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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-20/0790 of 2025/02/14

I 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:	AKK FORTA CLICK® fastening system
Product family to which the above construction product belongs:	Three-dimensional nailing plate (timber-to-timber connectors for wind bracing systems)
Manufacturer:	AKK Industri Industrivej 17 DK-7490 Aulum Internet www.akk-i.dk
Manufacturing plant:	AKK Industri Industrivej Nord 40 DK-7490 Aulum
This European Technical Assessment contains:	14 pages including 2 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:	EAD 130186-00-0603 for Three-dimensional nailing plates
This version replaces:	The ETA with the same number issued on 2021-04-08

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The connectors are multi piece, welded and non-welded connectors. They are intended for timber-to-timber connections fastened with nails or screws.

The connectors are made from pre-galvanized steel S250GD + Z275MA according to EN 10346 with tolerances according to EN10143 and S355 and S250 steel according to EN 10025 with electric galvanized surface according to DS/EN 1995-1-1.

This assessment covers the performance of the end connectors used for the connection between the timber elements and bracing strap, the tensions traps, couplers, various connectors for battens. The assessment does not cover the connections to the foundations, as these will be designed in the individual projects based on the prevailing regulations

Dimensions, hole positions and typical installations are shown in Annex A.

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

The end connectors are intended for use in making wind bracing connections in load bearing structures, typically as a connection in stabilizing structures between two timber members or between a timber member and a concrete or steel member, where requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 of Regulation 305/2011 (EU) shall be fulfilled.

The wood members can be of solid timber, glued laminated timber and similar glued members, or wood-based structural members with a characteristic density of 350 kg/m^3.

This requirement to the material of the wood members can be fulfilled by using the following materials:

- Solid timber classified to C18-C40 according to EN 338 / EN 14081
- Glued members of timber classified to C18 – C40 according to EN 338 / EN 14081.
- Glued laminated timber classified to GL24c or better according to EN 1194/EN 14080.
- Solid Wood Panels, SWP according to EN 13353.
- Laminated Veneer Lumber LVL according to EN 14374
- Plywood according to EN 636
- Oriented Strand Board, OSB according to EN 300

Annex B states the load-carrying capacities of the connections for timber strength class C18 and a characteristic density of 350 kg/m^3.

For timber or wood based material with a lower characteristic density than 350 kg/m^3 the load-carrying capacities shall be reduced by the k_{dens} factor:

$$k_{dens} = \left(\frac{\rho_k}{350}\right)^{0,5}$$

Where ρ_k is the characteristic density of the timber in kg/m^3.

The design of the connections shall be in accordance with Eurocode 5 or a similar national Timber Code. The wood members shall have a thickness which is larger than the penetration depth of the screws into the members and shall also fulfill the minimum sizes mentioned in the tables of Annex B.

The connectors are primarily for use in timber structures subject to the dry, internal conditions defined by service class 1 and 2 of Eurocode 5 and for connections subject to static or quasi-static loading.

The scope of the connectors regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions. Section 3.11 of this ETA contains the corrosion protection for connectors made from carbon steel.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the connectors of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, 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*) (BWR1)**	
	Joint Strength - Characteristic load-carrying capacity	See Annex B
	Joint Stiffness	No performance assessed
	Joint ductility	No performance assessed
	Resistance to seismic actions	No performance assessed
	Resistance to corrosion and deterioration	See section 3.6
3.2	**Safety in case of fire (BWR2)**	
	Reaction to fire	The connectors are made from steel classified as Euroclass A1 in accordance with EN13501-1 and Commission Delegated Regulation 2016/364
	Resistance to fire	No performance assessed
3.3	**General aspects related to the performance of the product**	
		The connectors have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service class 1 and 2
	Identification	See Annex A

*) See additional information in section 3.4 – 3.7.

3.4 Methods of verification

Safety principles and partial factors

The characteristic load-carrying capacities have been determined by calculation according to Eurocode 3 and Eurocode 5, without considering different ratios between the partial factors for timber connections and steel cross sections. Therefore, in the end use calculation based on this ETA, this shall be considered.

According to clause 6.3.5 of EN 1990 (Eurocode – Basis of structural design) the characteristic resistance for structural members that comprise one material acting in association should be calculated as

$R_d = (k_{mod} \times R_k)/\gamma_M$

where γ_M is the partial safety factor for wood connections

3.5 Mechanical resistance and stability

See annex B for characteristic load-carrying capacity of the end connectors at various angles.

The characteristic capacities of the end connectors are determined by calculation verified by testing as described in the EAD 130186-00-0603. They should be used for designs in accordance with Eurocode 5 or a similar national Timber Code.

Nails and screws in accordance with ETA-09/0273

The load bearing capacities of the brackets has been determined based on the use of Paslode Connector Nails with diameters 3,4 mm and 4,0 mm and lengths from 35 mm to 60 mm, and with Paslode Connector Screws with diameter 5,0 and lengths 25, 35 and 50 mm

No performance has been determined in relation to ductility of a joint under cyclic testing. The contribution to the performance of structures in seismic zones, therefore, has not been assessed.

No performance has been determined in relation to the joint's stiffness properties - to be used for the analysis of the serviceability limit state.

3.6 Aspects related to the performance of the product

3.6.1 Corrosion protection in service class 1 and 2.

In accordance with EAD 130186-00-0603 the end connectors have a zinc coating weight of min. Z275 equivalent to a zinc layer thickness of at least 20 μm.

3.7 General aspects related to the use of the product

The end connectors are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

The nailing pattern used shall be as defined in Annex A.

The following provisions concerning installation apply:

The structural members to which the brackets are fixed shall be:

- Restrained against rotation.
- Strength class C18 or better, see section II.2 of this ETA
- Free from wane under the end connector.
- The actual end bearing capacity of the timber member to be used in conjunction with the end connector and the appropriateness of the complete wind bracing system shall be checked by the designer of the structure to ensure it is not less than the end connector capacity and, if necessary, the bracket capacity reduced accordingly.
- The gap between the timber members does not exceed 3 mm.
- There are no specific requirements relating to preparation of the timber members.

The execution of the connection shall be in accordance with the approval holder's technical literature.

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 97/638/EC of the European Commission, as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 2+.

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 2025-02-14 by

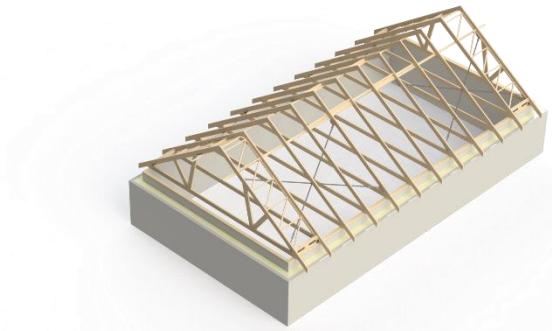
Thomas Bruun
Managing Director, ETA-Danmark

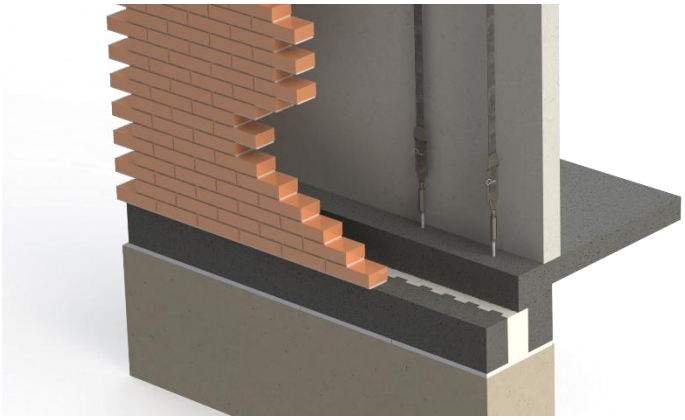
Annex A
Product details and definitions

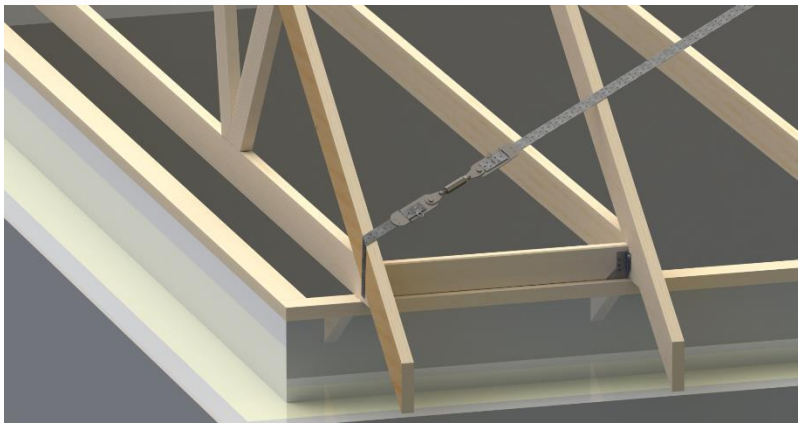
Typical installation

Typically the end connectors are used in a stabilizing structure between two or more timber members. The end connectors are used in combination with steel bracing straps or diagonal battens.

Wind bracing connectors placed on the lower side of the rafters







Examples of connections between a bracing strap and the connectors

Fasteners

Table A.1 Specified fasteners

Screws	Nail and screw size		Finish	
	Diameter [mm]	Length [mm]		
Paslode Connector nails	4,0	35-60	According to ETA-09/0273	CE marked according to ETA-09/0273
Paslode Connector nails - twist	3,4	40	According to ETA-09/0273	CE marked according to ETA-09/0273
Paslode Connector Screws	5,0	25, 35 and 50 mm	According to ETA-09/0273	CE marked according to ETA-09/0273

Tension bands

Dimensions: 0,9 x 40 mm. Material: Dogal 500 LAD + Z275 MA according to EN 10346
1,5 x 40 mm. Material: S350 GD Z275 MA according to EN 10346
2,0 x 40 mm. Material: S250 GD Z275 MA according to EN 10346.

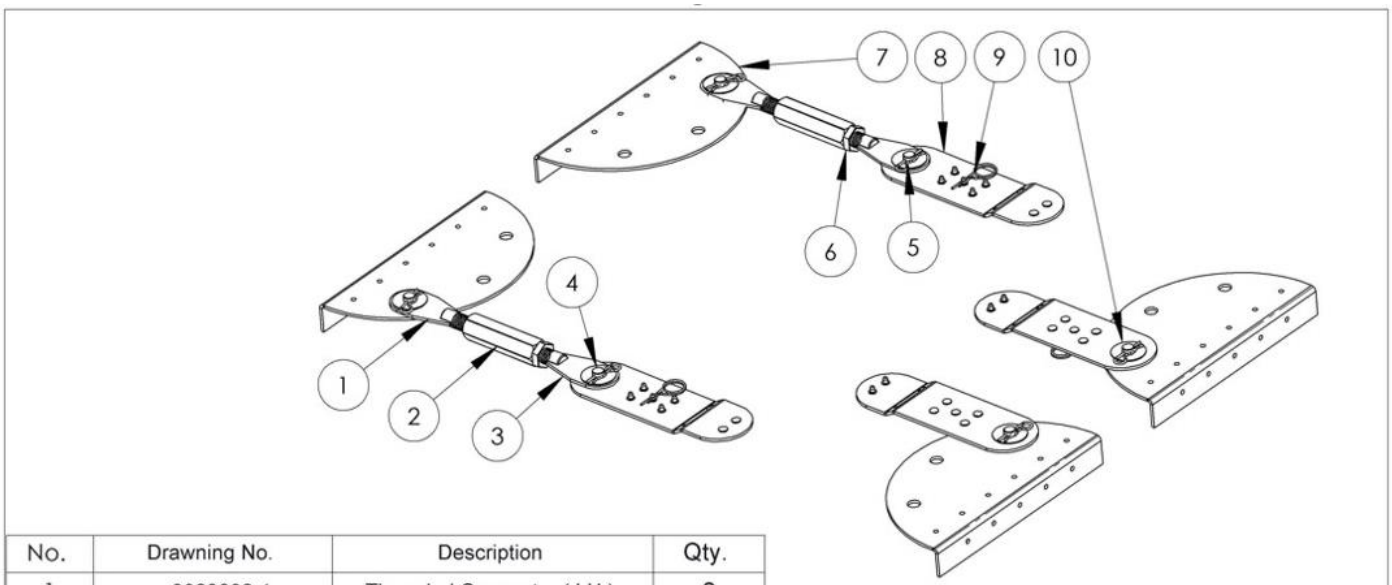
Production drawings

The main material of the component is described below. The material compositions and surface treatments are deposited with ETA-Danmark A/S.

AKK FORTA® CLICK fastening system

AKK FORTA® CLICK Tagsystem

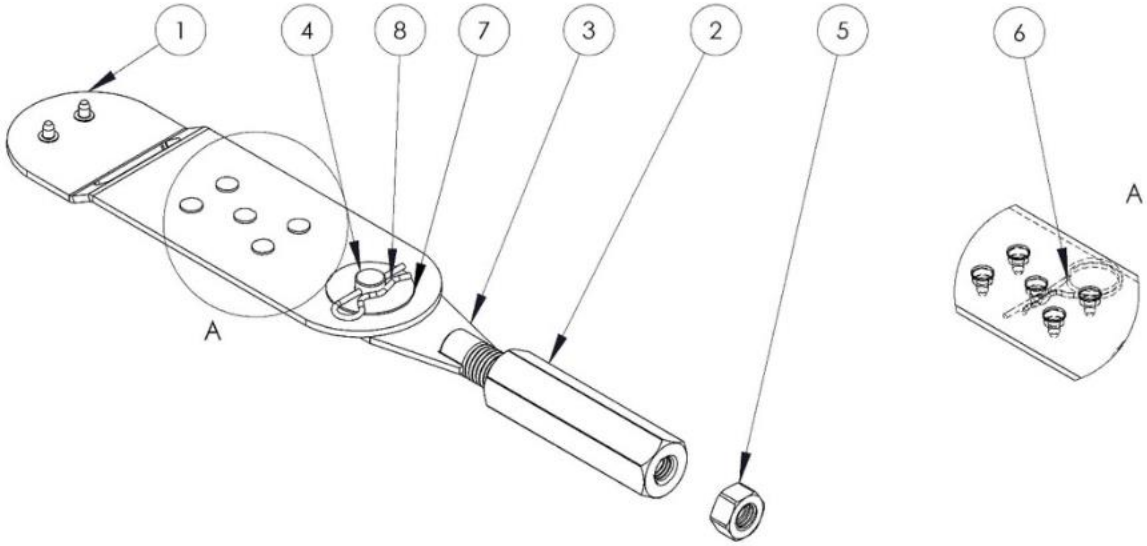
Made from pre-galvanized steel S250GD + Z275MA according to EN 10346 with tolerances according to EN10143 and S355 and S250 steel according to EN 10025 with electric galvanized surface according to DS/EN 1995-1-1. See item 1 in drawings below



No.	Drawning No.	Description	Qty.
1	9023602-1	Threaded Connector (LH)	2
2	9023603-1	Handle 90mm M16 ½Links - ½Rehcts	2
3	9023604-1	Threaded Connector(RH)	2
4	9023605-1	Punch 12mm	6
5	9023606-2	Split 2,2mm 1940-2150N/mm2	6
6	M16 Nut HDG.	EN ISO 4032 (DIN 934) 8.8	2
7	9023607-1	End Connector	4
8	9023608-1	Forta Click Connector	4
9	9023612-1	Spec. split 1,8mm for rivet	6
10	9023613-1	Washer	6

AKK FORTA® CLICK M12 Båndspænder

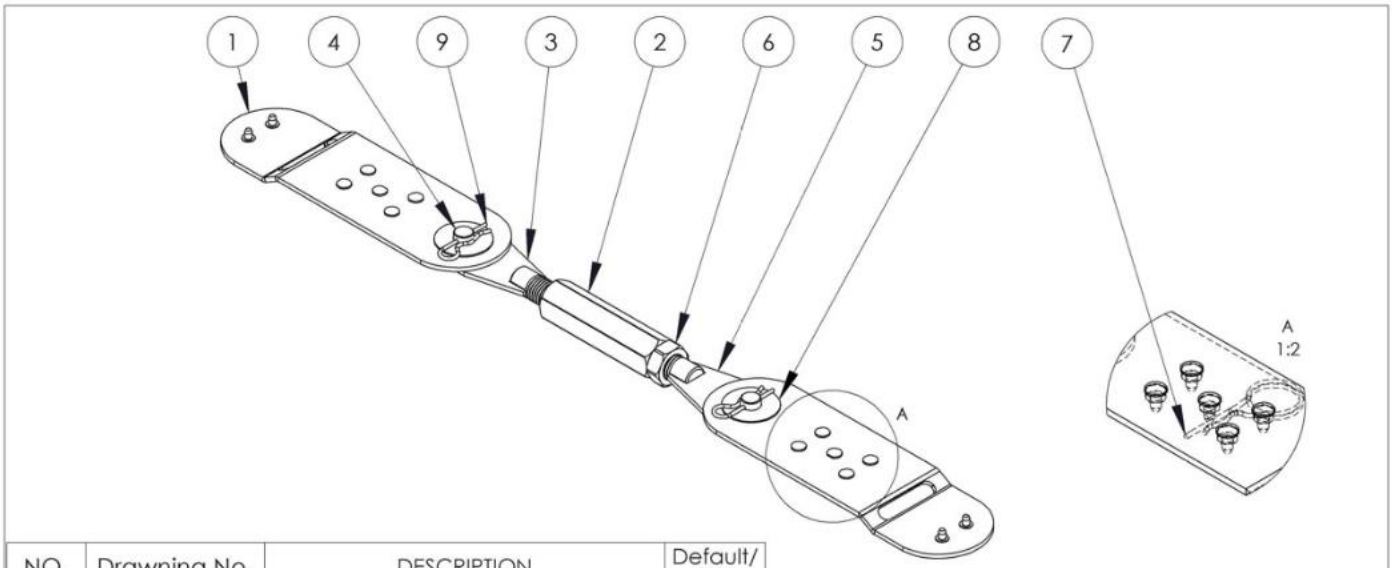
The main parts are made from pre-galvanized steel S250GD + Z275MA according to EN 10346 with tolerances according to EN10143 and S355 and S250 steel according to EN 10025 with electric galvanized surface according to DS/EN 1995-1-1. The material compositions of smaller parts such as bushings, pins, washers and rods are deposited with ETA-Danmark



No.	Drawning No.	Description.	Default/ QTY.
1	9023608-1	Forta Click Connector with rivets	1
2	9023702-1	Handle 90mm M16 ½Links - M12½Rehcts	1
3	9023602-1	Threaded Connector (LH)	1
4	9023605-1	Punch 12mm	1
5	Nut M12 HDG	EN ISO 4032 (DIN 934) 8.8	1
6	9023612-1	Spec. Split 1,8mm	1
7	9023613-1	Washer	1
8	9023606-2	Split 2,2mm 1940-2150N/mm2	1

AKK FORTA® CLICK Båndspænder

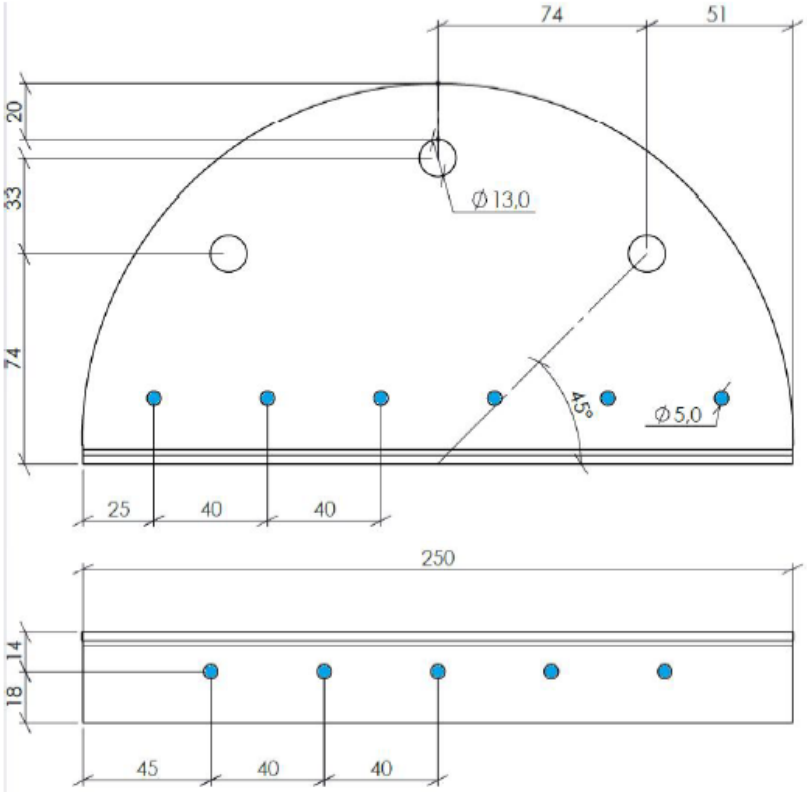
The main parts are made from pre-galvanized steel S250GD + Z275MA according to EN 10346 with tolerances according to EN10143 and S355 and S250 steel according to EN 10025 with electric galvanized surface according to DS/EN 1995-1-1. The material compositions of smaller parts such as bushings, pins, washers and rods are deposited with ETA-Danmark



NO.	Drawning No.	DESCRIPTION	Default/ QTY.
1	9023608-1	FORTA CLICK Connector with rivets	2
2	9023603-1	Handle 90mm M16 ½Links - ½Rehcts	1
3	9023602-1	Threaded connector (LH)	1
4	9023605-1	Punch - 12mm	2
5	9023604-1	Threaded Connector (RH)	1
6	M16 Nut HDG.	EN ISO 4032 (DIN 934) 8.8	1
7	9023612-1	Spec. Split 1,8mm	2
8	9023613-1	Washer	2
9	9023606-2	Split 2,2mm 1940-2150N/mm2	2

Minimum distances

The specified nails and screws in the FORTA CLICK end connector meet the requirements for nail spacing and edge distance in EN 1995-1-1 8.3.1.4 and Table 8.2 and in EN 1993-1-3 Table 8.3



Fastener Pattern

The characteristic capacities described below are based on full nailing in the FORTA CLICK end connector.

Annex B
Characteristic load-carrying capacity

Design Basis – general

Strength modification factors for service classes and load-duration classes

The design values of the load-carrying capacities R_d shall be calculated from the characteristic capacities R_k for the actual service class and load-duration class from the following expression:

$$R_d = \frac{k_{\text{mod}} \cdot R_k}{\gamma_M}$$

with the material partial coefficient γ_M for wood connections. The load duration factor k_{mod} is taken from Eurocode 5 and is for service classes 1 and 2 given in Table B1.

Table B.1. Factor k_{mod} for service class 1 and 2

Load duration classes and k_{mod} factors for service class 1 and 2				
P	L	M	S	I
Permanent	Long term	Medium term	Short term	Instantaneous
0,6	0,7	0,8	0,9	1,1

Density

The characteristic load-carrying capacities of the connections are stated for a characteristic density of 350 kg/m^3.
For timber or wood based material with a lower characteristic density than 350 kg/m^3 the load-carrying capacities shall be reduced by the k_{dens} factor:

$$k_{dens} = \left(\frac{\rho_k}{350}\right)^{0,5}$$

Where ρ_k is the characteristic density of the timber in kg/m^3.

Timber splitting

The risk of splitting of the timber or wood shall be evaluated for the specific connections. For the connectors used in lattice structures for wind stabilization or stabilization of compressed members of the structure the design of the connection will typically prevent the splitting of the timber or wood. If this is not the case it shall be checked by the rules of Eurocode 5 or a similar national Timber Code that splitting will not occur.

AKK FORTA® CLICK fastening system – components

The end connectors can be fastened by fixing in the face of the end connector into the top of the timber and/or in the edge flap into the side of the timber. When fastening into the edge flap the end connector shall always be placed over the timber. The capacities are based on full nailing of the FORTA CLICK end connector plate

The force acts at an angle of 30° - 60° to the battens. The force is in the same plane as the end connector (top/bottom side of the timber/truss)

Table B.2. Characteristic load-carrying capacities of FORTA CLICK, in kN with different tension bands.

AKK FORTA CLICK	
Characterstic load-carrying capacity (kN)	
Dogal 500 LAD + Z275 MA	17,28
S350 GD + Z275 MA	18,9
S250 GD + Z275 MA	19,8

Table B.3. Characteristic load-carrying capacities of FORTA CLICK M12 Båndspænder, in kN with different tension bands.

AKK FORTA CLICK M12 Båndspænder	
Characterstic load-carrying capacity (kN)	
Dogal 500 LAD + Z275 MA	17,28
S350 GD + Z275 MA	18,9
S250 GD + Z275 MA	19,8

Table B.4. Characteristic load-carrying capacities of AKK FORTA CLICK Båndspænder, in kN with different tension bands.

AKK FORTA CLICK Båndspænder	
Characterstic load-carrying capacity (kN)	
Dogal 500 LAD + Z275 MA	17,28
S350 GD + Z275 MA	18,9
S250 GD + Z275 MA	19,8

AKK FORTA® CLICK fastening system for wind bracing – full system

Table B5. Characteristic tensile capacities AKK FORTA CLICK wind bracing system with different nails and screws, and at different angles, in kN. Applicable to components made from pre-galvanized steel S250GD + Z275MA according to EN 10346 with tolerances according to EN10143 and S355 and S250 steel according to EN 10025 with electric galvanized surface according to DS/EN 1995-1-1 and applicable to all tension bands.

AKK FORTA CLICK Tagsystem Characterstic load-carrying capacity (kN)							
Nails	30	35	40	45	50	55	60
4.0x35	15,94	16,85	18,02	18,3	15,37	13,08	11,27
4.0x40	16,12	18,12	18,98	18,3	15,37	13,08	11,27
4.0x50	16,12	18,12	18,98	18,3	15,37	13,08	11,27
4.0x60	16,12	18,12	18,98	18,3	15,37	13,08	11,27
3.5x40_twist	10,39	10,99	11,75	12,73	14	13,08	11,27
Screws	30	35	40	45	50	55	60
5.0x25	14,74	15,58	16,66	18,05	15,37	13,08	11,27
5.0x35	16,12	18,12	18,98	18,3	15,37	13,08	11,27
5.0x50	16,12	18,12	18,98	18,3	15,37	13,08	11,27