CARES Technical Approval Report TA1-A 5051

Issue 3

Dextra

GRIP TEC
PARALLEL THREAD COUPLERS

DEXTRA
GRIPTEC Extruded Coupler

Assessment of the Dextra GRIPTEC Extruded Coupler and Quality System for Production

CARES TECHNICAL APPROVAL
UKAS PRODUCT CERTIFICATION
5051

Product

Dextra GRIPTEC
extruded coupler
for reinforcing steel

Produced by:

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1 Product Summary

DEXTRA Griptec standard and positional couplers as detailed in table 1 and 2 are for the mechanical connection of deformed high yield carbon steel bars for the reinforcement of concrete complying with the requirements of BS4449 Grade B500C.

1.1 Scope of Application

DEXTRA Griptec couplers have been evaluated for use as follows:

Griptec standard and positional couplers requirements in accordance with CARES Appendix TA1-A as detailed in table 1 and 2.

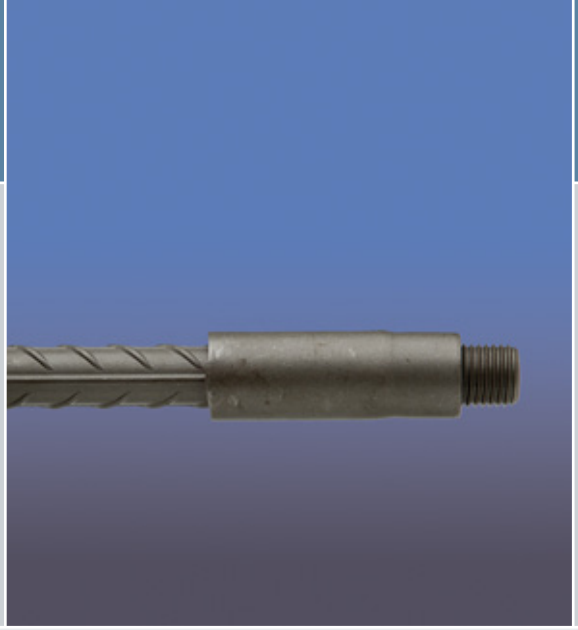
1.2 Design Considerations

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."



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 BS4449 Grade B500C.

1.3 Conclusion

It is the opinion of UK CARES that DEXTRA Griptec standard and positional 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.

Lee Brankley

L. Brankley
Chief Executive Officer

November 2015

CARES TECHNICAL APPROVAL 5051

2 Technical Specification

2.1 General

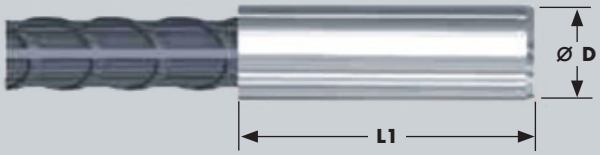
DEXTRA Griptec standard and positional couplers as detailed in table 1 and 2 are for joining deformed grade B500C reinforcing bars. The couplers comprise two ends, extruded onto the reinforcing steel and joined by a parallel thread connection. The Dextra GRIPTEC extrusion machine automatically conducts systematic performance testing of every joint.

2.2 GRIPTEC Standard Range

The Griptec standard coupler is designed for use where one of the bars to be spliced can be rotated. It comprises two steel sleeves that are swaged onto the bar ends and have matching male and female parallel ISO threads which allow the two bars to be joined.

Standard Coupler

Standard female coupler



Standard male coupler

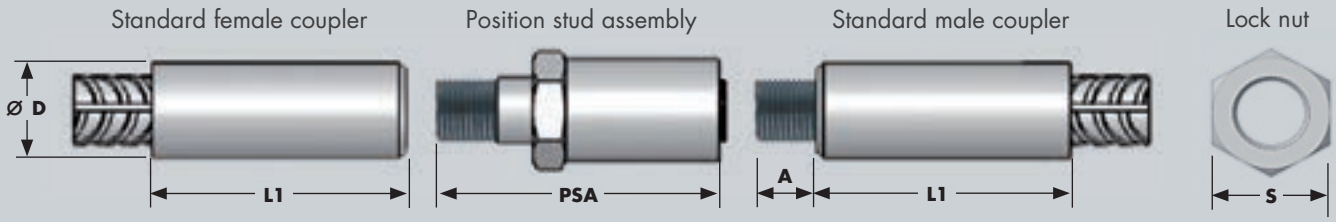
Size (mm)	Art No	D (mm)	L1 (mm)	A (mm)	Weight (kg)	Plastic protection colour	Tension/ Compression	Fatigue	Rebar
16	AG16	25 to 26	99 to 103	16	0.5	White	Tension-Compression	Class D	B500C
20	AG20N	29.5 to 32	107 to 110	20	1.1	Grey	Tension-Compression	Class D	B500C
25	AG25	37 to 39	112 to 125	22	1.2	Red	Tension-Compression	Class D	B500C
32	AG32N	47 to 49	137 to 143	28	2.1	Brown	Tension-Compression	Class D	B500C
40	AG40N	61 to 63	167 to 170	34	5.6	Green	Tension-Compression	Class D	B500C

Table 1

2.3 GRIPTEC Positional Range

The GRIPTEC positional coupler is designed for use where neither of the bars to be coupled can be rotated. The positional coupler comprises five components: the same male and female sleeves as in the standard coupler, plus a position stud (that screws itself into the female sleeve), a position nut (that screws itself onto the male sleeve), and a lock nut.

Positional Coupler



Size (mm)	Art No	D (mm)	PSA (mm)	S (mm) (Approx)	L1 (mm)	A (mm)	Weight (kg)	Plastic protection colour	Fatigue	Rebar	Tension/ Compression
32	AGP32	47 to 49	133	50	137 to 143	28	4.0	Brown	Class D	B500C	Tension-Compression
40	AGP40	61 to 63	161	65	167 to 170	34	8.8	Green	Class D	B500C	Tension-Compression

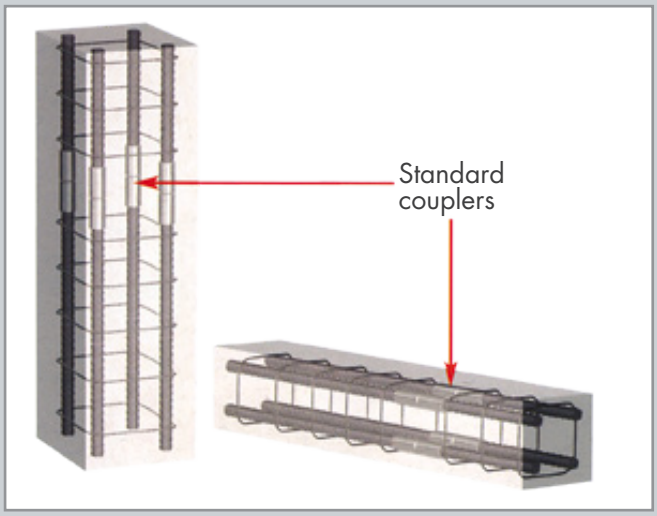
Table 2

3 Product Performance and Characteristics

Full tests have been carried out to demonstrate compliance with performance requirements defined in CARES Appendix TA1-A when used with reinforcing bars to BS4449 Grade B500C:

CARES APPENDIX TA1-A

- Permanent deformation is less than 0.10mm after loading to $0.65f_y$ in tension or compression or effective strain of $\leq 0.65f_{yk}/200x10^3$, at a stress of $0.65f_{yk}$ in compression.
- 99% characteristic tensile strength is greater than 575 MPa for grade B500C reinforcement.
- D Class fatigue.



Typical application of GRIPTEC standard coupler

The GRIPTEC standard couplers are for use in situations where one or both bars to be joined can be rotated freely

4 Installation

The bars to be spliced must be sheared with suitable shears that do not bend or deform the bar or leave a significant rag.

Griptec sleeve before extrusion

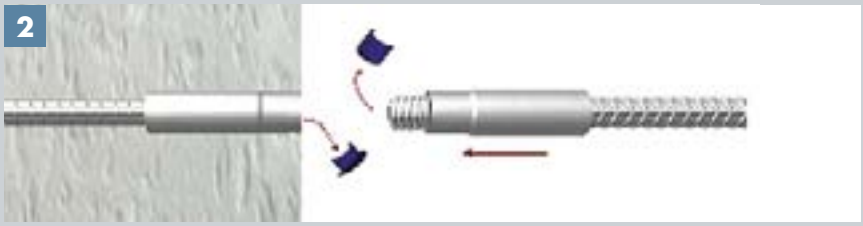
Griptec sleeve after extrusion

Sleeves must by extruded onto the bar ends exclusively using the Dextra GRIPTEC extrusion machine operated by suitably trained staff in accordance with the Dextra operating manual. The parts are screwed together and tightened using a suitable tool/wrench. A torque wrench is not necessary.

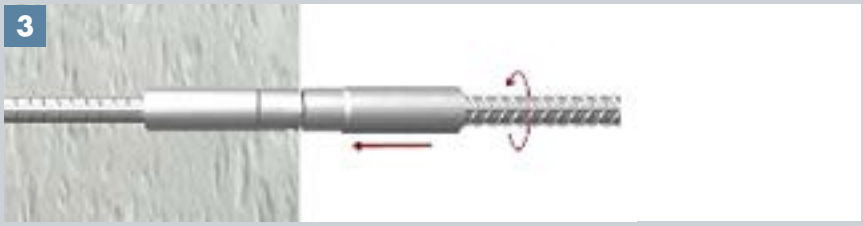
Griptec extrusion machine

4.1 Standard Range

Position the 1st stage bar



Position the continuation bar
Remove caps



Screw in the continuation bar
A suitable tool/wrench maybe used to ensure no threaded portion is visible outside the coupler

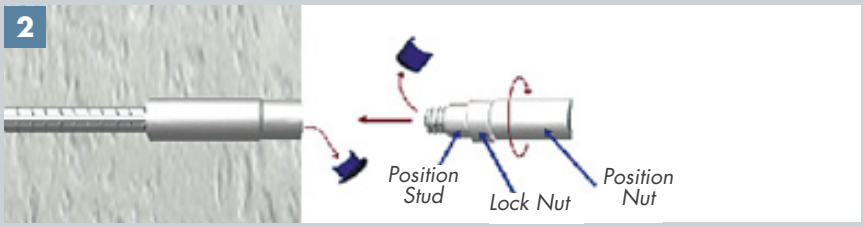
Lock the splice
Use a suitable tool/wrench on the continuation bar and tighten until the internal end faces of the couplers show close physical contact with each other

4.2 Positional Range

1

Position the 1st stage bar

2

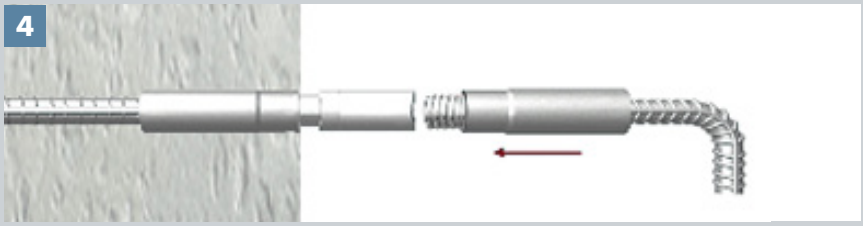


Remove caps and screw the position set into the female sleeve

3

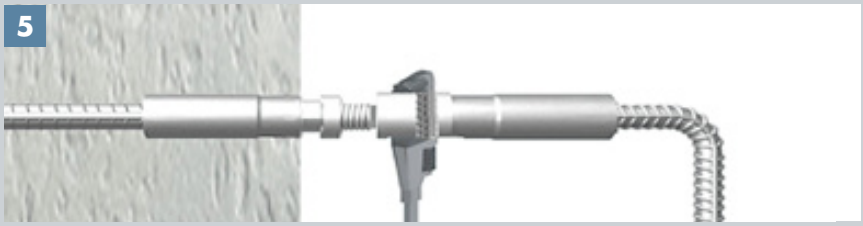
Lock the position stud
Use a suitable tool/wrench to tighten the position stud

4



Position the continuation bar
Connect bar ends

5



Join the bars by rotating the position nut

6

Lock the splice
Use a suitable tool/wrench on the continuation bar and tighten until the internal end faces of the couplers show close physical contact with each other

5 Safety Considerations

Couplers are supplied in wooden containers and have a maximum weight of 2500 kg and must be handled with appropriate lifting equipment. It is advisable to wear protective gloves during handling the containers, couplers and reinforcement; during the swaging process and during coupler installation.

6 Product Testing and Evaluation

DEXTRA Griptec swaged couplers have been tested to satisfy the requirements of CARES Appendix TA1-A with reinforcing bars to BS4449 Grade B500C. The testing comprised the following elements:

- Tensile Strength
- Permanent Deformation in tension or compression
- High cycle fatigue (Class D)

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

DEXTRA swaged couplers are produced under an ISO9001 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.

8 Building Regulations

8.1 The Building Regulations (England and Wales)

Structure, Approved Document A

DEXTRA Griptec standard and positional swaged mechanical 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 DEXTRA Griptec standard and positional swaged mechanical couplers comply with the material requirements of EC2.

8.2 The Building Regulations (Northern Ireland)

Materials and Workmanship

This technical approval gives assurance that DEXTRA Griptec standard and positional swaged mechanical 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 DEXTRA Griptec standard and positional swaged mechanical couplers comply with the material requirements of EC2 by virtue of *Clause 0.8.*

Structure

DEXTRA Griptec standard and positional swaged mechanical 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 Steel for the reinforcement of concrete - Weldable reinforcing steel - Bar, coil and decoiled product - Specification.
- BS8110: Part 1: 1997 (amended 2007): Structural Use of Concrete, Code of Practice for Design and Construction.
- BS EN ISO 9001: 2008 Quality management systems - Requirements.
- BS EN 1992-1-1:2004 Eurocode 2 Design of concrete structures - General rules for buildings.
- CARES Appendix TA1-A; Quality and Operations Schedule for the Technical Approval of Couplers for Reinforcing Steel for use in Structures and Structural elements Designed in accordance with the Fatigue Requirements of Structural Eurocodes.

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 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 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 5051. Confirmation that this technical approval is current can be obtained from UK CARES.

GRIPTEC Coupler Applications

The use of GRIPTEC couplers allows the design and installation of reinforcement in congested areas or where the continuation bars cannot be rotated.

GRIPTEC couplers allow reinforcing bars to be butt jointed.

Griptec bar end preparation takes about 30 seconds.

GRIPTEC standard coupler

GRIPTEC positional coupler

TECHNICAL APPROVAL

UKAS PRODUCT CERTIFICATION
Registration Number 002

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Independent Product Assessments for the Construction Industry

10.12.15