

# CARES Technical Approval Report TA1-B 5046

Issue 1



Dextra



**Dextra  
Unitec Couplers**

Assessment of the  
Dextra Unitec  
Coupler Product  
and Quality System  
for Production



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# Product

## Dextra Unitec Couplers for reinforcing steel

### Produced by:

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## 1 Product Summary

Dextra Unitec Couplers in the size range 12mm - 40mm are for the mechanical connection of deformed high yield carbon steel bars for the reinforcement of concrete complying with the requirements of BS4449 grades B500B and B500C.

### 1.1 Scope of Application

Dextra Unitec Couplers in the size range 12mm - 40mm have been evaluated for use as follows:

- a) TA1-B: EC2 and BS 8110 for static applications in tension or compression with BS4449 grades B500B and B500C reinforcement.

### 1.2 Design Considerations

BS8110 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, BS8110 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."

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 Dextra Unitec Couplers in the size range 12mm - 40mm 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.

B. Bowsher  
Chief Executive Officer

October 2012



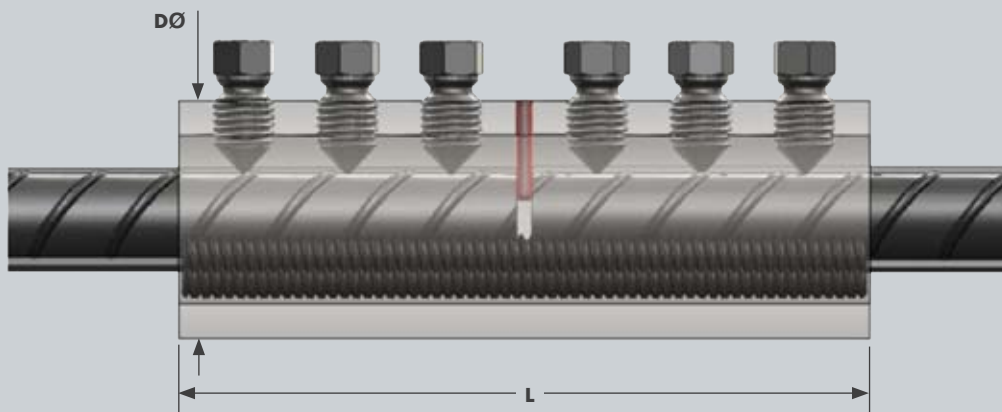
## 2 Technical Specification

The function of Dextra Unitec Couplers is to connect deformed steel reinforcing bars complying with BS 4449 grades B500B or B500C as appropriate and thereby create structural continuity of the reinforcing system.

### 2.1 Unitec Couplers

Unitec couplers are designed for concrete-embedded bars, repair and retrofit works, and bent bars. Preparation of the reinforcing bar end is not needed. The Unitec coupler can be installed on site with a standard wrench. (Larger sizes need a power tool). Proper installation has been achieved once the bolt heads have sheared off.

#### Unitec Coupler



Size mm	Art No	D (mm)	L (mm)	Shear bolts		Weight (kg)
				Size	Quantity	
12	FPUS0400002	48	140	M12	6	1.6
16	FPUS0500002	48	140	M12	6	1.6
20	FPUS0700002	58.5	180	M16	6	2.8
25	FPUS0800002	62	240	M16	8	3.8
32	FPUS1000002	82.5	280	M20	8	8.5
40	FPUS1200002	95.2	425	M20	12	15.4

Table 1

### 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 or B500C as appropriate:

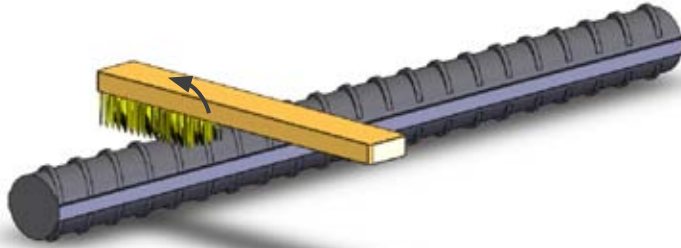
CARES APPENDIX TA1-B strength requirements

- Permanent deformation is less than 0.10mm after loading to  $0.65f_y$  in tension or compression with BS4449 grades B500B or B500C reinforcement.
- 99% characteristic tensile strength is greater than 540MPa with B500B reinforcement 575MPa with B500C reinforcement.



## 4 Installation

1



The reinforcing bar shall be free of any excessive dirt, concrete slurry, rust, etc. that may affect product performance.

2



Rebar Size	12	16	20	25	32	40
Maximum shear cut diameter	14	18	24	27	37	46

Table 2

Maximum shear cut diameter shall not exceed the limit in table 2.

3



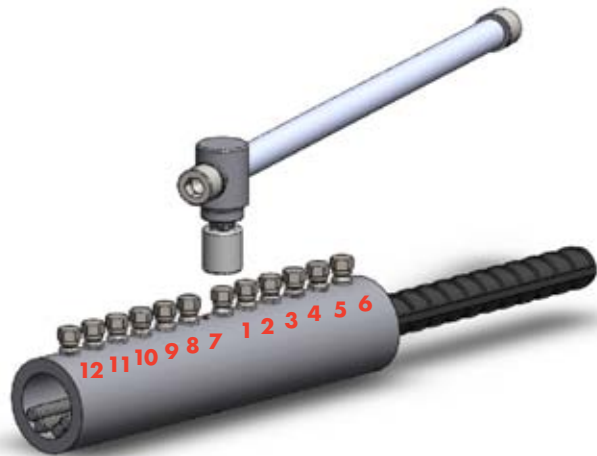
Ensure the Unitec coupler which can be found in the product datasheet is sized properly for the bars being spliced.

4



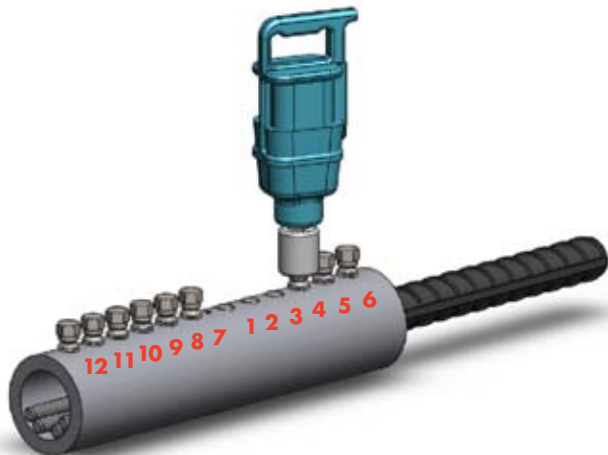
Insert the Unitec coupler over the end of the first bar until contact with the centre pin.

5



Hand tighten the bolts from centre to outside (1 to 12) with a wrench to pre-position the coupler.

6



Tighten the bolts, from centre to outside (1 to 12), with a hand wrench or power drive (pneumatic wrench) until the heads of the screws shear off.

7



Repeat the same sequence on the other side.



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## **5 Safety Considerations**

Couplers are supplied in wooden containers which have a maximum weight of 1000 kg and must be handled with appropriate lifting equipment. It is advisable to wear protective gloves during handling the containers, couplers and reinforcement; during coupler installation.

## **6 Product Testing and Evaluation**

Dextra Unitec Couplers have been tested to satisfy the requirements of CARES Appendix TA1-B for Couplers with reinforcing bars to BS4449 grades B500B and B500C. The testing comprised the following elements:

- Tensile Strength
- Permanent deformation in tension or compression

## **7 Quality Assurance**

Dextra Unitec Couplers are produced under an EN ISO 9001 quality management system certified by CARES. The quality management system scheme monitors the production of the couplers and ensures that materials and geometry remain within the limits of this technical approval.

The products are also subject to a programme of periodic testing.



## 8 Building Regulations

### Eurocodes

BS8110 was withdrawn in April 2010 after its coexistence period with Eurocode 2 ended. Although not yet formally endorsed by the Secretary of State it is anticipated that under building regulations Eurocode 2 when used in conjunction with the national annex will be accepted in lieu of BS8110.

### 8.1 The Building Regulations (England and Wales)

#### Structure, Approved Document A

Dextra Unitec Couplers, when used in BS8110 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, to support regulation 7

This technical approval gives assurance that Dextra Unitec Couplers comply with the material requirements of BS8110.

### 8.2 The Building Regulations (Northern Ireland)

#### Part B, Materials and Workmanship

This technical approval gives assurance that Dextra Unitec Couplers comply with the material requirements of BS8110 by virtue of regulation B3, *Deemed to satisfy provisions regarding the fitness of materials and workmanship.*

### 8.3 The Building Standards (Scotland) Regulations

#### Part B, Fitness of Materials

This technical approval gives assurance that Dextra Unitec Couplers, comply with the material requirements of BS8110 by virtue of Clause B2.1

#### Part C, Structure

Dextra Unitec Couplers, when used in BS8110 based designs using the data contained within this technical approval, satisfy the requirements of *The Building Standards (Scotland) Regulations 1990, Part C, C2.1 clause b. construction,ii.*



## 9 References

- BS 4449: 2005: Steel for the reinforcement of concrete - Weldable reinforcing steel - Bar, coil and decoiled product - Specification.
- BS8110: Part 1: 1997: 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 management systems - Requirements.
- CARES Appendix TA1-B; Quality and Operations Schedule for the Technical Approval of Couplers for Reinforcing Steel For BS8110 Applications for Static Tension or Static 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 and method of manufacture 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 Dextra 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 5046. Confirmation that this technical approval is current can be obtained from UK CARES.





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