CARES Technical Approval Report TA1-B 5094

Issue 1

nVent LENTON

Product approval held by: ERICO

nVent LENTON
C15N Weldable Coupler

Assessment of the nVent LENTON C15N Weldable Coupler Product and Quality System for Production

TECHNICAL APPROVAL 5094

0002

Validate with the CARES Cloud App

Product

nVent LENTON C15N Weldable Coupler for reinforcing steel

Product approval held by:

ERICO Europe BV,
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The Netherlands

1 Product Summary

nVent LENTON C15N Weldable Couplers in the size range as detailed in table 1 provide a quick and easy solution for connecting BS4449 grades B500B and B500C reinforcing steel bar (rebar) perpendicular to structural steel sections or plates and are machined from weldable grades of steel.

The coupler is internally taper threaded on one end with the other end or exterior surface prepared for welding.

1.1 Scope of Application

nVent LENTON C15N Weldable Couplers in the size range of as detailed in table 1 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 and B500C reinforcement.

b) BS8597:2015 for mechanical splices in reinforced concrete structures under predominantly static loads in tension only using BS4449 Grade B500B and B500C reinforcement.

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."

Clause 8.8 Additional rules for large diameter bars goes on to state that "Splitting forces are higher and dowel action is greater with the use of large diameter bars. Such bars should be anchored with mechanical devices."

The specified cover for fire resistance and durability should be provided to the coupler sleeve. The couplers as detailed in table 1 have been designed with controlled mechanical properties to be compatible with reinforcing bars complying with BS4449 Grades B500B and B500C.

1.3 Conclusion

It is the opinion of CARES that nVent LENTON C15N Weldable Couplers in the size range as detailed in table 1 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.

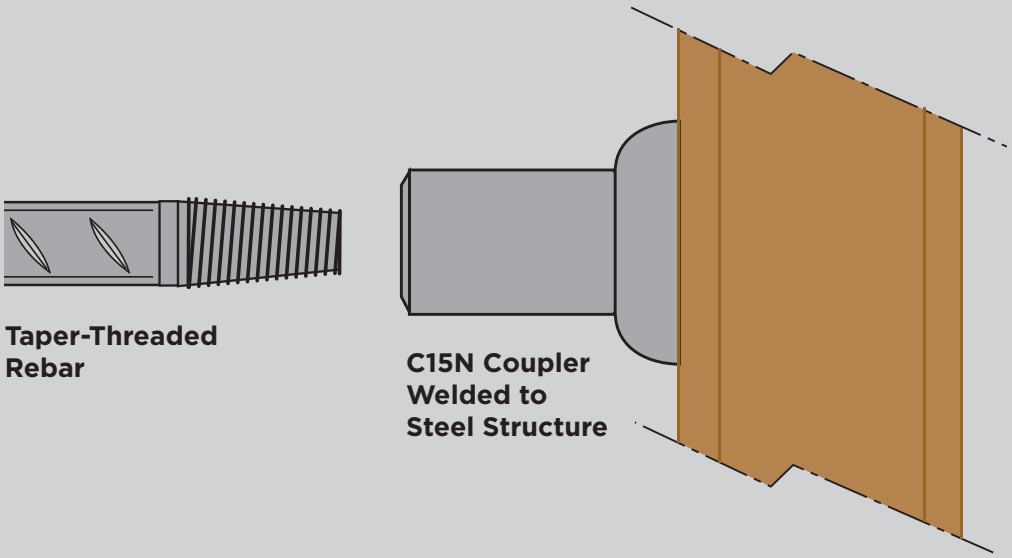
L. Brankley
Chief Executive Officer
August 2024

2 Technical Specification

2.1 General

nVent LENTON C15N Weldable Couplers are designed for composite construction where concrete reinforcement bars must be connected to structural steel. The coupler is made of a weldable grade steel. Part numbers detailed in table 1 are stamped on the couplers. A further suffix and batch identity is also stamped ensuring traceability to the manufacturing unit and production respectively.

2.2 nVent LENTON C15N Weldable Coupler

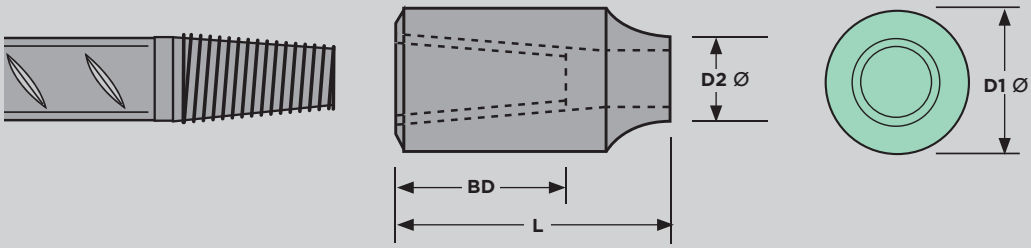


C15N Weldable Coupler

It's important to note that this technical assessment focuses on the coupled joint and does not evaluate the performance of the weld itself. However, it is acknowledged that the welding procedure could negatively impact the performance of the coupled joint.

The assessment tests on the couplers mentioned above were conducted on welds completed by a welding contractor qualified under BS EN 1090-2:2018. As part of the weld preparation process, this contractor developed a welding procedure specification in accordance with BS EN ISO 15609-1:2019. The welding was performed by a welder certified under BS EN ISO 9606-1:2017.

To ensure the integrity of both the coupled joint and the weld, it is crucial that all welding adheres to these standards. Further information is available from nVent.



The dimensions for the C15N Weldable Coupler are as follows:

Size mm	Part No	"D1" mm	"D2" mm	"L" mm	"BD" mm	Weight kg	Colour Plug	Installation Torque Nm
12	EL12C15N	20	10.4	36.3	19	0.06	Red	40
16	EL16C15N	25	13.4	43.2	24	0.10	Black	120
20	EL20C15N	30	15.3	58.9	35	0.19	Yellow	180
25	EL25C15N	40	19.4	66.0	40	0.40	Red	270
32	EL32C15N	50	25.7	73.9	45	0.67	Yellow	300
40	EL40C15N	60	31.6	87.6	57	1.10	Green	350
50	EL50TC15N	75	39.1	110.5	83	2.17	Black	350

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 and B500C as appropriate.

CARES APPENDIX TA1-B requirements

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

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

4 Installation

The bars to be threaded must be cut square and threaded, using LENTON equipment and suitably trained and experienced operatives in accordance with LENTON operating instructions. These operators will have received LENTON equipment training.

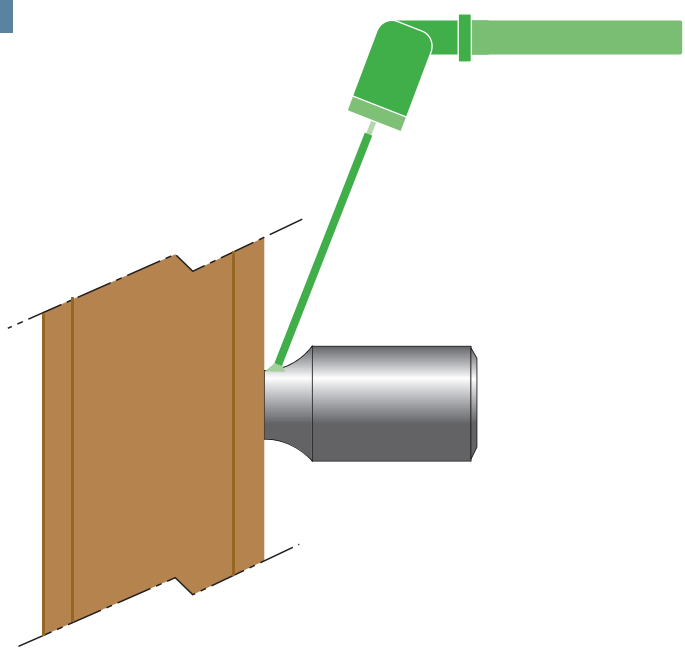
It is essential that the joints are tightened to the correct torque mentioned in the installation manual, using the appropriate LENTON torque wrench.

4.1 nVent LENTON C15N Weldable Coupler

C15N Weldable Couplers are designed for composite construction where concrete reinforcement bars must be connected to structural steel.

C15N Weldable Coupler installation instructions

1

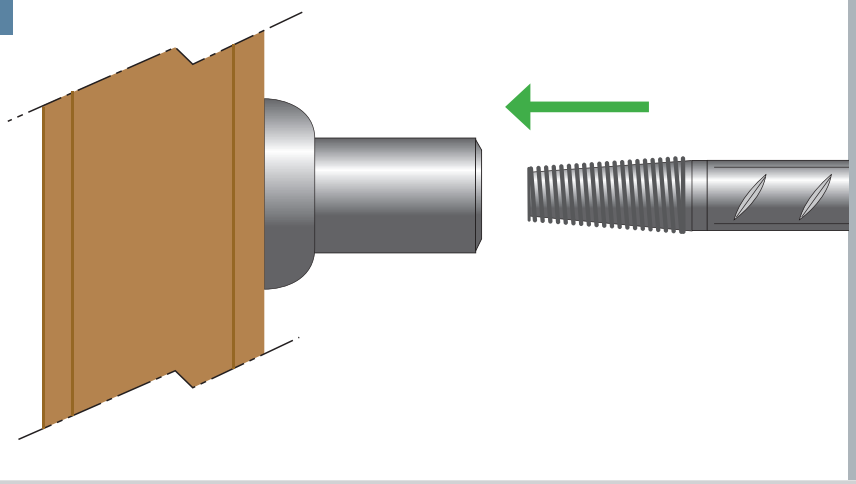


The C15N coupler is welded to the steel structure prior to making the joint.

The welding procedure requires execution class of at least 2 (EXC2) in accordance with EN 1090-2:2018 in accordance with ISO 15609-1:2019 by welders of a qualification in accordance with ISO 9606-1:2017.

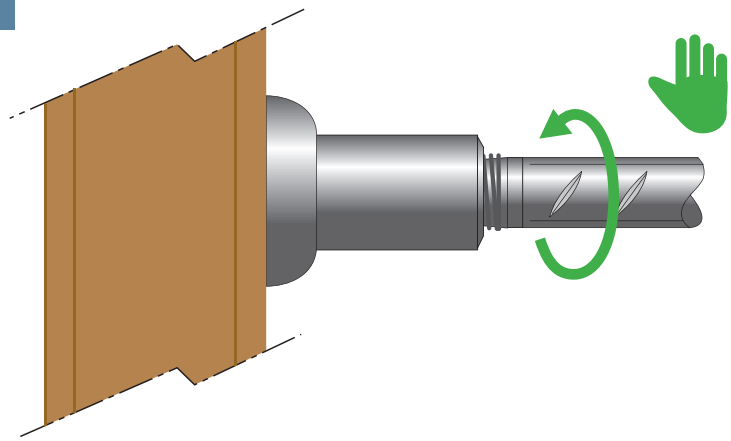
It is essential that all welding conforms to the above requirements. Further details may be obtained from nVent.

2



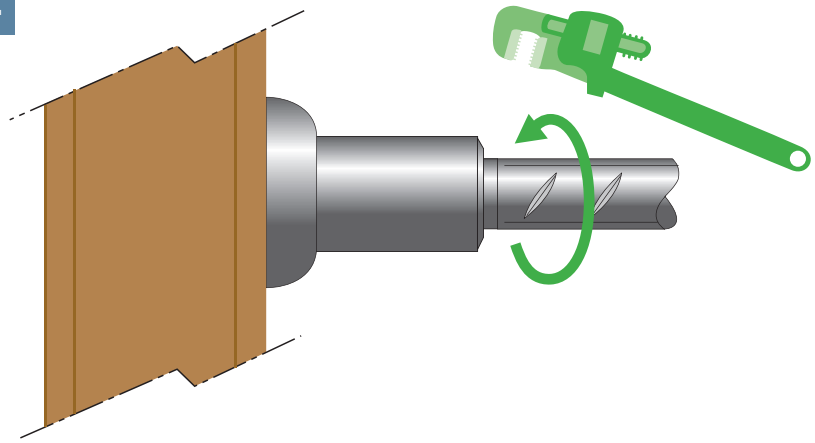
To make the joint bring the tapered threaded continuation bar and the welded coupler together.

3



Screw the taper threaded continuation bar by hand into the coupler.

4



Tighten the joint with a LENTON wrench to the correct torque as specified in the installation manual.

5 Safety Considerations

Care must be taken in handling and installing couplers. Couplers are supplied in containers that have a maximum weight of 25kg. Protective gloves should be worn when handling the containers, threaded bars and installing the couplers.

6 Product Testing and Evaluation

nVent LENTON C15N Weldable Couplers have been tested to satisfy the requirements of CARES TA1-B: Eurocode 2 and BS8110 for static applications in tension only with BS4449 Grade B500B and B500C reinforcement.

BS8597:2015 for mechanical splices in reinforced concrete structures under predominantly static loads in tension only using Grade B500B and B500C reinforcement.

The testing comprised the following elements:
- Tensile Strength
- Permanent deformation in tension

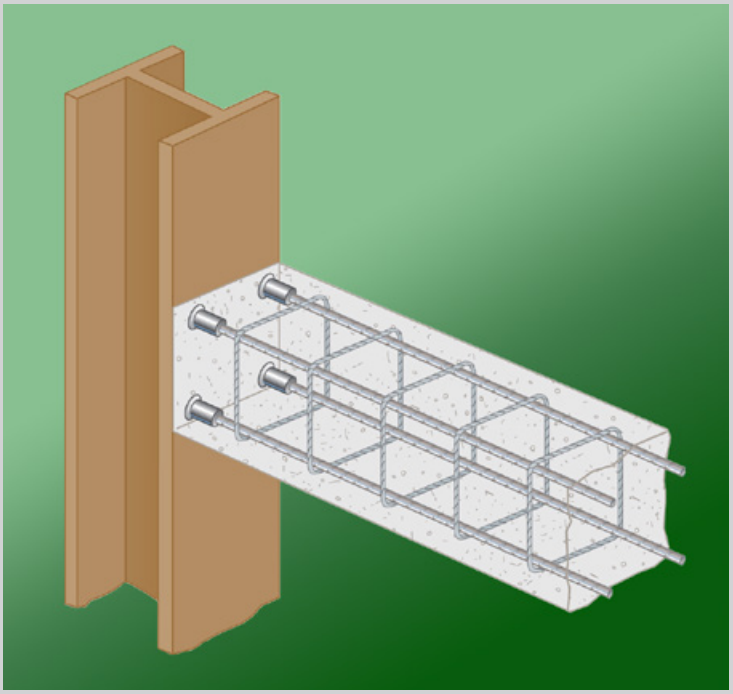
The products are subject to a programme of periodic testing to ensure that they remain within the performance limits of this technical approval.

7 Quality Assurance

nVent LENTON C15N Weldable Couplers for reinforcing steel are produced under a BS EN ISO9001 quality management system certified by CARES at locations agreed with CARES.

The quality management system scheme monitors the production of the C15N Weldable Coupler 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

nVent LENTON C15N Weldable 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 nVent LENTON C15N Weldable Couplers comply with the material requirements of EC2.

8.2 The Building Regulations (Northern Ireland)

Materials and Workmanship

This technical approval gives assurance that nVent LENTON C15N Weldable 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 nVent LENTON C15N Weldable Couplers comply with the material requirements of EC2 by virtue of *Clause 0.8.*

Structure

nVent LENTON C15N Weldable 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

- BS4449: 2005 Steel for the reinforcement of concrete. Weldable reinforcing steel. Bar, coil and decoiled product. Specification.
- BS 8110-1:1997 (revised 2005) 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: 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 Static Loading in Tension or Tension and Compression.
- BS EN 1090-2:2018 Execution of steel structures and aluminium structures - Technical requirements for steel structures Part 2: Technical requirements for steel structures.
- BS EN ISO 15609-1:2019 – TC Specification and qualification of welding procedures for metallic materials. Welding procedure specification - Arc welding.
- BS EN ISO 9606-1:2017 – TC Qualification testing of welders. Fusion welding – Steels.
- BS EN ISO 15613:2004 Specification and qualification of welding procedures for metallic materials. Qualification based on pre-production welding test.

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 nVent 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 5094. Confirmation that this technical approval is current can be obtained from CARES.

nVent LENTON C15N Weldable Coupler Applications

The nVent LENTON C15 Weldable Half Coupler is used in composite reinforced concrete and structural steel construction, primarily to connect reinforcing bar to structural steel members.

Weldable half couplers welded to structural steel columns.

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