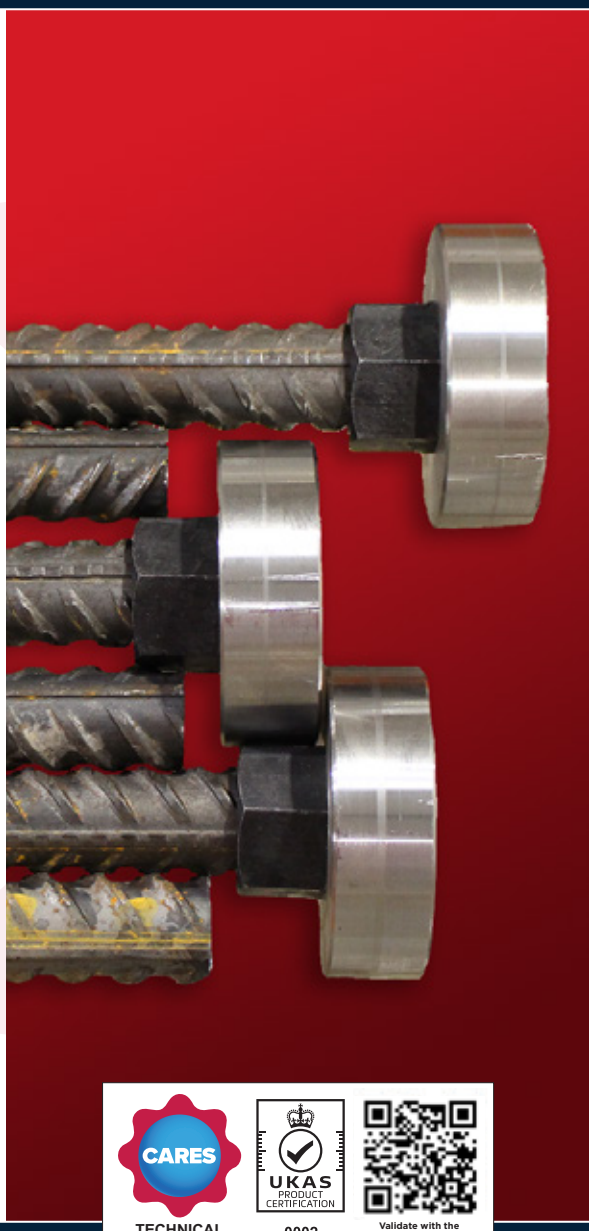
CARES Technical Approval Report TA1-B 5087

Issue 1

Bartec Company
Linxion PI End Anchors

Assessment of the Linxion BTLX A, BTLX API and BTLX APISL End Anchor Product and Quality System for Production



TECHNICAL APPROVAL 5087

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Product

Linxion BTLX A, BTLX API and BTLX APISL End Anchors for reinforcing steel

Product approval held by:

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1 Product Summary

Linxion BTLX A, BTLX API and BTLX APISL End Anchors for reinforcing steel 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..

1.1 Scope of Application

Linxion BTLX A, BTLX API and BTLX APISL End Anchors in the size range 16mm to 40mm as detailed in tables 1 to 6 have been evaluated for use as follows:

TA1-B: Reinforcement Anchors for EN1992-1-1 applications for Static Loading with BS4449 Grade B500B reinforcement in tension.

1.2 Design Considerations

Eurocode 2, Clause 8.4 Anchorage of longitudinal reinforcement requires:

8.4.1 General (1) Reinforcing bars, wires or welded mesh fabrics shall be so anchored that the bond forces are safely transmitted to the concrete avoiding longitudinal cracking or spalling. Transverse reinforcement shall be provided if necessary.

8.4.1 (5) Where mechanical devices are used the test requirements should be in accordance with the relevant product standard or a European Technical Approval.

1.3 Conclusion

It is the opinion of CARES that Linxion BTLX A, BTLX API and BTLX APISL End Anchors in the size range as detailed in tables 1 to 6 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 Linxion BTLX A, BTLX API and BTLX APISL End Anchors is to provide a full strength connection to deformed reinforcing steel bars complying with BS4449 Grade B500B and thereby enabling anchorage of reinforcing steel.

The End Anchor features the following advantages:

- Minimises the length of the rebar and reduces the congestion inside the concrete element.
- Eliminates the need for hooked rebar.
- Faster, simpler installation.
- Simplifies the structural design.
- Better anchorage in the concrete element.

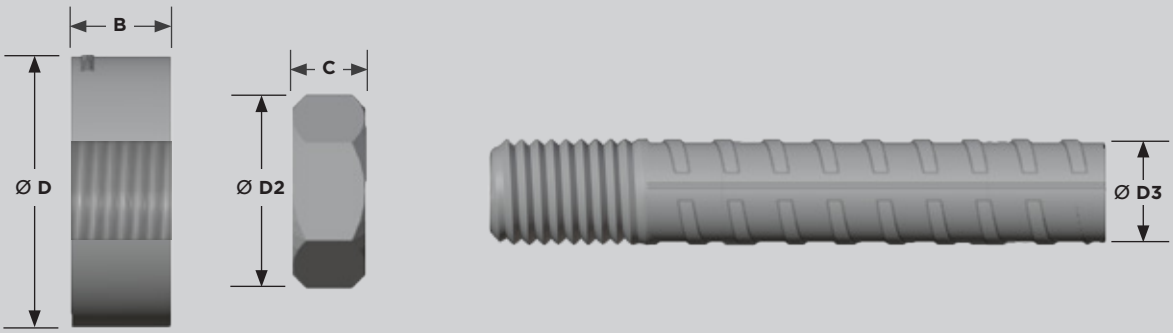
The Linxion End Anchors consist of a threaded round steel plate, which are fitted and secured by a nut to the threaded rebar.
The End Anchor is designed and tested to ensure proper embedding in concrete.
The A and API Anchors have a contact area* at least 4 times the rebar cross section area, whilst the APISL Anchors have a contact area* at least 9 times the rebar cross section area.
(*note that the locking nut is applied to this contact area)

This evaluation considers the strength of the connection between the anchor and the reinforcing steel only and does not address aspects of anchor performance nor its connection to the structure which are matters for the designer or specifier.

2.2 Linxion BTLX A End Anchors

The 40mm A End Anchors as per the dimensions in Table 1 and 2 consists of a threaded reinforcing bar with a locking nut and anchor. The threaded part of the rebar bar is enlarged by cold forging prior a matching external parallel thread is applied.

A End Anchor **Locking Nut Type E** **Threaded Rebar**



Description	D3 mm	D mm	B mm	Weight Kg
BTLX A40	40	95	45	1.72

Table 1 - A End Anchor

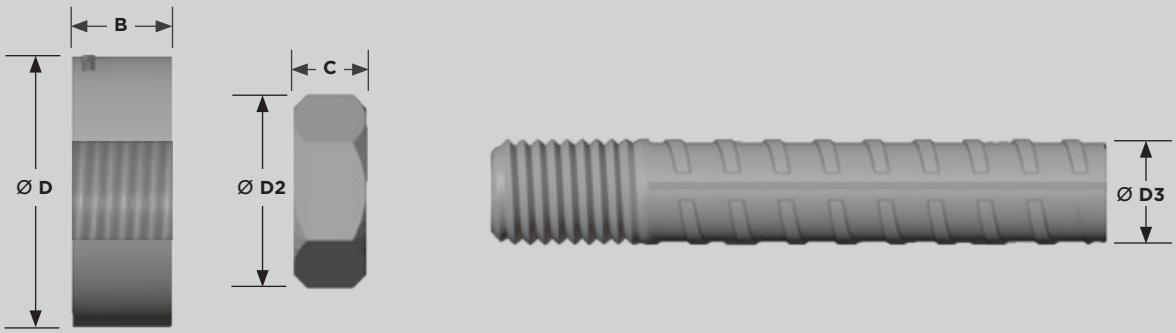
Description	D2 mm	C mm
E40	60	31

Table 2 - Locking Nut Type E

2.3 Linxion BTLX API End Anchors

The 16mm - 40mm API End Anchors as per the dimensions in Table 3 and 4 consists of a threaded reinforcing bar with a locking nut and anchor. The threaded part of the rebar bar is enlarged by cold forging prior a matching external parallel thread is applied.

API End Anchor **Locking Nut Range Pi** **Threaded Rebar**



Description	D3 mm	D mm	B mm	Weight Kg
BTLX API 16	16	38	16	0.06
BTLX API 20	20	48	20	0.11
BTLX API 25	25	60	25	0.44
BTLX API 32	32	75	32	0.89
BTLX API 40	40	95	40	1.80

Table 3 - API End Anchor

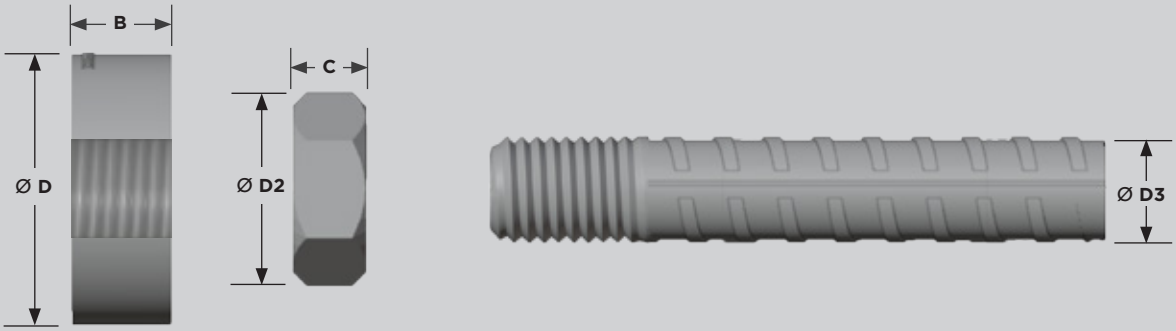
Description	D2 mm	C mm
EPI16	24	13
EPI20	30	16
EPI26	41	22
EPI32	46	24
EPI40	60	31

Table 4 - Locking Nut Range Pi

2.4 Linxion BTLX APISL End Anchors

The 16mm - 40mm APISL End Anchors as per the dimensions in Table 5 and 6 consists of a threaded reinforcing bar with a locking nut and anchor. The threaded part of the rebar bar is enlarged by cold forging prior a matching external parallel thread is applied.

APISL End Anchor **Locking Nut Range Pi** **Threaded Rebar**



Description	D3 mm	D mm	B mm	Weight Kg
BTLX APISL 16	16	55	16	0.27
BTLX APISL 20	20	56	20	0.47
BTLX APISL 26	25-26	85	25	1.00
BTLX APISL 32	30-32	105	32	1.96
BTLX APISL 40	40	130	40	3.74

Table 5 - APISL End anchor

Description	D2 mm	C mm
EPI16	24	13
EPI20	30	16
EPI26	41	22
EPI32	46	24
EPI40	60	31

Table 6 - Locking Nut Range Pi

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 strength requirements

- Permanent elongation 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 BS4449 grade B500B reinforcement.

The evaluation considers the strength of the connection between the anchor and the reinforcing steel only and does not address aspects of anchor performance nor its connection to the structure which are matters for the designer or specifier.

4 Installation

4.1 Process

The bars to be spliced are cut straight and cold-upset using the Bartec Company Machines, and then finally threaded. The machines must be operated by suitable trained staff in accordance with Bartec Company operating instructions. The parts are screwed together and tightened using a suitable wrench.

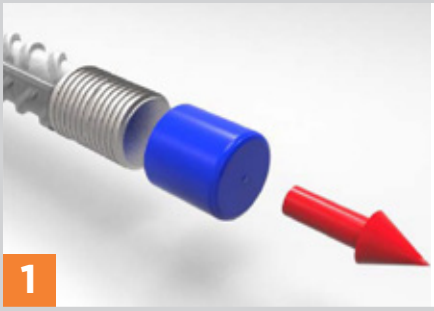
Figure 1 - Mobile production line

Cold upsetting

Thread by cutting

Figure 2

4.2 Linxion BTLX A, BTLX API and BTLX APISL End Anchor Sequences



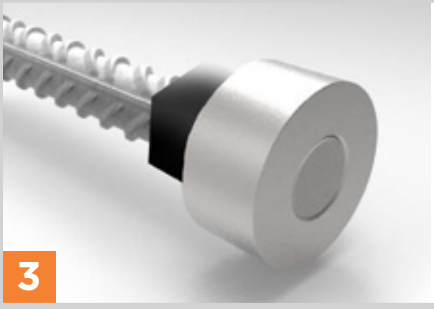
Remove the Threading Protection

Before installing the anchor, make sure that the thread has the correct length and diameter

Fix the Coupler

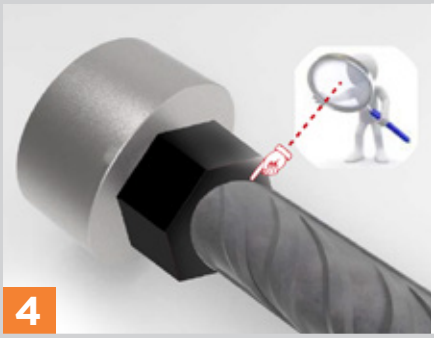
The Anchor and the nut must be screwed in by hand.
Grip the anchor with a standard wrench then tighten the lock nut on the anchor.

(rebar diameter > 25mm : L = 80 cm min)



Completed Installation

The anchor is correctly installed when it is properly fixed at the end of the threading



Completed Installation Inspection

At the end of the operation there is no thread visible on the outside of the coupler.

5 Safety Considerations

Anchors are supplied in cartons weighting up to 25kg, which may be handled manually with care. Heavier cases require the use of mechanical handling equipment. It is advisable to wear suitable protective gloves during handling the cartons, couplers and implementation, as well as during the cutting, upsetting and threading process.

6 Product Testing and Evaluation

Linxion BTLX A, BTLX API and BTLX APISL End Anchors 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

7 Quality Assurance

Linxion BTLX A, BTLX API and BTLX APISL End Anchors End 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 Standard Couplers and Anchors 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

Linxion BTLX A, BTLX API and BTLX APISL End Anchors, 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 Linxion BTLX A, BTLX API and BTLX APISL End Anchors comply with the material requirements of EC2.

8.2 The Building Regulations (Northern Ireland)

Materials and Workmanship

This technical approval gives assurance that Linxion BTLX A, BTLX API and BTLX APISL End Anchors 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 Linxion BTLX A, BTLX API and BTLX APISL End Anchors comply with the material requirements of EC2 by virtue of *Clause 0.8.*

Structure

Linxion BTLX A, BTLX API and BTLX APISL End Anchors, 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 Steel bars for the reinforcement of and use in concrete - 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 Bartec Company 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 5087. Confirmation that this technical approval is current can be obtained from CARES.

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Independent Product Assessments for the Construction Industry

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