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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-16/0864 of 2025/07/08

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:	Eurotec TCC-II Ø7,3 and TCC-II Ø9,0 and shear bolt SB-40 and SB-60 connectors
Product family to which the above construction product belongs:	Self-tapping screws and steel cylinders as dowel-type fasteners for use in wood-concrete slab kits
Manufacturer:	E.u.r.o. Tec GmbH Unter dem Hofe 5 D-58099 Hagen Tel. +49 2331 / 6245 - 0 Fax +49 2331 / 6245 - 200 Internet www.eurotec.team
Manufacturing plant:	Held on file by ETA-Danmark A/S
This European Technical Assessment contains:	16 pages including 10 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:	The ETA with the same number issued on 2022-05-17

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

This ETA is an assessment of the TCC-II Ø7,3x150, Ø7,3x210 and TCC-II Ø9,0x180, Ø9,0x230 mm Connectors and the Eurotec shear bolts SB-40 and SB-60 for wood-concrete composite slab kits. The diameter of the TCC-II Ø7,3 connectors is 7,3 mm, the length is 150 or 210 mm. The diameter of the TCC-II Ø9,0 connectors is 9,0 mm, the length is 180 or 230 mm. The diameter of the steel cylinder of Eurotec shear bolts is 40 mm, the length is 40 or 60 mm. Eurotec shear bolts are connected to the timber member with self-tapping KontruX ST SK screws 6,5x100 according to ETA-11/0024. Shape and tolerances of the components of the Eurotec shear bolts and the screws are given in Annex 3.

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

E.u.r.o. Tec GmbH delivers the TCC-II Ø7,3 and TCC-II Ø9,0 mm Connectors and the Eurotec shear bolts SB 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:

- Concrete slab, according to EN 206-1, and reinforcement according to EN 10080 and national regulations either prefabricated or cast at the building site.
- In the case of concrete cast at the building site: formwork, e.g. timber boards or wood-based panel. For TCC-II Ø7,3 and TCC-II Ø9,0 Connectors this is an optional intermediate layer between the concrete and the timber. For Eurotec shear bolts no wood-based intermediate layer is used. When the concrete slabs are prefabricated, no intermediate layer between timber and concrete is needed.
- In the case of concrete cast at the building site: lateral moulding along the edges of the slab.
- Timber members, e.g. glulam according to EN 14080, sawn softwood timber according to EN 14081-1, LVL according to EN 14374 or cross laminated timber according to ETA.

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 of 50 mm and minimum timber member depths of 100 mm. The minimum concrete flange depth for Eurotec shear bolts is 60 mm for SB-40 or 80 mm for the SB-60 respectively. The maximum concrete flange depth is 70 % of the timber member depth. Typical span widths 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 span widths also are possible.

A typical composite member with TCC-II Connectors is shown in figure 1.1a of Annex 1. Slab kits with SB Connectors are shown in figure 1.1b.

2 Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)

TCC-II Ø7,3 and TCC-II Ø9,0 Connectors and Eurotec shear bolts 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 (exterior, above ground, protected) is possible, as balconies.

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life for the fasteners of at least 50 years for the TCC-II Ø7,3, the TCC-II Ø9,0 Connectors and the Eurotec shear bolts.

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 product 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 TCC-II Ø7,3 or TCC-II Ø9,0 Connectors or Eurotec shear bolts 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. The screws are made of case hardened steel as specified in the control plan and corrosion protected with a zinc coating. Geometry of the screws is defined in Annex 3. Mechanical properties of TCC-II Ø7,3 and TCC-II Ø9,0 mm Connectors and the Eurotec shear bolts and applicable creep and duration of load factors for composite members are given in Annex 2.
3.2 Safety in case of fire (BWR 2)	
Reaction to fire	TCC-II Ø7,3 and TCC-II Ø9,0 mm Connectors including the zinc coating and Eurotec shear bolts are classified non-combustible in accordance with EC Decision 2000/147/EC and fulfil the requirements of class A1 according to EN 13501-1.

*) See additional information in section 3.3 – 3.4.

In addition to the specific clauses relating to dangerous substances contained in this European technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.3 General aspects

E.u.r.o. Tec GmbH delivers TCC-II Ø7,3 and TCC-II Ø9,0 Connectors and Eurotec shear bolts intended to be component in wood-concrete composite slabs in accordance with the provisions of this European Technical Assessment. TCC-II Ø7,3 and TCC-II Ø9,0 Connectors and Eurotec shear bolts are manufactured in the factory in accordance with the provisions of this European Technical Assessment.

TCC-II Ø7,3 and TCC-II Ø9,0 Connectors and Eurotec shear bolts 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 TCC-II Ø7,3 and TCC-II Ø9,0 Connectors and Eurotec shear bolts 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 TCC-II Ø7,3 and TCC-II Ø9,0 Connectors and Eurotec shear bolts 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 TCC-II Ø7,3 and TCC-II Ø9,0 Connectors and the KonstruX screws for the shear bolts is provided for by the protective zinc coating for a mean thickness of 5 µm. The KonstruX connectors and the metric bolts 14x60 or 14x80 (Grade 8.8) do not require corrosion protection in service classes 1 and 2.

4 Assessment and verification of constancy of performance (AVCP)

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 foreseen in the applicable EAD

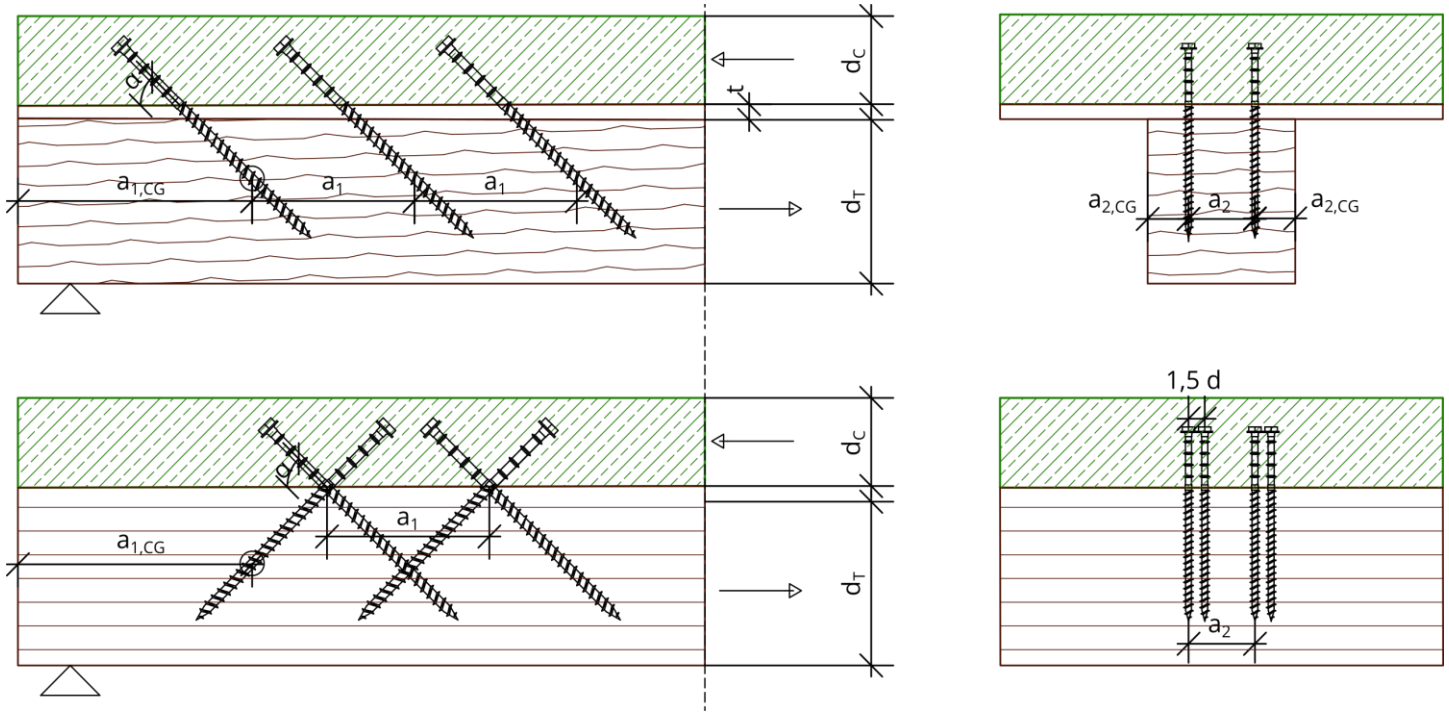
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

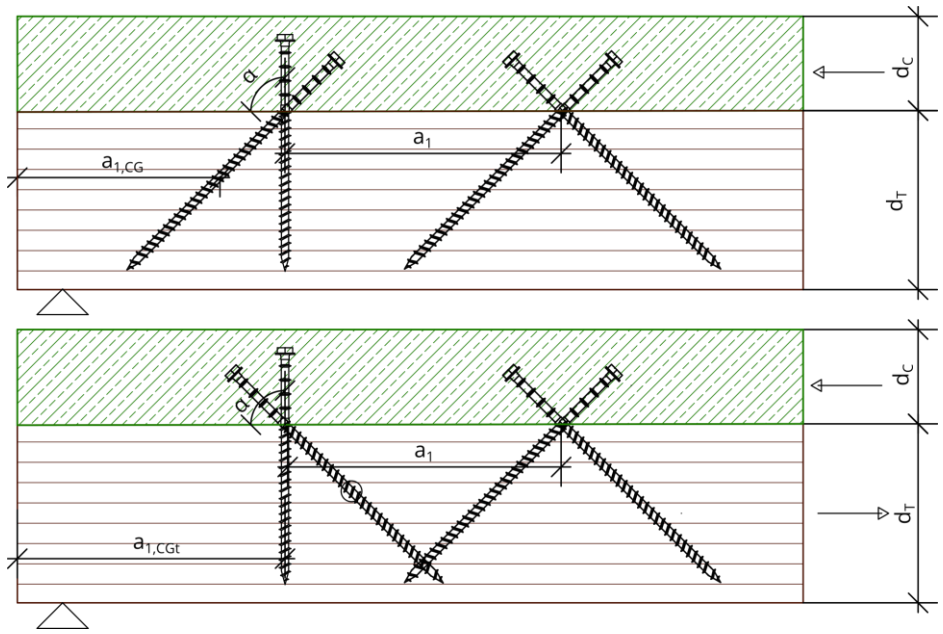
Issued in Copenhagen on 2025-07-08 by

Thomas Bruun
Managing Director, ETA-Danma

ANNEX 1
WOOD-CONCRETE COMPOSITE SLAB COMPOSED WITH TCC-II Ø7,3 AND TCC-II Ø9,0 CONNECTORS AND SHEAR BOLTS

Figure 1.1a Elevation on (left) and cross-section through (right) a composite member with TCC-II screws





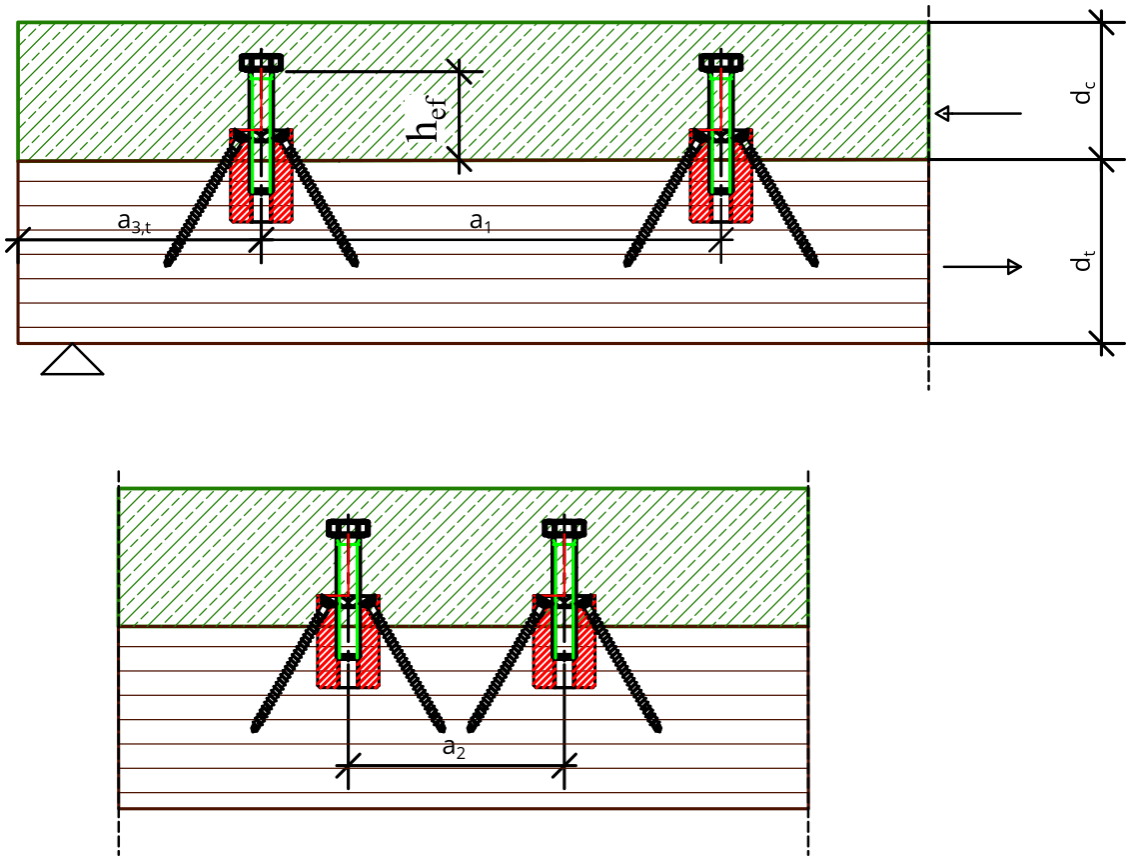


Figure 1.1b Elevation on (above) and cross-section through (right) a composite member with shear bolt

Table 1.1 – Minimum spacing, end and edge distances for TCC-II Ø7,3 and TCC-II Ø9,0 mm screws and Eurotec shear bolts in mm

	TCC-II Ø7,3	TCC-II Ø9,0	Eurotec shear bolts	
			SB-40	SB-60
Spacing parallel to grain a_1	80	100	300	
Spacing perpendicular to grain a_2	30	45	120	180
Spacing within a crossed screw pair	11	14	-	
End distance $a_{1,CG}$ for TCC-II $a_{3,t}$ for SB	80	100	150	200
Edge distance $a_{1,CG}$ or $a_{4,c}$	30	36	60	70
Minimum timber depth d_t	According screws' arrangement		100	120
Minimum concrete depth d_c	$50mm \leq d_c \leq 0{,}7d_t$		SB40: $d_c \geq 60$ mm $h_{ef} = 40mm$ SB60: $d_c \geq 80$ mm $h_{ef} = 60mm$	
Interlayer thickness t	$t \leq 50$ mm		Foil or no interlayer	
Angle between screw axis and grain for unidirectional inclined TCC-II	30°, 45°, 90°		-	

The composition of the screw materials is deposited at ETA Danmark.
The length and diameter of the screws is given in Annex 3. More exact description of the shape and tolerances of the screws are referred to under 3.2.2.1 in the Control plan.

ANNEX 2
MECHANICAL PROPERTIES

Resistance and stiffness

Structural model

Composite members with TCC-II Ø7,3 and TCC-II Ø9,0 Connectors or Eurotec shear bolts 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 only for unidirectionally inclined TCC-II Ø7,3 and TCC-II Ø9,0 Connectors. The friction coefficient may be assumed as $\mu = 0,25$.

In order to apply the friction between the concrete slab and the timber beam for the calculation of the system, the following conditions shall be fulfilled:

- Static system as single span or continuous girder
- Predominantly static load
- Screws arranged unidirectionally inclined with systematically existing compression force between wood and concrete for reasons of equilibrium

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

The timber beam may only be arranged on top of the concrete slab, if tensile forces perpendicular to the joint line between timber and concrete are transferred by screws arranged perpendicular to the joint line.

The support of the wood concrete composite elements shall be carried out via the lower cross-sectional part either directly by contact or by appropriate connections.

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 = ∞). 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. 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 TCC-II Ø7,3, TCC-II Ø9,0 Connectors and Eurotec shear bolts

Material	Service class	
	1	2
Solid timber, EN 14081-1	0,6	2,0
Glued Laminated timber, EN 14080	0,6	2,0
LVL, EN 14374	0,6	2,0
Cross laminated timber, ETA	0,8	2,0
Concrete, EN 206-1	2,5	2,5
Joint TCC-II Ø7,3, Ø9,0 Connectors and Eurotec shear bolt	0,6	4,0

For timber-concrete composite joints made with TCC-II Ø7,3 and TCC-II Ø9,0 Connectors the slip modulus K_{ser} per fastener under service load parallel to the shear plane should be taken from Table 2.2 with ℓ_{ef} in mm.

Table 2.2 – Values of K_{ser} for timber-concrete-joints with TCC-II Ø7,3,TCC-II Ø9,0 mm Connectors and Eurotec shear bolts

Connector orientation	K_{ser} in N/mm				
	TCC-II connectors with interlayer		TCC-II connectors with direct contact between timber and concrete		Eurotec shear bolts
	d = 7,3 mm	d = 9,0 mm	d = 7,3 mm	d = 9,0 mm	
Single 90°	600	700	1800	2200	$1,4 \cdot F_{Rk}$
Single 30°, 45°	110 ℓ_{ef}	110 ℓ_{ef}	110 ℓ_{ef}	110 ℓ_{ef}	-
Crossed Pair ±45°	185 ℓ_{ef}	225 ℓ_{ef}	185 ℓ_{ef}	225 ℓ_{ef}	--
Pair 45°/90°	61 ℓ_{ef}	75 ℓ_{ef}	61 ℓ_{ef}	75 ℓ_{ef}	-

For timber-concrete composite joints made with TCC-II Ø7,3,TCC-II Ø9,0 Connectors and Eurotec shear bolts the characteristic load bearing capacity per single fastener or per crossed screw pair F_{Rk} parallel to the shear plane should be taken from Tables 2.3a and 2,3b with ρ_k in kg/m³ and d and ℓ_{ef} in mm. Characteristic yield moment M_{yk} is given in Table 2.4.

Table 2.3a – Values of F_{Rk} for timber-concrete-joints with TCC-II Ø7,3 and TCC-II Ø9,0 mm Connectors.

Connector orientation	F_{Rk} in N	
	With interlayer	Direct contact between timber and concrete
Single $\alpha = 90°$	$f_{h,2,k} \cdot d \cdot t \left[\sqrt{1 + \frac{4 \cdot M_{y,k}}{f_{h,2,k} \cdot d \cdot t^2} + \frac{f_{h,1,k}}{2 \cdot f_{h,2,k}}} - 1\right]$	$\sqrt{4 \cdot M_{y,k} \cdot f_{h,2,k} \cdot d}$
Single unidirectionally inclined under α=30° or α=45°	$F_{Rk} = (cos\alpha + \mu \cdot sin\alpha) \cdot min\{1{,}2 \cdot F_{ax,\alpha,Rk}; f_{tens,k}\}$ for more than one TCC screw in the section and the longer types 7,3x210 or 9,0x230 a_1 and a_2 must be augmented under the assumption of cracked concrete $a_1 \geq 120mm$ strength class C20/25 cracked TCC 7,3x210: $a_2 \geq 90mm$; TCC 9x230: $a_2 \geq 140mm$ strength class C25/30 cracked TCC 7,3x210: $a_2 \geq 70mm$; TCC 9x230: $a_2 \geq 120mm$ strength class C30/37 cracked TCC 7,3x210: $a_2 \geq 50mm$; TCC 9x230: $a_2 \geq 100mm$	
Crossed Pair $\alpha = \pm 45°$	$F_{Rk} = \sqrt{2} \cdot min\{1{,}2 \cdot F_{ax,\alpha,Rk}; f_{tens,k}\}$	
Crossed Pair $\alpha = 90°/45°$	$F_{Rk} = min\{1{,}2 \cdot F_{ax,\alpha,Rk}; f_{tens,k}\}$	

where:

t	is the interlayer thickness in mm;
$f_{h,1,k}$	is the characteristic embedment strength in the interlayer in MPa;
$f_{h,2,k}$	is the characteristic embedment strength in the timber member in MPa;
d	is the connector diameter in mm;
$M_{y,k}$	is the characteristic fastener yield moment in Nmm;

$F_{ax,\alpha,Rk}$ is the characteristic $F_{ax,\alpha,Rk} = k_{ax} \cdot f_{ax,k} \cdot d \cdot \ell_{ef} \cdot \left(\frac{\rho_k}{350kg/m^3}\right)^{0,8}$ withdrawal capacity in N:

ℓ_{ef}	is the penetration depth of the connector in the timber member in mm;
ρ_k	is the characteristic timber member density in kg/m³;
k_{ax}	effect of angle α between screw axis and grain $k_{ax} = 0{,}3 + 0{,}7 \cdot \alpha/45$ for $\alpha < 45°$ else $k_{ax} = 1$
μ	friction factor μ=0,25

Table 2.3b – Values of F_{Rk} for timber-concrete-joints with shear bolts SB.

$F_{Rk} = min\{F_{Rk,timber}; F_{Rk,concrete}\}$		$F_{Rk,timber}$	$F_{Rk,concrete}$
SB-40	$h_e = 20mm$	$F_{Rk,timber} = 4440 \cdot \left(\frac{\rho_k}{350}\right)^{0,8} + \frac{31,5 \cdot d_c \cdot h_e \cdot \rho_k}{350}$	Not relevant
SB-60	$h_e = 40mm$		$F_{Rk,c} = 2,0 \cdot k_1 \cdot \sqrt{f_{ck}} \cdot 60_{ef}^{1,5}$

where:

F_{Rk}	is the characteristic load-carrying capacity per connector in N;
f_{ck}	is concrete's minimum compressive strength in MPa;
$k_1 = 12,7$	for uncracked concrete;
$k_1 = 8,9$	for cracked concrete;
$d_c = 40mm$	is the connector diameter in mm;

Table 2.4 – Properties of TCC-II Ø7,3x150 and TCC-II Ø9,0x180 mm Connectors

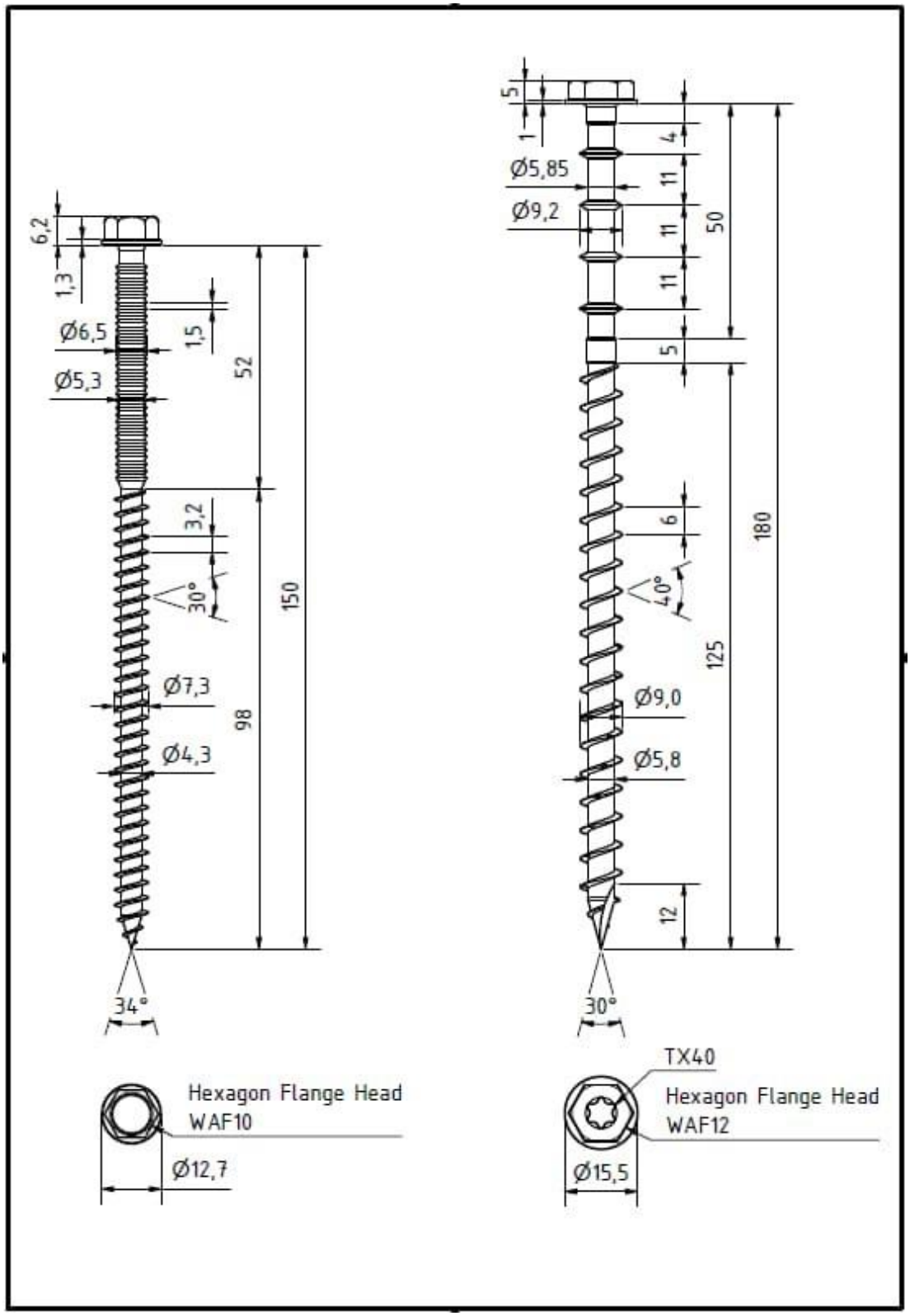
TCC-II connector with diameter	d = 7,3 mm	d = 9,0 mm
Yield moment $M_{y,k}$ [Nm]	25	34
Tensile capacity $f_{tens,k}$ [kN]	23	30
Withdrawal parameter $f_{ax,k}$ [N/mm²]	12,6	11,5

Resistance to fire

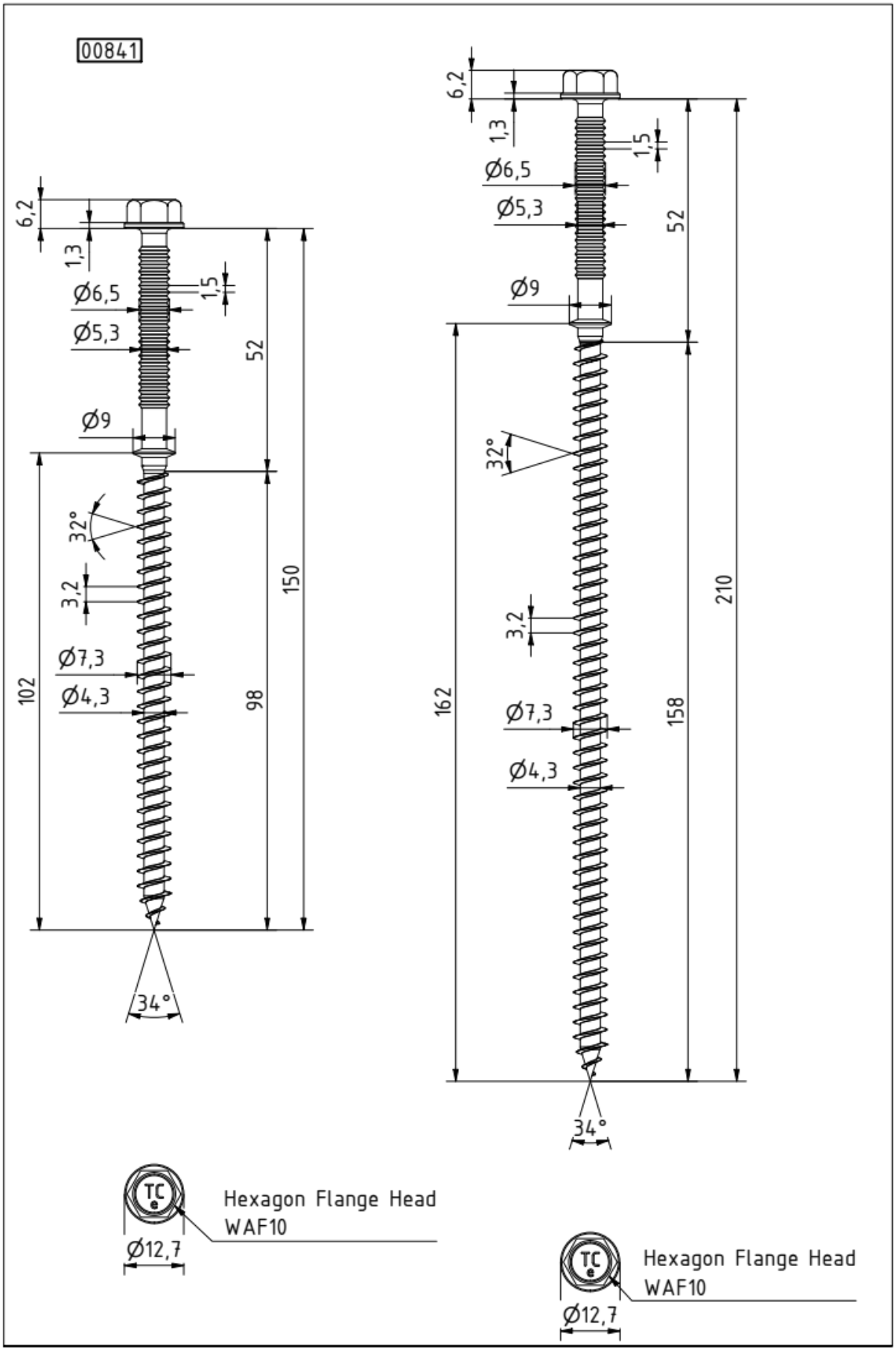
Simplified rules in EN 1995-1-2 for calculation of resistance to fire in case of screws are applicable for constructions made by TCC-II Ø7,3 TCC-II Ø9,0 Connectors and Eurotec shear bolts.

Thus, in design of works, fire resistance of the timber members may be determined according to EN 1995-1-2 and the fire resistance of the concrete flange according to EN 1992-1-2, if the national rules allow for calculation.

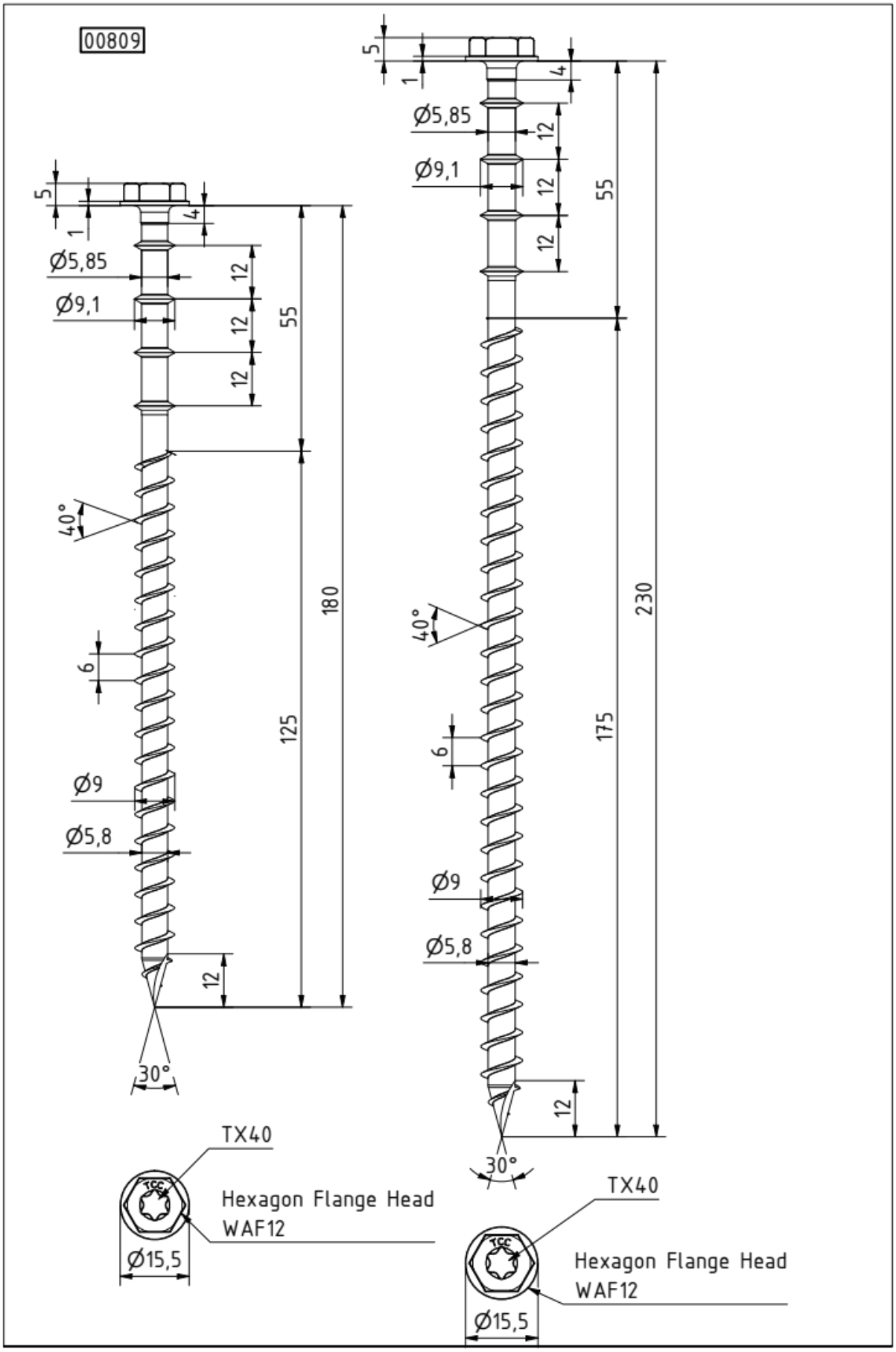
ANNEX 3
Drawing of the TCC-II Ø7,3 and TCC-II Ø9,0 Connectors. Old types.
Tolerances held on file by ETA-Danmark A/S



Drawing of the TCC-II Ø7,3 Connectors new type.
Tolerances held on file by ETA-Danmark A/S



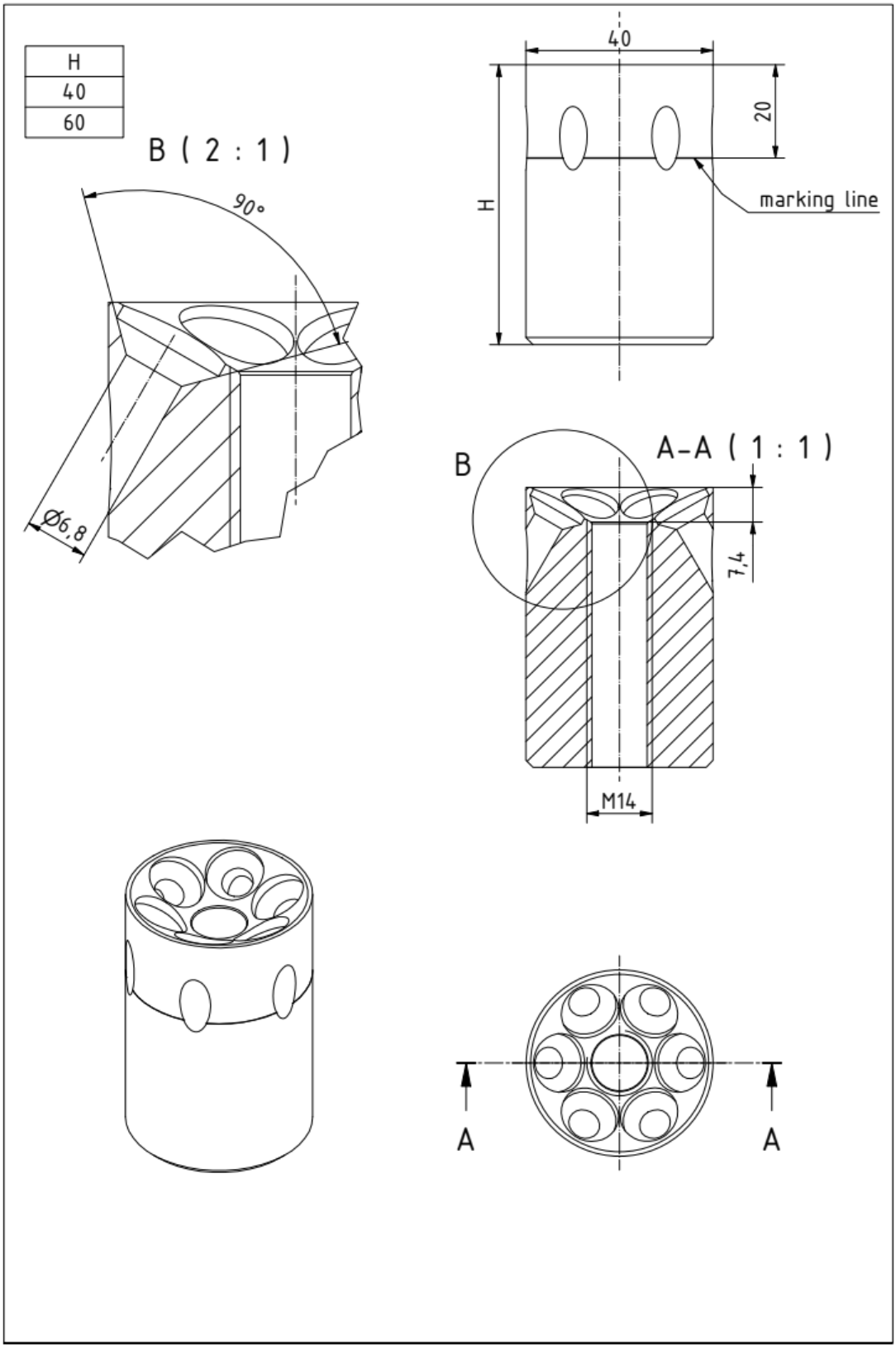
Drawing of the TCC-II Ø9,0 Connectors new type.
Tolerances held on file by ETA-Danmark A/S



Drawing of the HBV-Fix-KonstruX for Eurotec shear bolts SB 40, SB 60

The SB-40 is placed into a 20 mm deep blind hole with 40 mm diameter. An 8.8 metric bolt M14x60 is inserted into the central thread until the bolt touches the bottom of the blind hole.

The SB-60 is placed into a 40 mm deep blind hole with 40 mm diameter. An 8.8 metric bolt M14x100 is inserted into the central thread until the bolt touches the bottom of the blind hole.



Six KonstruX screws 6,5x100 according to ETA-11/0024 are driven through the inclined holes into the timber member.