

CARES Technical Approval Report TA1-B 5093

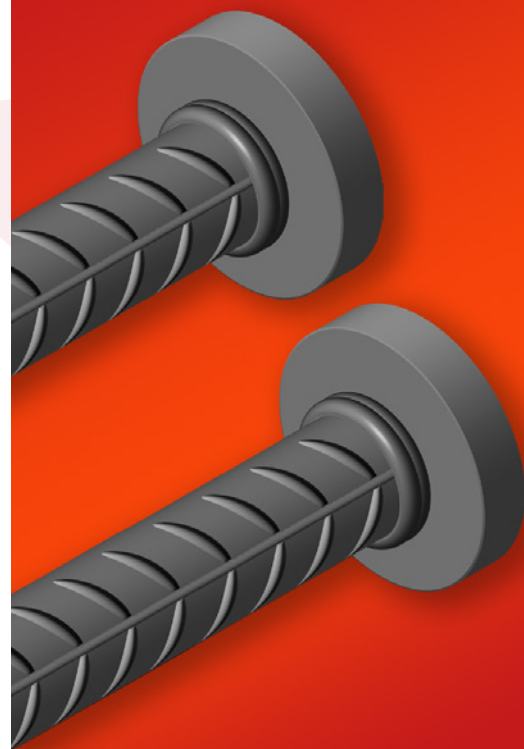


Issue 1



HY-TEN HT.A Mechanical Anchor

Assessment of the
HY-TEN HT.A Mechanical
Anchor Product
and Quality System
for Production



Electronic Copy www.carescertification.com



Product

HY-TEN HT.A Mechanical Anchor for the anchorage of steel reinforcing bars

Product approval held by:

HY-TEN Limited
Chatham Docks
Chatham
Kent
ME4 4SW

Tel: 0800 037 1014 Fax: 01634 892 693
Email: kent@hy-ten.co.uk

1 Product Summary

HY-TEN HT.A Mechanical Anchors in the size range 16mm - 40mm are for the anchorage of steel reinforcing bars complying with the requirements of BS4449 grade B500B, and size range 16mm to 25mm are for the anchorage of steel reinforcing bars complying with the requirements of BS4449 grade B500C.

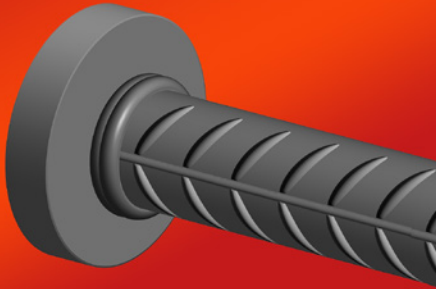
1.1 Scope of Application

HY-TEN HT.A Mechanical Anchors in the size range 16mm to 40mm have been evaluated for use as follows:

- a) TA1-B: Eurocode 2 and BS 8110 for static applications in tension only with BS4449 Grade B500B reinforcement.
- b) BS8597:2015 for mechanical splices in reinforced concrete structures under predominantly static loads in tension only using BS4449 Grade B500B reinforcement.

HY-TEN HT.A Mechanical Anchors in the size range 16mm to 25mm have been evaluated for use as follows:

- a) TA1-B: Eurocode 2 and BS 8110 for static applications in tension only with BS4449 Grade B500C reinforcement.
- b) BS8597:2015 for mechanical splices in reinforced concrete structures under predominantly static loads in tension only using BS4449 Grade B500C reinforcement.



1.2 Design Considerations

Eurocode 2, Clause 8.4 Anchorage of longitudinal reinforcement requires:

8.4.1 General (1)P 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) (5) Where mechanical devices are used the test requirements should be in accordance with the relevant product standard or a European Technical Approval.

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 HY-TEN HT.A Mechanical Anchors in the size range 16mm - 40mm size range 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
May 2024



2 Technical Specification

2.1 General

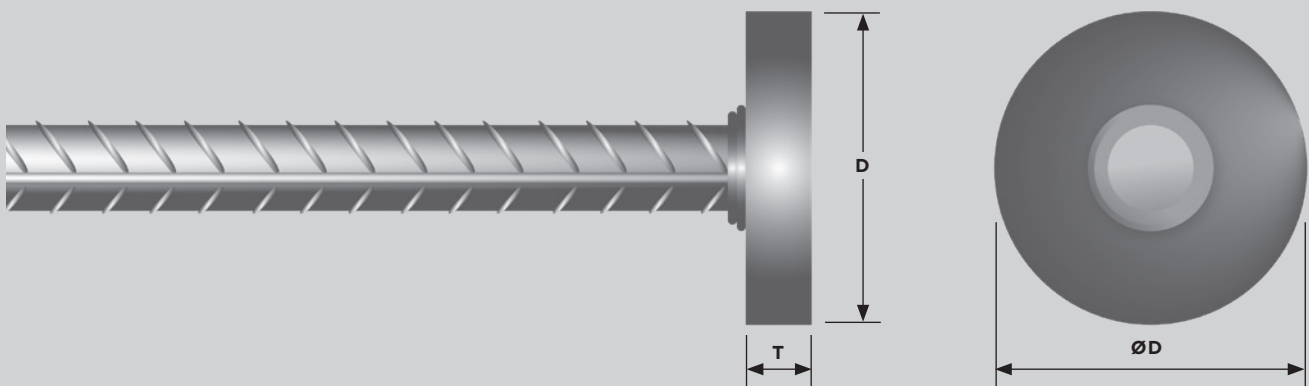
The HY-TEN HT.A Mechanical Anchor is an oversized end anchor secured to the end of a length of reinforced steel, creating anchorage within the concrete. It replaces conventional hooked rebar thereby reducing congestion. The installation is simple and quick allowing for a reduction in placement costs.

2.2 HY-TEN Anchor Range

The HY-TEN HT.A Mechanical Anchor comprises a circular plate which has been friction welded to the reinforcing steel under strict process conditions ensuring weld dimensions are maintained as per table 1 below.

It is recognised that close control of these dimensions is necessary to ensure anchor properties are not adversely affected.

HY-TEN HT.A Mechanical Anchor

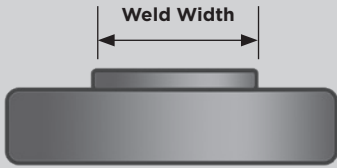


Coupler ref	Rebar Diameter (mm)	Diameter ØD (+/- 1.0mm)	Thickness T (+/- 1.0mm)	Reinforcement B500B tension only	Reinforcement B500C tension only
HT.A 16	16	53	16	Yes	Yes
HT.A 20	20	65	20	Yes	Yes
HT.A 25	25	80	22	Yes	Yes
HT.A 32	32	105	28	Yes	No
HT.A 40	40	125	34	Yes	No

Table 1 - Dimensions

2.3 HY-TEN Anchor Weld Flashing Tolerances

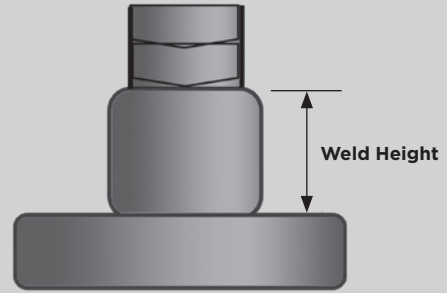
HY-TEN HT.A Mechanical Anchor Weld Width



Diameter (mm)	Average Weld Width (mm)	Minimum Weld Width (mm)	Maximum Weld Width (mm)
16	25	22	30
20	32	26	37
25	35	31	40
32	47	40	55
40	56	46	66

Table 2 - Weld Width

HY-TEN HT.A Mechanical Anchor Weld Height



Diameter (mm)	Average Weld Height (mm)	Minimum Weld Height (mm)	Maximum Weld Height (mm)
16	25	15	35
20	25	15	35
25	25	15	35
32	40	26	54
40	40	26	54

Table 3 Weld Height

www.carescertification.com

Electronic Copy



TECHNICAL APPROVAL 5093



0002



Validate with the CARES Cloud App

3 Product Performance and Characteristics

Full destructive tests have been carried out to demonstrate compliance with performance requirements defined in CARES Appendix TA1-B when used with reinforcing bars to BS4449 Grades B500B and B500C:

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.

CARES APPENDIX TA1-B strength requirements

- Permanent elongation is less than 0.10mm after loading to $0.65f_y$ in tension.
- 99% characteristic tensile strength is greater than 540MPa with B500B reinforcing steel.
- 99% characteristic tensile strength is greater than 575MPa with B500C reinforcing steel.

NB. This Technical report assesses the connection between the anchor head and reinforcing steel. It does not assess the effectiveness of the anchor design. Separate testing may be undertaken to assess this.

4 Installation

HT.A headed anchors can be used as an alternative to L-bars / hooked bars where a full-strength connection is required but may not always be practical due to congestion / fixing restrictions.

HT.A connections can be used in numerous and various applications They are produced to site specifications in our CARES certified depot There is no further installation required on-site, only their application.

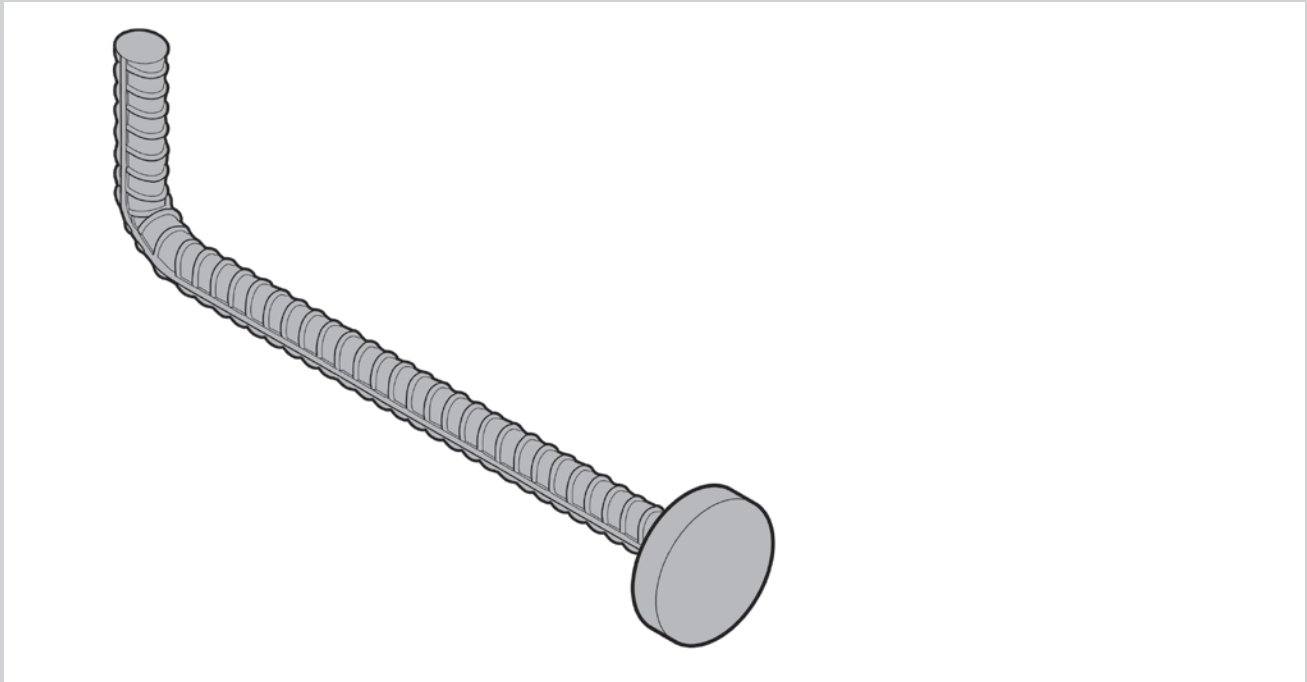


Figure 1 - L Bar

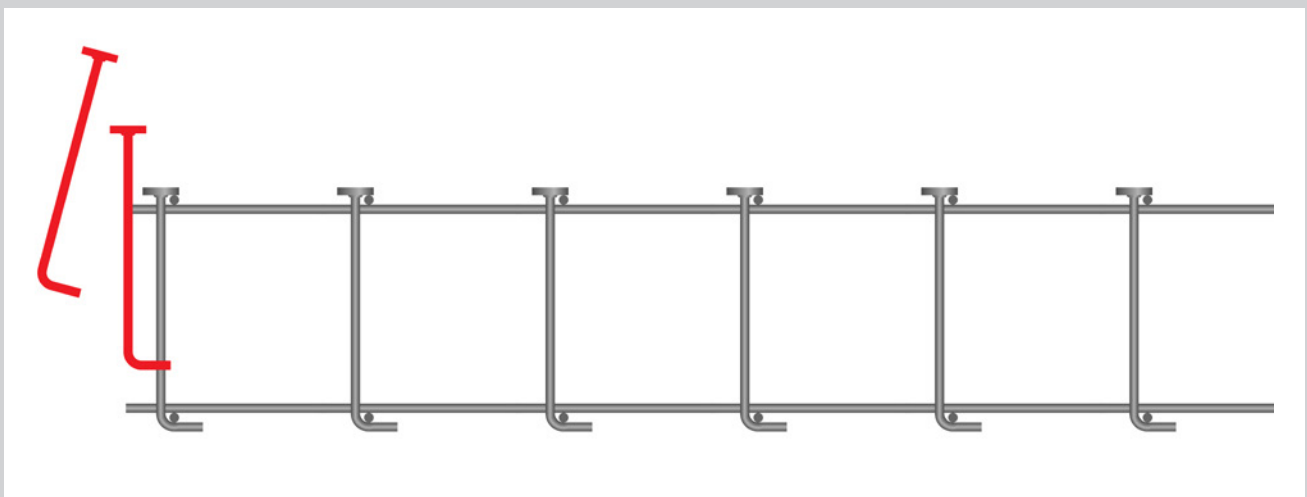


Figure 2 - L Bar Installation

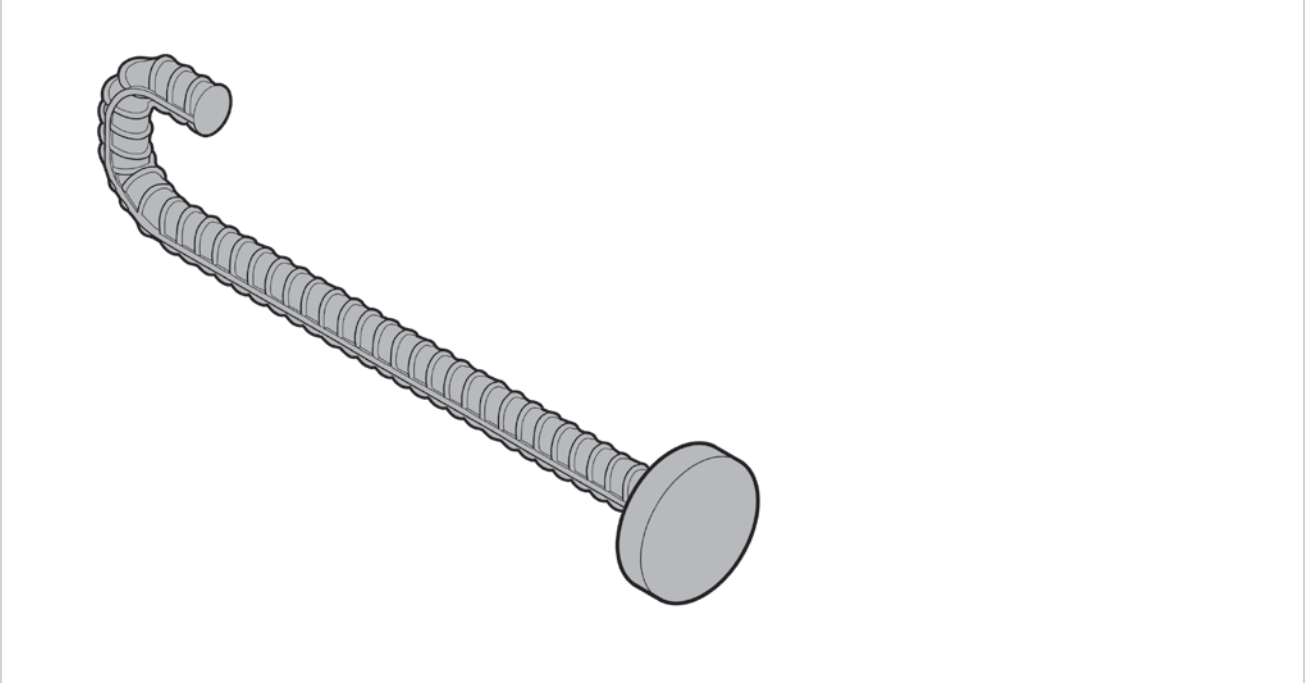


Figure 3 - Hooked Bar

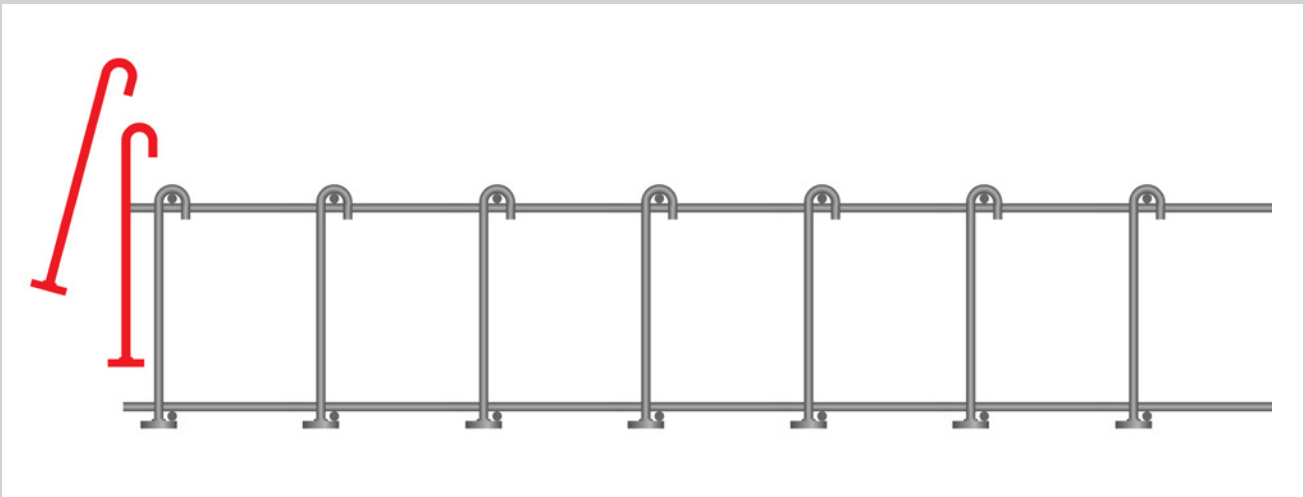


Figure 4 - Hooked Bar Installation

5 Safety Considerations

Anchors are supplied in wooden containers and must be handled with appropriate lifting equipment. It is advisable to wear protective gloves during handling the product during site installation.

6 Product Testing and Evaluation

HY-TEN HT.A Mechanical Anchors have been tested to satisfy the requirements of CARES Appendix TA1-B for Couplers with reinforcing bars to BS4449 Grade B500B and B500C as per table 1.

The testing comprised the following elements:

- Tensile Strength
- Permanent deformation in tension

7 Quality Assurance

HY-TEN HT.A Mechanical Anchors 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 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

HY-TEN HT.A Mechanical 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 HY-TEN HT.A Mechanical Anchors comply with the material requirements of EC2.

8.2 The Building Regulations (Northern Ireland)

Materials and Workmanship

This technical approval gives assurance that HY-TEN HT.A Mechanical 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 HY-TEN HT.A Mechanical Anchors comply with the material requirements of EC2 by virtue of *Clause 0.8*.

Structure

HY-TEN HT.A Mechanical 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 HY-TEN 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 5093. Confirmation that this technical approval is current can be obtained from CARES.



Electronic Copy www.carescertification.com

CARES

Pembroke House
21 Pembroke Road
Sevenoaks
Kent TN13 1XR

Phone: +44(0)1732 450000
E-mail: general@carescertification.com
www.carescertification.com



**Independent Product Assessments
for the Construction Industry**

Copyright CARES ©