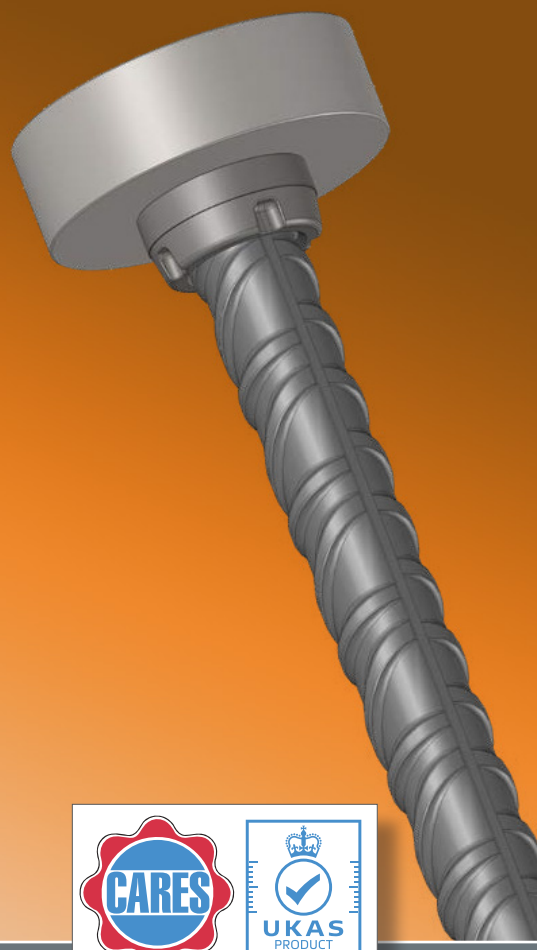
CARES Technical Approval Report TA1-B 5086

Issue 1

ARMATURIS®

Armaturis®
Head Anchors

Assessment of the Armaturis® Head Anchor Product and Quality System for Production



CARES TECHNICAL APPROVAL 5086

UKAS PRODUCT CERTIFICATION 0002

Product

Armaturis® Head Anchors
for reinforcing steel

Product approval held by:

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1 Product Summary

Armaturis® Head Anchors for reinforcing steel are for the mechanical bonding or anchoring 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

Armaturis® Head Anchors in the size range as detailed in tables 1 and 2 has 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 UK CARES that Armaturis® Head Anchors in the size range as detailed in tables 1 and 2 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

March 2022

2 Technical Specification

2.1 General

The function of the Armaturis® Head Anchor is to provide a full strength connection to deformed reinforcing steel bars complying with BS4449 Grade B500B and thereby enable anchorage of reinforcing steel.

The Armaturis® Head Anchor features the following advantages:

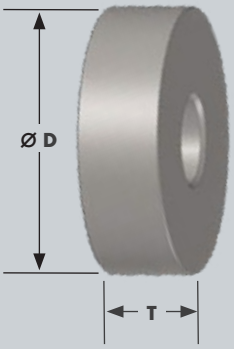
- Minimises the length of the rebar and reduces the congestion inside the concrete element.
- Eliminates the need for hooked rebar.
- Faster, simpler installation.
- Simplifies the structural design.
- Better anchorage in the concrete element.

The Armaturis® Head Anchor consists of a threaded round steel plate and locknut which may be fitted to the Armaturis Rolled Threaded rebar, Armaturis® Head Anchors meet the ACI 318 and Eurocode 2 concerning the embedding lengths for reinforcement steel. The End Anchor is designed and tested to ensure proper embedding in concrete, having a contact area equal to 9 times the rebar cross section area, or a minimum diameter 3 times the rebar diameter.

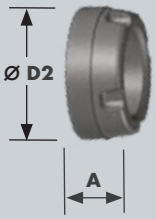
2.2 Armaturis® Head Anchors

The Armaturis® Head Anchors dimensioned in Tables 1 and 2 consist of a threaded round steel plate, a Locknut and Armaturis® Roll Threaded Rebar. The threaded part of the rebar is enlarged by cold forging prior to roll threading to retain the full cross-sectional area of the bar.

Armaturis® PFI Head Anchor



Locknut



Armaturis® Roll Threaded Rebar

Rebar Diameter	Part Number	D	T
12	PFI 12	min 38	12
14	PFI 14	min 45	14
16	PFI 16	min 51	16
20	PFI 20	min 64	20
25	PFI 25	min 80	35
32	PFI 32	min 102	32
40	PFI 40	min 127	40

Table 1 - Armaturis® PFI Head Anchor
(Dimensions in mm)

Part Number	A	D2
FRL 12	10	min 21.6
FRL 14	10	min 21.6
FRL 16	11.5	min 26.9
FRL 20	14	min 32.7
FRL 25	17.5	min 41.3
FRL 32	21	min 50
FRL 40	26.5	min 62.4

Table 2 - Locknuts
(Dimensions in mm)

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

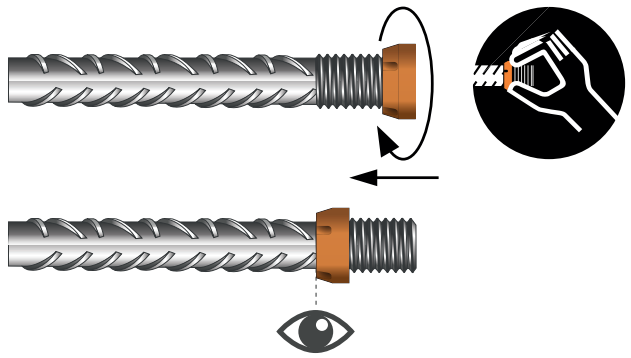
- Permanent elongation is less than 0.10mm after loading to $0.65f_y$ in tension with BS4449 grade B500B reinforcement.
- 99% characteristic tensile strength is greater than 540MPa with BS4449 grade B500B reinforcement.

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 Armaturis® Head Anchor installation

1 Screw on the locknut

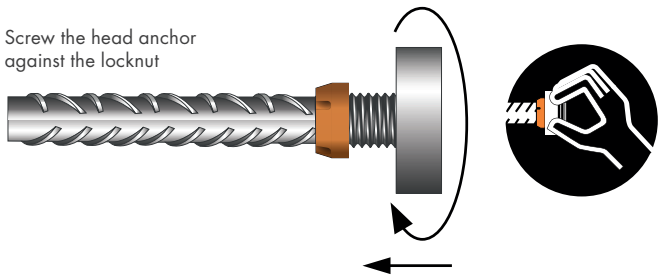


Inspection

- [X] Screw the locknut up to the end of the bar's thread.

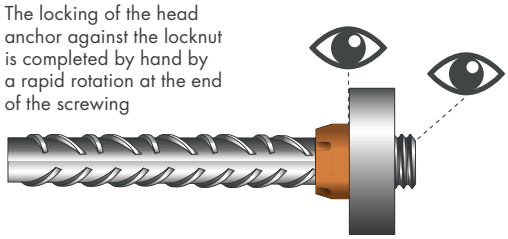
2 Screw on the head anchor

Screw the head anchor against the locknut



Assembly carried out on site:

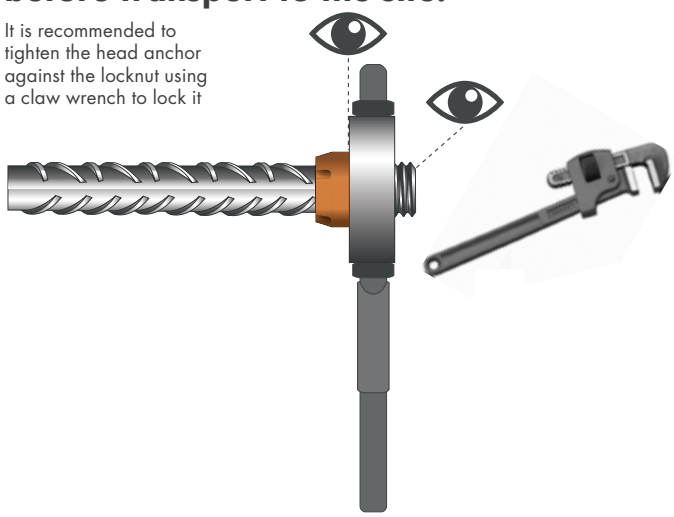
The locking of the head anchor against the locknut is completed by hand by a rapid rotation at the end of the screwing



- [X] The screwing is fully performed when the head anchor comes flat against the locknut.
- [X] One to two threads of the bar thread must protrude from the anchor plate.

Assembly carried out in the factory before transport to the site:

It is recommended to tighten the head anchor against the locknut using a claw wrench to lock it



At this stage of assembly, the Armaturis® Head Anchor guarantees the safety of the rebar-concrete bond.

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

Armaturis® Head 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

Armaturis® Head Anchors 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

Armaturis® Head 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 Armaturis® Head Anchors comply with the material requirements of EC2.

8.2 The Building Regulations (Northern Ireland)

Materials and Workmanship

This technical approval gives assurance that Armaturis® Head 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 Armaturis® Head Anchors comply with the material requirements of EC2 by virtue of *Clause 0.8.*

Structure

Armaturis® Head 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 Armaturis® 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 5086. Confirmation that this technical approval is current can be obtained from UK CARES.

TECHNICAL APPROVAL
5086

UKAS PRODUCT CERTIFICATION
0002

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Independent Product Assessments for the Construction Industry

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