.1.2 Positional coupler - Connection with reinforcing steel B500B

Rebar nominal diameter ϕ [mm]	Resistance to static or quasi-static loading (tension and compression) ¹⁾ B500B $f_{u,min}$ [N/mm ²]	Slip after static or quasi-static loading ²⁾ s_2 [mm]
16	540	0,1
20		
25		

¹⁾ $f_{u,min} = f_{yk} \cdot 1,08$ with $f_{yk} = 500$ N/mm² for B500B

²⁾ Slip within the connection under loading measured at $0,02 \cdot f_{yk}$

RECOSTAL® COUPLER

Performance parameters

Annex C