

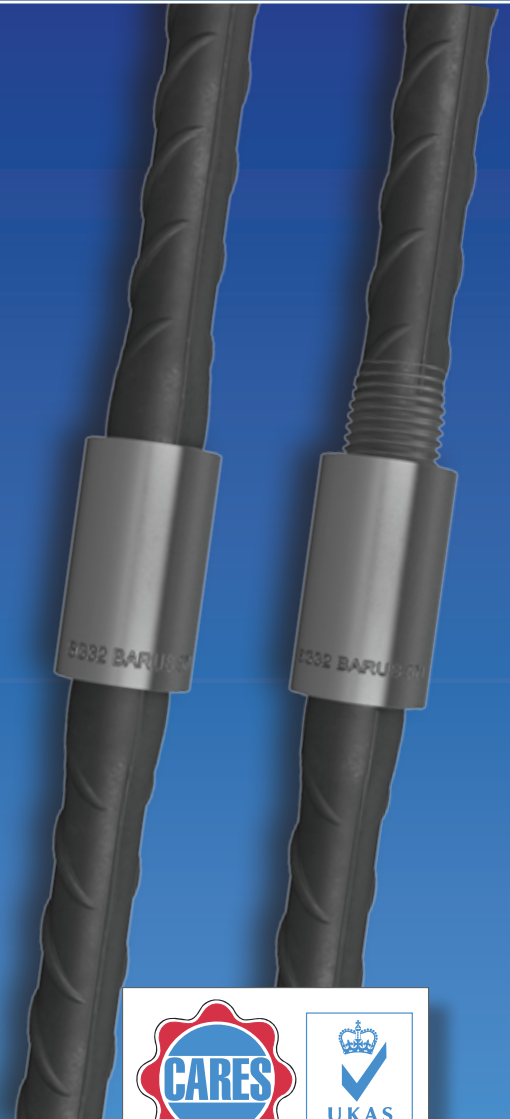
CARES Technical Approval Report TA1-B 5064

Issue 1



BARUS SimGrip Standard and Positional Parallel Threaded Couplers

Assessment of the
BARUS SimGrip
Standard and Positional
Parallel Thread Coupler
Product and Quality
System for Production



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Product

BARUS SimGrip Standard and Positional parallel threaded mechanical couplers for reinforcing steel

Product approval held by

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1 Product Summary

BARUS SimGrip Standard and Positional parallel threaded couplers are for the mechanical connection of deformed high yield carbon steel bars for the reinforcement of concrete complying with the requirements of BS4449 Grade B500B.

1.1 Scope of Application

BARUS SimGrip Standard and Positional parallel threaded mechanical couplers, in the size range 16mm - 40mm, have been evaluated for use as follows:

- a) Static tension applications in reinforced concrete structures designed for EC2 and BS8110: Part 1: in accordance with CARES Appendix TA1-B.

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 BARUS SimGrip Standard and Positional parallel threaded couplers 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

June 2017



2 Technical Specification

2.1 General

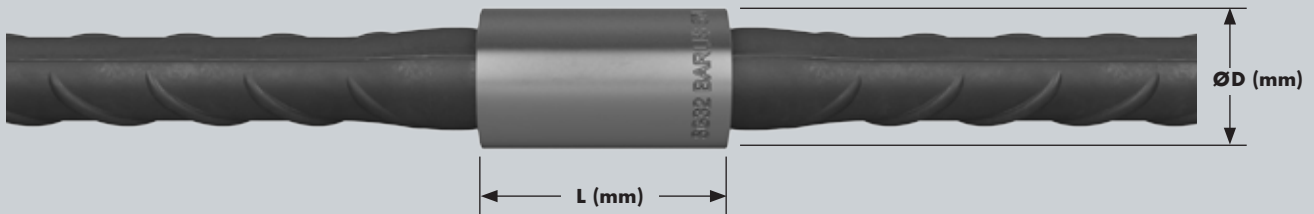
BARUS SimGrip Standard and Positional parallel threaded mechanical couplers are for joining deformed grade B500B steel reinforcing bars complying with BS4449 thereby create structural continuity of the reinforcing system.

BARUS SimGrip Standard and Positional couplers provides a full strength connection. Each end of the bar to be joined is cut square, enlarged using a cold forging process and a standard metric threaded onto the enlarged bar end. The thread form is such that the cross sectional area of the bar ends is not reduced, thus ensuring the strength of the connection matches or exceeds that of the parent bars.

2.2 SimGrip-St (Standard) Coupler

The SimGrip-St (Standard) is comprised of an internally threaded coupler and is used in applications where the continuation bar can be rotated freely. The ends of the bars are cold upset and threaded for half the length of the coupler.

SimGrip-St (Standard) Coupler



Bar Size (mm)	Product Code	L (mm)	D (mm)	Metric Thread (mm)	Colour Code	TA1B B500B tension only
16	BSGC16	40	28	M20x2.5	Pink	✓
20	BSGC20	48	32	M24x3.0	Green	✓
25	BSGC25	60	40	M30x3.5	Blue	✓
32	BSGC32	72	50	M36x4.0	Yellow	✓
40	BSGC40	90	62	M45x4.5	Red	✓

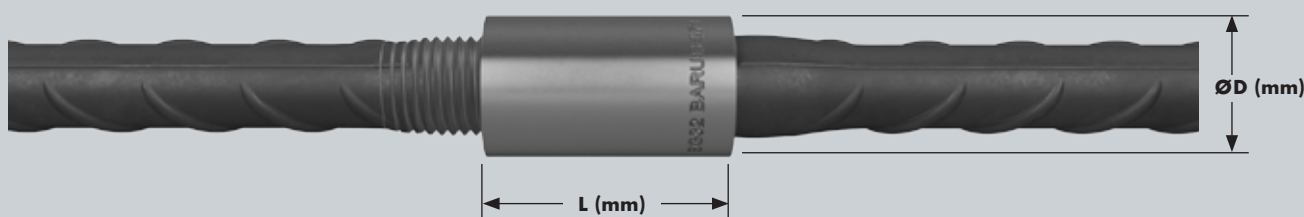
Table 1

2.3 SimGrip-Ps (Positional) Coupler

The SimGrip-Ps coupler is designed for use when both bars would be impossible or difficult to rotate because of their size, length or location, the SimGrip splice system simply extends the thread onto the ribs of the bar, thereby enabling the coupler to be fully screwed onto it. It is then unscrewed from one bar and back onto the second bar to accomplish the connection.

The SimGrip-Ps positional coupler type is the same as for standard type, however, one bar is threaded for a full coupler length.

SimGrip-Ps (Positional) Coupler



Bar Size (mm)	Product Code	L (mm)	D (mm)	Metric Thread (mm)	Colour Code	TA1B B500B tension only
16	BSGC16	40	28	M20x2.5	Pink	✓
20	BSGC20	48	32	M24x3.0	Green	✓
25	BSGC25	60	40	M30x3.5	Blue	✓
32	BSGC32	72	50	M36x4.0	Yellow	✓
40	BSGC40	90	62	M45x4.5	Red	✓

Table 2

3 Product Performance and Characteristics

Full tests have been carried out to demonstrate compliance with performance requirements defined in CARES Appendix TA1-B including the performance requirements of EC2 and BS8110 when used with reinforcing bars to BS4449 Grade B500B.

CARES APPENDIX TA1-B strength requirements

- Permanent deformation is less than 0.10mm at 325 MPa for B500B in tension



4 Installation

4.1 Process

The bars to be spliced are cut square and cold-upset using the BARUS rebar forging machine, and then threaded. For proper installation, SimGrip Method Statement must be followed. The parts are screwed together and tightened using a suitable wrench.

The machines must be operated by suitably trained and certified staff in accordance with BARUS operating instructions.

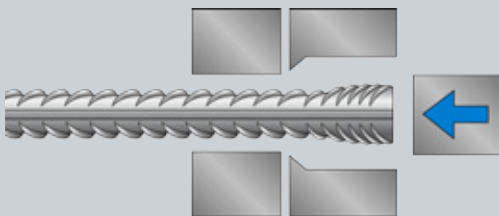
The semi-automatic, PLC controlled equipment specifically designed and manufactured by BARUS for use in the coupler industry to ensure and enhance product performance. See figure 1 and 2.



Figure 1 - BARUS Cold Forging Press



Figure 2 - BARUS Threading Machine



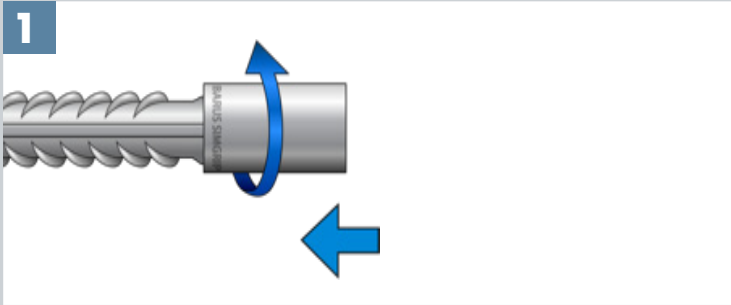
Cold upsetting



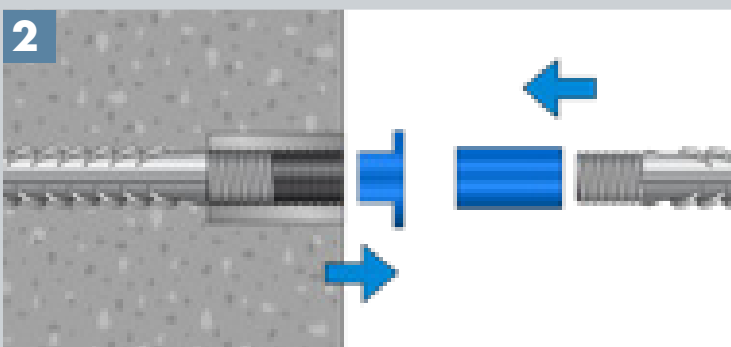
Threaded bar

Figure 3

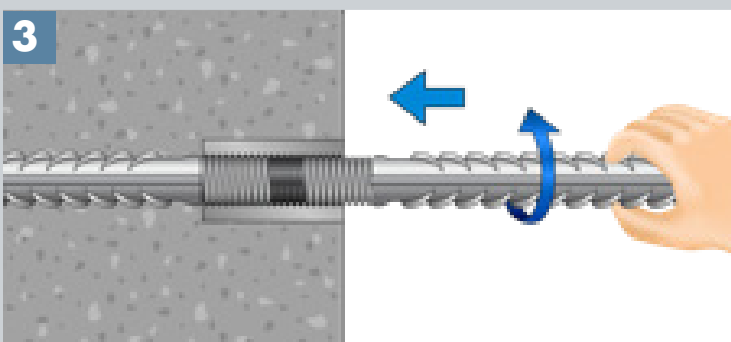
4.2 BARUS SimGrip Standard parallel threaded coupler installation



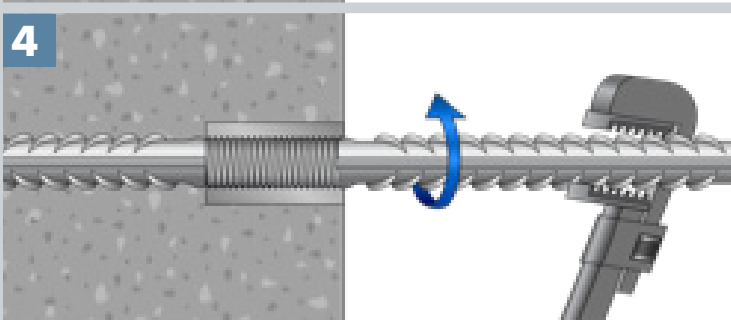
Screw the coupler onto the fixed bar until it hits the end of the threading and lock tight. The bar end should be centered within the coupler.



Remove the plastic caps from the coupler and rebar.

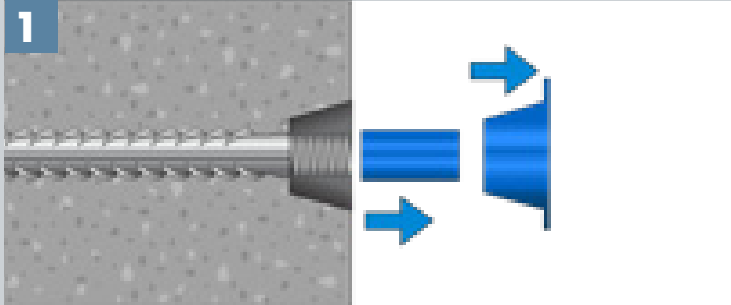


Attach the continuation bar into the coupler and rotate as far as the continuation bar will turn.

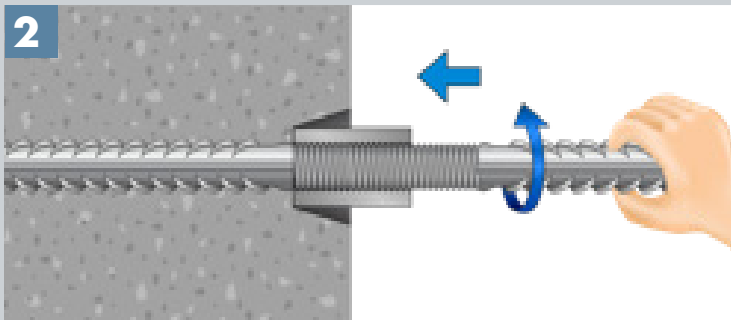


Tighten the joint using a wrench on the continuation bar.

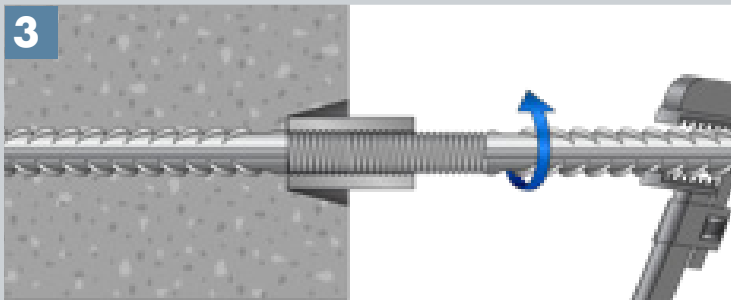
4.3 BARUS SimGrip Positional parallel threaded coupler installation



Remove the BARUS concrete spacer plug and rebar thread protector.



Screw the coupler from the continuation bar and rotate until it hits the end of the threading on the opposing bar and lock tight.



Tighten the joint using a wrench on the continuation bar.

5 Safety Considerations

Couplers are supplied in wooden containers as per BARUS packing procedures and must be followed and handled with appropriate lifting equipment. It is advisable to use safety equipment such as gloves, hard hat and eye protection during rebar cutting, forging and installation.

6 Product Testing and Evaluation

BARUS SimGrip Standard and Positional parallel threaded couplers have been tested to satisfy the requirements of EC2 and BS8110 when used with reinforcing bars to BS4449 Grade B500B.

The testing comprised the following elements:

EC2 and BS8110

- Tensile Strength
- Permanent Deformation

The products are subject to a programme of periodic testing to ensure that they remain within the performance limits of this technical approval.

7 Quality Assurance

BARUS SimGrip Standard and Positional couplers are produced under an ISO9001 quality management system certified by CARES. The quality assurance scheme monitors the production of the couplers and ensures that materials and geometry remain within the limits of this technical approval.



8 Building Regulations

8.1 The Building Regulations (England and Wales)

Structure, Approved Document A

BARUS SimGrip Standard and Positional parallel threaded couplers, 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 BARUS SimGrip Standard and Positional parallel threaded couplers comply with the material requirements of EC2.

8.2 The Building Regulations (Northern Ireland)

Materials and Workmanship

This technical approval gives assurance that BARUS SimGrip Standard and Positional parallel threaded couplers 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 BARUS SimGrip Standard and Positional parallel threaded couplers comply with the material requirements of EC2 by virtue of *Clause 0.8*.

Structure

BARUS SimGrip Standard and Positional parallel threaded couplers, 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

- BS 4449:2005 Specification for carbon steel bars for the reinforcement of concrete.
- BS8110: Part 1: 1997 (Amended 2007) Structural Use of Concrete, Code of Practice for Design and Construction.
- BS EN 1992-1-1:2004 Eurocode 2 Design of concrete structures - General rules for buildings.
- BS EN ISO 9001: 2008 Quality systems. Model for quality assurance in production, installation and servicing.
- CARES Appendix TA1-B; Quality and Operations Schedule for the Technical Approval of Couplers for Reinforcing Steel For BS8110 and ENI 992-1-1 Applications for 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 providing 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 BARUS 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 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 5064. Confirmation that this technical approval is current can be obtained from UK CARES.

BARUS SimGrip Standard and Positional Coupler Applications



SimGrip Standard and Positional parallel threaded couplers in high-rise projects; foundations, columns, slabs curtain walls.



SimGrip Standard and Positional parallel threaded couplers in Cages, Pre-Cages, Piles and Diaphragm Walls.



SimGrip Standard and Positional parallel threaded couplers in columns.

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