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to Article 29 of the Regulation (EU)
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MEMBER OF EOTA



European Technical Assessment ETA-24/0906 of 08/11/2024

General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the
construction product:

Friulsider CONNETTORE screw

Product family to which the
above construction product
belongs:

Self-tapping screws for use in wood-concrete slab kits

Manufacturer:

Friulsider S.p.A.
Via Trieste,1
IT- 33048 S. Giovanni al Natisone (UD)
Tel. +39 0432 747911
Internet www.friulsider.com

Manufacturing plant:

Friulsider S.p.A.
Plant 1

This European Technical
Assessment contains:

10 pages including 3 annexes which form an integral
part of the document

This European Technical
Assessment is issued in
accordance with Regulation
(EU) No 305/2011, on the
basis of:

European Assessment Document (EAD) no EAD
130090-00-0303 "Wood-concrete composite slab with
dowel-type fasteners"

This version replaces:

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product

This ETA is an assessment of the Friulsider CONNETTORE screw for wood-concrete composite slab kits. The diameter of the Friulsider CONNETTORE screw is 8 mm and 12 mm with length 120 mm and 150 mm respectively. Shape and tolerances of the screws are given in Annex 3.

The kits are individually designed to meet the requirements put on the works.

Friulsider S.p.A delivers the Friulsider CONNETTORE screw for the composite action to be used as kit components. The composite members may be prefabricated at factory, or they may be composed at the building site. The proper function of the wood-concrete composite slabs provides for the following components to be added in the factory or at the building site:

Base Material:

- Timber members, made from glued laminated timber or glued solid timber GL24 according to EN 14080.

Moulding:

- In the case of concrete cast at the building site: optional intermediate layer between the concrete and the timber as formwork, e.g. timber boards or wood based panel. Lateral moulding along the edges of the slab. This moulding has no function in the final product
- In the case of prefabricated concrete slab: no intermediate layer between timber and concrete is needed.
- No essential characteristics are assessed for the moulding.

Finalisation of wood-concrete composite slab kit:

- Concrete slab, according to EN 206-1, and reinforcement according to EN 10080 and national regulations either prefabricated or cast at the building site.
- The concrete slab is not part of the kit. No characteristics are assessed for the concrete slab.

Finished floor or ceiling covering as well as possible sound reducing courses are not part of the kit.

The concrete flange is loaded in compression. The timber members are usually parallel or almost parallel.

This ETA covers screws for composite members with minimum concrete flange depths which comply with the regulations on the minimum slab depths in the place of use (national regulations) but not less than 50 mm and minimum timber member depths of 100 mm. The maximum concrete flange depth is 70 % of the timber member depth. Typical spans for the construction are up to 8 m with sawn softwood timber members, 10 m with LVL members and 14 m with glulam members but larger spans also are possible.

A typical composite member is shown in figure 1.1a of Annex 1. A screw is shown in figure 1.1b.

2 Specification of the intended use in accordance with the applicable European Assessment Document

Friulsider CONNETTORE screw are intended to be used in structural composite members such as floor, roof, or wall constructions in service classes 1 and 2 as defined in EN 1995-1-1 subject to static or quasi static loading. In addition, use class 3.1 as defined in EN 335-1 (exterior, above ground, protected) is possible, as balconies, depending on national provisions.

The provisions made in this European Technical Assessment are based on an assumed working life of Friulsider CONNETTORE screw for wood-concrete composite floors of 50 years, provided that the conditions laid down in this ETA for the installation, use and maintenance are met.

The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works

3 Performance of the product and references to the methods used for its assessment

Characteristic	Assessment of characteristic
3.1 Mechanical resistance and stability (BWR 1)*)	
Structural performance	Wood-concrete composite slabs including Friulsider CONNETTORE screw are used and manufactured according to an individual design made by a structural engineer responsible for the design of works on a case-by-case basis. Wood-concrete composite floors may function as directly load bearing and structural bracing members. The structural performance of them shall be considered in accordance with the limit state design principles specified in Eurocodes. The performance of the composite slab is outside of this ETA.
Material	See annex 3 The screws are made of steel as specified in the control plan and corrosion protected with a zinc coating.
Geometry	See annex 3
Mechanical strength	See annex 2
Mechanical stiffness	See annex 3
Corrosion protection	See 3.4
Shear resistance	See annex 3
3.2 Safety in case of fire (BWR 2)	
Reaction to fire	The screws are made from steel classified as Euroclass A1 in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364

*) See additional information in section 3.3 – 3.4.

3.3 General aspects

Friulsider S.p.A delivers Friulsider CONNETTORE screw intended to be used as components in wood-concrete composite slabs in accordance with the provisions of this European Technical Assessment. The Friulsider CONNETTORE screws are manufactured in the factory in accordance with the provisions of this European Technical Assessment as identified during inspection of the plant.

Friulsider CONNETTORE screws shall be installed on the basis of a specific structural design for each composite slab installation. Load bearing capacities to be used in the design are given in Annex 2.

The design also shall take into account any aspects regarding installation of the kit components, as any temporary bracing and supporting. Wood-concrete composite slabs shall be installed by appropriately qualified personnel, following the installation plan. Only screws without any defects are allowed to be used. Before concrete is poured, the person responsible for the design of the works shall check the set of the Friulsider CONNETTORE screws to be in accordance with the design. The manufacturer shall ensure that the information of these provisions is given to those concerned.

3.4 Aspects related to the performance of the product

3.4.1 Corrosion protection in service class 1 and 2.
Durability of the finished composite slab is not covered by this ETA.

Durability of the Friulsider CONNETTORE screw is provided for by the protective zinc coating for a minimum thickness of 5 µm

4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base

4.1 AVCP system

According to the decision 2000/447/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1.

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

Issued in Copenhagen on 2024-11-08 by



Thomas Bruun
Managing Director, ETA-Danmark

ANNEX 1
WOOD-CONCRETE COMPOSITE SLAB COMPOSED WITH
FRIULSIDER CONNETTORE SCREW

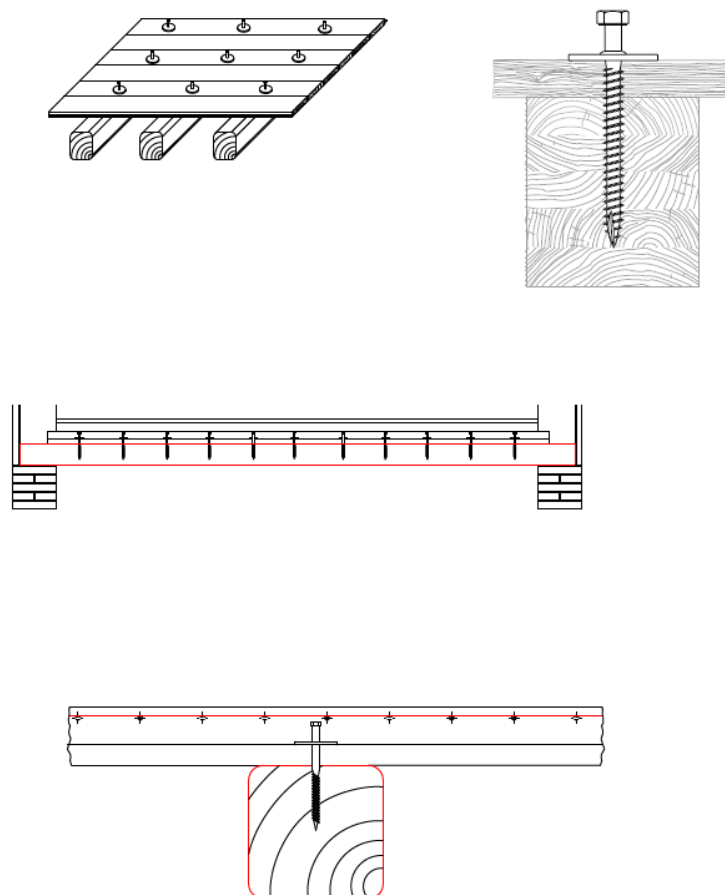


Figure 1.1a Elevation on a composite member with Friulsider CONNETTORE screw

Table 1.1 – Minimum spacing, end and edge distances for Friulsider CONNETTORE screw in mm

		d (mm)		d (mm)
		$\alpha=90^\circ$	8	12
Spacing // to grain	a ₁	4d	45	58
Spacing $\perp$ to grain	a ₂	$(3+\sin(\alpha)) \times d$	45	58
Loaded end distance // to grain	a _{3,t}	$(7+5\cos(\alpha)) \times d$	56	84
Unloaded end distance // to grain	a _{3,c}	7d	56	84
Loaded end distance $\perp$ to grain	a _{4,t}	$(3+4\sin(\alpha)) \times d$	56	84
Unloaded end distance $\perp$ to grain	a _{4,c}	3d	24	36

The composition of the screw materials is deposited at ETA Danmark.

The length and diameter of the screws is given in Annex 3.

ANNEX 2

MECHANICAL PROPERTIES

Resistance and stiffness

Structural model

Composite members with Friulsider CONNETTORE screws are to be designed taking into account the influence of the slip occurring in the joints. A method for the calculation of the load bearing capacity and the deformation of mechanically jointed beams or columns is given in Annexes B and C of Eurocode 5 Part 1-1: General – Common rules and rules for buildings. Calculations should be carried out assuming a linear relationship between force and slip. Alternative methods for the calculation based on numerical models are also applicable.

For the determination of the internal forces and moments an elastic behaviour of the concrete may be assumed if the tensile stress in the concrete does not exceed twice the concrete tensile strength.

Friction between timber and concrete may be taken into account, if no acoustic interlayer is placed between timber and concrete. The friction coefficient may in this case be assumed as $\mu = 0,25$.

Apart from the design of the composite member, the load-carrying-capacity of the concrete layer spanning above the timber beams and the shear capacity of the timber member in the perimeter area around the screws should be checked.

Design of the wood-concrete composite slab

The design of the wood-concrete composite slab in the ultimate and the serviceability limit states shall take into account the influence of creep, concrete shrinkage and moisture changes. The verification of the limit states is to be performed both for the initial state ($t = 0$) and the final state ($t = \infty$). The influence of creep and moisture changes may be taken into account by reducing the modulus of elasticity of the timber and concrete and the slip modulus to be used in calculations analogous with EN 1995-1-1 and EN 1992-1-1. The values of the deformation factors k_{def} given in Table 2.1 should be used. For prefabricated concrete slabs, the concrete shrinkage may be disregarded.

Table 2.1 – Values of k_{def} for timber, concrete and Friulsider CONNETTORE

Material	Service class	
	1	2
Glued Laminated timber, EN 14080	0,6	0,8

For timber-concrete composite joints made with Friulsider CONNETTORE screws the slip modulus K_{ser} per fastener under service load parallel to the shear plane is 4,10 kN/mm for 8 mm screws and 9,47 kN/mm for 12 mm screws and the ultimate slip moduli, K_u is 2,80 kN/mm for 8 mm screws and 6,26 kN/mm for 12 mm screws.

Table 2.2 – Properties of Friulsider CONNETTORE.

Friulsider CONNETTORE in 20 mm decking	d = 8 mm	d = 12 mm
Yield moment $M_{y,k}$ [Nm]	16,61	66,84
Tensile capacity $F_{tens,k}$ [kN]	13,64	34,06
Torsional strength, $f_{tor,k}$ [Nm]	15,66	44,74
Insertion moment, $M_{i,k}$ [Nm]	8,24	37,82
Shear resistance, $F_{v,k}$ [kN]	6,64	14,83
Withdrawal parameter $f_{ax,k}$ [MPa]	5,06	7,36

ANNEX 3

SPECIFICATION OF THE FRIULSIDER CONNETTORE SCREW

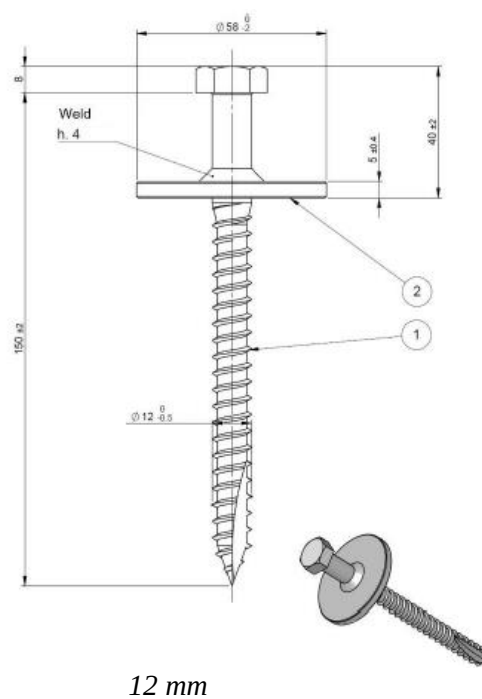
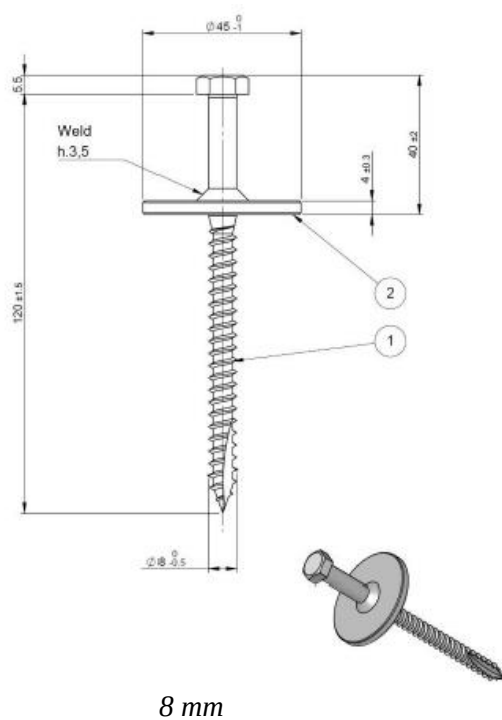


Figure 3.1b Friulsider CONNETTORE screw