

CARES Technical Approval Report TA1-B 5088



Issue 1



DYWIDAG-SYSTEMS INTERNATIONAL recostal® Parallel Thread Couplers

Assessment of the
DYWIDAG-Systems International
recostal® Type A and B
Standard and Positional Parallel
Thread Couplers Product and
Quality System for Production



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Product

**DYWIDAG-Systems
International recostal®
Type A and B
Parallel Thread Couplers
for reinforcing steel**

Product approval held by:

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1 Product Summary

recostal® Parallel Thread Standard and Positional Couplers Type A and B in the size range 16mm - 25mm are for the mechanical connection of parallel threaded high-yield carbon steel bars for the reinforcement of concrete complying with the requirements of BS4449 Grades B500B.

1.1 Scope of Application

recostal® Parallel Thread Standard and Positional Couplers Type A and B in the size range of 16mm to 25mm have been evaluated for use as follows:

BS8597:2015 for mechanical splices in reinforced concrete structures under predominantly static loads in tension only using BS4449 Grade B500B reinforcement.

1.2 Design Considerations

BS 8110 Clause 3.12.8.9 Laps and Joints states "Connections transferring stress may be lapped, welded or joined with mechanical devices. They should be placed, if possible, away from points of high stress and should preferably be staggered". However, BS 8110 Clause 3.12.8.16.2 Bars in tension states "The only acceptable form of full-strength butt joint for a bar in tension comprises a mechanical coupler" satisfying specified slip and tensile strength criteria.

Eurocode 2, Clause 8.7 Laps and mechanical couplers 8.7.1 General (1)P “Forces are transmitted from one bar to another by:

- lapping of bars, with or without bends or hooks;
- welding;
- mechanical devices assuring load transfer in tension-compression or in compression only.”

Clause 8.8 Additional rules for large diameter bars goes on to state that “Splitting forces are higher and dowel action is greater with the use of large diameter bars. Such bars should be anchored with mechanical devices.”

The specified cover for fire resistance and durability should be provided to the coupler sleeve. All couplers have been designed with controlled mechanical properties to be compatible with reinforcing bars complying with reinforcement of the relevant Grade in accordance with BS4449.

1.3 Conclusion

It is the opinion of CARES that recostal® Parallel Thread Standard and Positional Couplers Type A and B in the size range 16mm to 25m are satisfactory for use within the limits stated in paragraph 1.1 when applied and used in accordance with the manufacturer’s instructions and the requirements of this certificate.



L. Brankley
Chief Executive Officer
July 2022



2 Technical Specification

2.1 General

The function of recostal® Parallel Thread Standard and Positional Couplers Type A and B is to connect deformed steel reinforcing bars complying with BS 4449 Grade B500B and thereby create structural continuity of the reinforcing system.

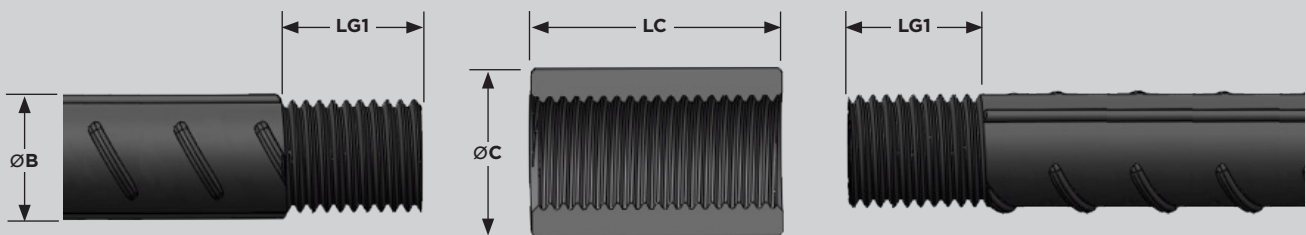
The recostal® Parallel Thread Standard and Positional Couplers Type A and B range offer a full strength connection. The ends of the rebar to be connected are cut square and a thread is cut into the reinforcing bars using a calibrated machine. The length of the thread ensures that the connection joint is stronger than the bar and slip is within defined and accepted standards. A nominal allowance of +50mm per threaded bar end should be made for cutting the bar end.

2.2 recostal® Parallel Standard Thread Coupler Type A

recostal® Parallel Thread Standard Couplers Type A for joining bars of the same size allow for full tension connection where same size reinforcement bars need to be coupled on site during concrete construction. The product is available for bar diameters from 16mm – 25mm. Reinforcement bars are ordered and supplied bespoke to specification.

recostal® Parallel Thread Standard Couplers Type A is suitable for applications where the continuation bar can be rotated. The threaded bar ends are either protected by the coupler or an external plastic sheath. The internal thread of the coupler is protected by an internal plastic end cap. For certain applications (such as deep concrete pours), the coupler end caps may not prevent the ingress of concrete fines. For these applications, further protection may be required.

recostal® Standard Coupler Type A



Coupler Ref	ØB (mm)	LG1 (mm)	ØC (mm)	LC (mm)	Tolerance (mm)	Installation Torque	Reinforcement Grade
RC16	16	24	25	45	±1	80	B500B
RC20	20	29	30	55	±1	160	B500B
RC25	25	34.5	38	65	±1	230	B500B

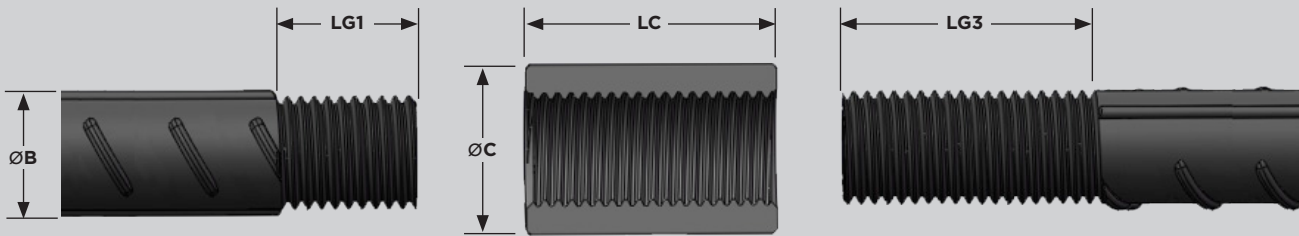
Table 1

2.2 recostal® Parallel Standard Transitional Thread Coupler Type B

recostal® Parallel Thread Standard Transitional Couplers Type B allow for full tension connection where reinforcement bars of different size need to be coupled on site during concrete construction. The product is available for bar diameters from 16mm - 25mm. Reinforcement bars are ordered and supplied bespoke to specification.

recostal® Parallel Thread Standard Transitional Couplers Type B is suitable for applications where the continuation bar can be rotated. The threaded bar ends are either protected by the coupler or an external plastic sheath. The internal thread of the coupler is protected by an internal plastic end cap. For certain applications (such as deep concrete pours), the coupler end caps may not prevent the ingress of concrete fines. For these applications, further protection may be required.

recostal® Standard Transitional Coupler Type B



Coupler Ref	ØB (mm)	LG1 (mm)	ØC (mm)	LC (mm)	LG3 (mm)	Tolerance (mm)	Installation Torque	Reinforcement Grade
RC16	16	24	25	45	50	±1	80	B500B
RC20	20	29	30	55	60	±1	160	B500B
RC25	25	34.5	38	55	71	±1	230	B500B

Table 2

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3 Product Performance and Characteristics

Full destructive tests have been carried out to demonstrate compliance with the performance requirements defined in CARES Appendix TA1-B when used with reinforcing steel BS4449 grade B500B.

CARES APPENDIX TA1-B requirements

- Permanent deformation is less than 0.10mm after loading to $0.65f_y$ in tension with BS4449 grade B500B reinforcement.
- 99% characteristic tensile strength is greater than 540MPa with B500B reinforcement.

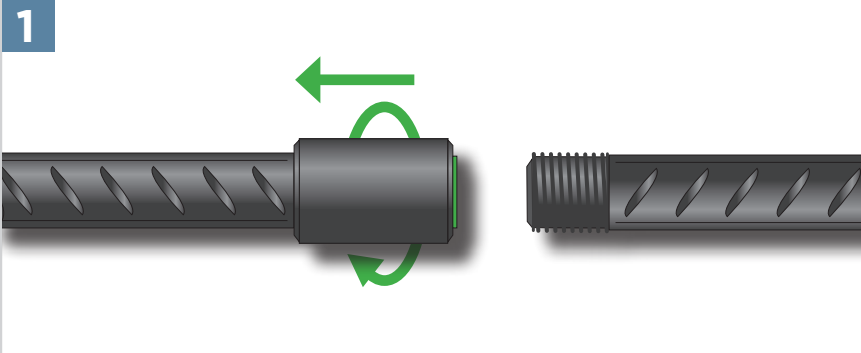
BS 8597:2015 requirements for slip and tensile strength

Tests verify compliance with Clause 5 of BS 8597;2015 for the following:

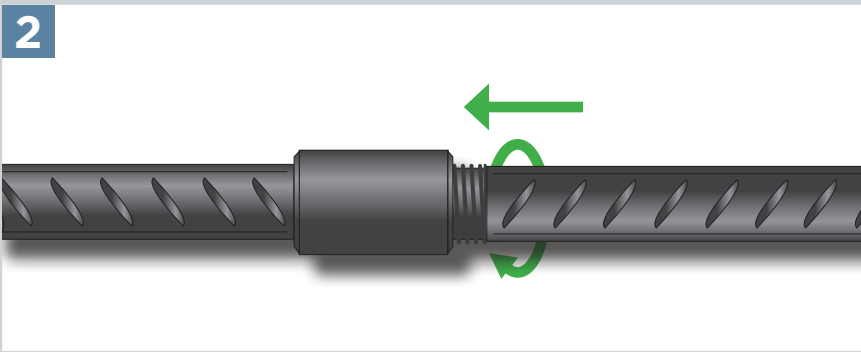
- a) slip under static forces; and
- b) tensile strength under static forces

4 Installation

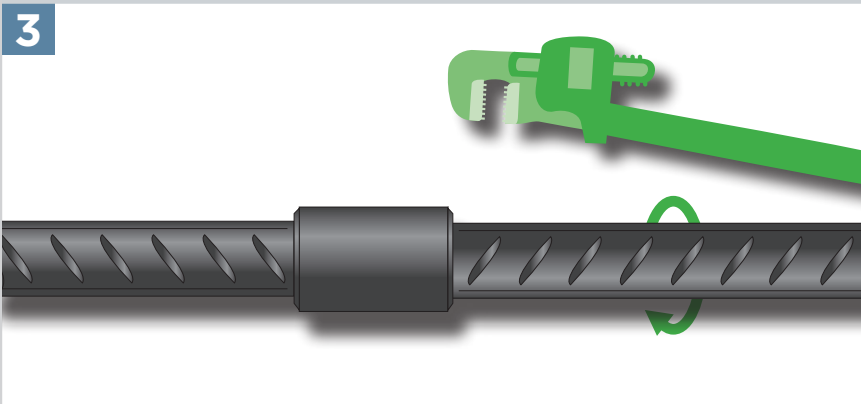
recostal® Parallel Thread Standard Coupler Type A Sequence



Fix and rotate the coupler to the rear of the thread on the fixed bar and lock tight. The bar end should be central within the coupler.



Remove the plastic cap from the coupler. Position and rotate the continuation bar in the coupler.



Tighten the joint using a wrench on the continuation bar. After tightening there should not be more than 2 - 4 mm of the thread exposed, depending on the diameter of the rebar, to reach the specified torque values given in Table 1.

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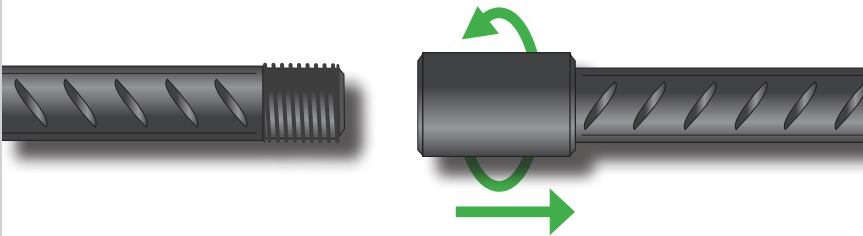
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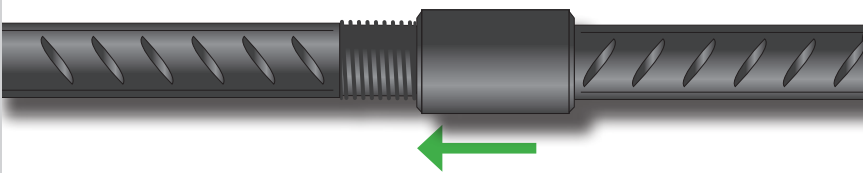
recostal® Parallel Thread Standard Transitional Coupler Type B Sequence

1



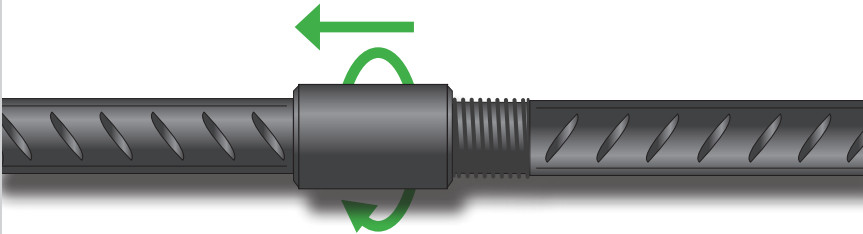
Fix the coupler to the rear thread on the continuation bar.

2



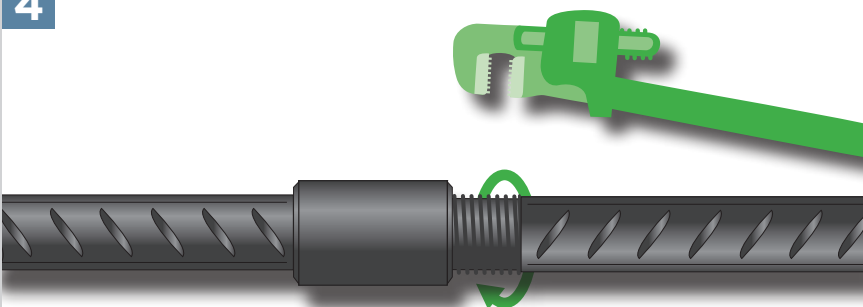
Position the continuation bar with the coupler against the end of the first bar.

3



Rotate the coupler from the continuation bar with the coupler against the end of the first bar.

4



Using a wrench, rotate the continuation bar to lock the two ends against each other. After tightening, the length of exposed thread should not be more than half of the coupler length plus 2 - 4 mm of the thread exposed, depending on the diameter of the rebar, to reach the specified torque values given in Table 2.

5 Safety Considerations

recostal® Parallel Thread Standard and Positional Couplers Type A and B are generally supplied in robust cardboard cartons. Cartons/containers weighing up to 25kg are to be handled with care. Heavier cases require the use of mechanical handling equipment. Protective gloves should be worn when installing the couplers.

6 Product Testing and Evaluation

recostal® Parallel Thread Standard and Positional Couplers Type A and B have been tested to satisfy the requirements of CARES Appendix TA1-B for Couplers with reinforcing bars to BS4449 Grade B500B.

The testing comprised the following elements:

- Tensile Strength
- Permanent deformation in tension

Tests verify compliance with Clause 5 of BS 8597;2015 for both slip under static forces and tensile strength under static forces.

7 Quality Assurance

recostal® Parallel Thread Standard and Positional Couplers Type A and B for reinforcing steel are produced under an EN ISO 9001 quality management system certified by CARES at locations agreed with CARES.

The quality management system scheme monitors the production of the recostal® Parallel Thread Couplers and ensures that materials and geometry remain within the limits of this technical approval.

The products are subject to a programme of periodic testing to ensure continued compliance.



8 Building Regulations

8.1 The Building Regulations (England and Wales)

Structure, Approved Document A

DYWIDAG-Systems International recostal® Parallel Thread Standard and Positional Couplers Type A and B, when used in EC2 based designs using the data contained within this technical approval, satisfy the relevant requirements of The Building Regulations (England and Wales), Approved Document A.

Materials and Workmanship, Approved Document

This technical approval gives assurance that the DYWIDAG-Systems International recostal® Parallel Thread Standard and Positional Couplers Type A and B comply with the material requirements of EC2.

8.2 The Building Regulations (Northern Ireland)

Materials and Workmanship

This technical approval gives assurance that DYWIDAG-Systems International recostal® Parallel Thread Standard and Positional Couplers Type A and B comply with the material requirements of EC2 by virtue of regulation 23, *Deemed to satisfy provisions regarding the fitness of materials and workmanship*.

8.3 The Building Standards (Scotland)

Fitness of Materials

This technical approval gives assurance that DYWIDAG-Systems International recostal® Parallel Thread Standard and Positional Couplers Type A and B comply with the material requirements of EC2 by virtue of *Clause 0.8*.

Structure

DYWIDAG-Systems International recostal® Parallel Thread Standard and Positional Couplers Type A and B, when used in EC2 based designs using the data contained within this technical approval, satisfy the requirements of *The Building Standards (Scotland) clause 1*.

9 References

- BS4449: 2005 + A3: 2016 Steel bars for the reinforcement of and use in concrete - Requirements and test methods.
- BS8110: Part 1: 1997: Structural Use of Concrete , Code of Practice for Design & Construction
- BS 8597:2015 Steels for the reinforcement of concrete – Reinforcement couplers – Requirements and test methods.
- BS EN 1992-1-1:2004 Eurocode 2 Design of concrete structures - General rules for buildings.
- BS EN ISO 9001: Quality management systems - Requirements.
- CARES Appendix TA1-B: Quality and Operations Schedule for the Technical Approval of Couplers for Reinforcing Steel and Reinforcement Anchors For BS8110 and EN1992-1-1 Static Loading in Tension or Tension and Compression.



10 Conditions

1. The quality of the materials and method of manufacture have been examined by CARES and found to be satisfactory. This Technical Approval will remain valid provided that:
 - a) The product design and specification are unchanged.
 - b) The materials, method of manufacture and location are unchanged.
 - c) The manufacturer complies with CARES regulations for Technical Approvals.
 - d) The manufacturer holds a valid CARES Certificate of Product Assessment.
 - e) The product is installed and used as described in this report.
2. CARES make no representation as to the presence or absence of patent rights subsisting in the product and/or the legal right of DYWIDAG-Systems International to market the product.
3. Any references to standards, codes or legislation are those which are in force at the date of this certificate.
4. Any recommendations relating to the safe use of this product are the minimum standards required when the product is used. These requirements do not purport to satisfy the requirements of the Health and Safety at Work etc Act 1974 or any other relevant safety legislation.
5. CARES does not accept any responsibility for any loss or injury arising as a direct or indirect result of the use of this product.
6. This Technical Approval Report should be read in conjunction with CARES Certificate of Product Assessment No 5088. Confirmation that this technical approval is current can be obtained from CARES.

DYWIDAG-Systems International Coupler Applications



DYWIDAG-Systems International recostal® Parallel Thread Coupler suitable for steel bars in various reinforced concrete structures, and has the advantages of easy operation and fast construction.



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