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European Technical Assessment

ETA-10/0067 of 30.05.2023

General part

Technical Assessment Body issuing the European Technical Assessment	Österreichisches Institut für Bautechnik (OIB) Austrian Institute of Construction Engineering
Trade name of the construction product	Wolf Binderwinkel (Wolf angle bracket)
Product family to which the construction product belongs	Angle bracket for timber-to-timber and timber-to-concrete connections
Manufacturer	Wolf Systembau Gesellschaft m.b.H. Fischerbühel 1 4644 Scharnstein Austria
Manufacturing plant	Wolf Systembau Gesellschaft m.b.H. Fischerbühel 1 4644 Scharnstein Austria
This European Technical Assessment contains	13 pages including 6 Annexes which form an integral part of this assessment.
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	European Assessment Document (EAD) 130186-00-0603 “Three-dimensional nailing plates”.
This European Technical Assessment replaces	European Technical Assessment ETA-10/0067 of 09.07.2015.

Remarks

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may be made with the written consent of Austrian Institute of Construction Engineering. Any partial reproduction has to be identified as such.

Specific parts

1 Technical description of the product

1.1 General

This European Technical Assessment[1] (ETA) applies to the angle bracket "Wolf Binderwinkel (Wolf angle bracket)". Wolf Binderwinkel is a one-piece angle bracket to be used in load-bearing timber-to-timber or timber-to-concrete connections. They are installed to members made of timber or wood-based products with special nails and to members made of concrete with suitable anchors.

Wolf Binderwinkel corresponds to the specifications given in the Annexes of the European Technical Assessment. The material characteristics, dimensions and tolerances of Wolf Binderwinkel, not indicated in these Annexes, are given in the technical file[2] of the European Technical Assessment.

1.2 Angle bracket

Wolf Binderwinkel is made of galvanised steel S280GD + Z275 according to EN 10346[3]. There are two types of angle brackets, one with a slotted hole and one with a circular hole. The two types together with their most important dimensions are shown in Annex 2.

1.3 Nail

The nail to install the angle bracket is specified in Annex 1. The nail is in galvanised steel as well. No essential characteristic is assessed for the nail.

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

2.1 Intended use

The angle brackets are intended to be used in load bearing connections of timber structures as side grain to side grain connections, e.g. between beams and purlins, or as side grain to concrete connections.

The connection may be with a single angle bracket or with angle brackets on each side of the fastened timber member. The typical installation of the angle brackets is shown in Annex 3.

The angle brackets shall be subjected to static and quasi static actions only.

The angle brackets are intended to be used in service classes 1 and 2 according to EN 1995-1-1.

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[1] The ETA-10/0067 was firstly issued in 2010 as European technical approval with validity from 09.07.2010, converted in 2015 to the European Technical Assessment ETA-10/0067 of 09.07.2015 and converted in 2023 to the European Technical Assessment ETA-10/0067 of 30.05.2023.

[2] The technical file of the European Technical Assessment is deposited at Österreichisches Institut für Bautechnik and, in so far as is relevant to the tasks of the notified factory production control certification body involved in the assessment and verification of constancy of performance procedure, is handed over to the notified factory production control certification body.

[3] Reference documents are listed in Annex 6.

2.2 General assumptions

Wolf Binderwinkel is manufactured in accordance with the provisions of the European Technical Assessment using the manufacturing process as identified in the inspection of the manufacturing plant by Österreichisches Institut für Bautechnik and laid down in the technical file.

The manufacturer shall ensure that the requirements in accordance with the Clauses 1, 2 and 3 as well as with the Annexes of the European Technical Assessment are made known to those who are concerned with design and execution of the works.

Design

The European Technical Assessment only applies to the manufacture and use of the angle brackets. Verification of stability of the works including application of loads on the angle brackets is not subject of the European Technical Assessment.

The following conditions shall be observed:

- Design of connections with angle brackets is carried out under the responsibility of an engineer experienced in timber structures.
- Design of the works shall account for the protection of the connections to maintain service class 1 or 2 according to EN 1995-1-1.
- The angle brackets are installed correctly.
- For the lifting force F_1 according to Annex 4 it shall be checked in accordance with EN 1995-1-1 that splitting will not occur.

Design of connections with angle brackets may be according to EN 1995-1-1 taking into account the Annexes of the European Technical Assessment. Standards and regulations in force at the place of use shall be considered.

Packaging, transport, storage, maintenance, replacement and repair

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

Installation

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

The angle brackets shall be fully nailed with nails as specified in Annex 1.

The structural members which are connected with the angle brackets shall be

- restrained against rotation, except for the loads F_{4e} and F_{5e},
- strength class C24 or better,
- free from wane under the bracket,
- with plane surfaces against the angle brackets,
- without virtually gap between the timber members, and
- with minimum spacing and edge distances in accordance with EN 1995-1-1.

If the connection consists of an angle bracket on both sides of the fastened timber member, the angle brackets shall be installed with an offset of 1 cm.

2.3 Assumed working life

The provisions made in the European Technical Assessment (ETA) are based on an assumed intended working life of Wolf Binderwinkel of 50 years, when installed in the works, provided that the product is subject to appropriate installation, maintenance, replacement and repair (see clause 2.2). These provisions are based upon the current state of the art and the available knowledge and experience[4].

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA nor by the Technical Assessment Body, but are regarded only as a means for choosing the appropriate products in relation to the expected economically reasonable working life of the works.

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

3.1 Essential characteristics of the product

Table 1: Essential characteristics of the product and assessment methods

№	Essential characteristic	Product performance
Basic requirement for construction works 1: Mechanical resistance and stability		
1	Joint strength	3.1.1
2	Joint stiffness	No performance assessed.
3	Joint ductility	No performance assessed.
4	Resistance to seismic actions	No performance assessed.
5	Resistance to corrosion and deterioration	3.1.2
Basic requirement for construction works 2: Safety in case of fire		
6	Reaction to fire	3.1.3
7	Resistance to fire	No performance assessed.

3.1.1 Joint strength

The characteristic load bearing capacities of the angle brackets are determined by testing. The angle brackets are fully nailed with nails of nominal dimensions 4.0 × 35 mm as specified in Annex 1. Kinematic restraints are defined in Annex 4.

The values of the characteristic load bearing capacities for the loading directions F_1 to F_5 as defined in Annex 4 are given in Annex 5.

If the angle brackets are connected to structural members made of concrete, anchors with stiff washers are used. For such connections the same load bearing capacities shall be used as for timber-to-timber connections given in Annex 5, provided the anchors are designed to exceed the load bearing capacities of the angle bracket to timber connections.

[4] The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

3.1.2 Resistance to corrosion and deterioration

The product is intended to be used in service classes 1 and 2 according to EN 1995-1-1. The product and each member of the connection should at least be suitable for service classes 1 and 2, but not for service class 1 only.
The angle brackets are made of galvanised steel S280GD + Z275 according to EN 10346.

3.1.3 Reaction to fire

The angle brackets are made of steel classified as Euroclass A1 in accordance with Commission Decision 96/603/EC as amended.

3.2 Assessment methods

3.2.1 General

The assessment of the essential characteristics in Clause 3.1 of Wolf Binderwinkel for the intended use, and in relation to the requirements for mechanical resistance and stability and for safety in case of fire in the sense of the basic requirements for construction works № 1 and 2 of Regulation (EU) № 305/2011 has been made in accordance with the European Assessment Document EAD 130186-00-0603 “Three-dimensional nailing plates”.

3.2.2 Identification

The European Technical Assessment for Wolf Binderwinkel is issued on the basis of agreed data that identify the assessed product. Changes to materials, to composition, to characteristics of the product, or to the production process could result in these deposited data being incorrect. Österreichisches Institut für Bautechnik should be notified before the changes are implemented, as an amendment of the European Technical Assessment is possibly necessary.

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

4.1 System of assessment and verification of constancy of performance

According to Commission Decision 97/638/EC the system of assessment and verification of constancy of performance to be applied to Wolf Binderwinkel is System 2+. System 2+ is detailed in Commission Delegated Regulation (EU) № 568/2014 of 18 February 2014, Annex, 1.3, and provides for the following items

(a) The manufacturer shall carry out:

(i) an assessment of the performance of the construction product carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of that product;

(ii) factory production control;

(iii) testing of samples taken at the manufacturing plant by the manufacturer in accordance with a prescribed test plan[5].

(b) The notified factory production control certification body shall decide on the issuing, restriction, suspension or withdrawal of the certificate of conformity of the factory production control on the basis of the outcome of the following assessments and verifications carried out by that body:

(i) initial inspection of the manufacturing plant and of factory production control;

(ii) continuing surveillance, assessment and evaluation of factory production control.

[5] The prescribed test plan has been deposited with Österreichisches Institut für Bautechnik and is handed over only to the notified factory production control certification body involved in the procedure for the assessment and verification of constancy of performance. The prescribed test plan is also referred to as control plan.

4.2 Construction products for which a European Technical Assessment has been issued

Manufacturers undertaking tasks under Systems 2+ shall consider the European Technical Assessment issued for the construction product in question as the assessment of the performance of that product. Manufacturers shall therefore not undertake the tasks referred to in point 4.1 (a)(i).

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

5.1 Tasks for the manufacturer

5.1.1 Factory production control

In the manufacturing plant the manufacturer shall establish and continuously maintain a factory production control. All procedures and specification adopted by the manufacturer shall be documented in a systematic manner. The factory production control shall ensure the constancy of performances of Wolf Binderwinkel with regard to the essential characteristics.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan. The incoming raw materials shall be subject to controls by the manufacturer before acceptance. Check of incoming materials shall include control of inspection documents presented by the manufacturer of the raw materials.

The frequencies of controls and tests conducted during manufacturing and on the assembled product are defined by taking account of the manufacturing process of the product and are laid down in the control plan.

The results of factory production control are recorded and evaluated. The records include at least the following data:

- Designation of the product, basic materials and components
- Type of control or test
- Date of manufacture of the product and date of testing of the product or basic materials or components
- Results of controls and tests and, if appropriate, comparison with requirements
- Name and signature of person responsible for factory production control

The records shall be presented to the notified factory production control certification body involved in continuous surveillance. On request the records shall be presented to Österreichisches Institut für Bautechnik.

5.1.2 Declaration of performance

The manufacturer is responsible for preparing the declaration of performance. When all the criteria of the assessment and verification of constancy of performance are met, including the certificate of conformity of the factory production control issued by the notified factory production control certification body, the manufacturer shall draw up a declaration of performance.

5.2 Tasks for the notified factory production control certification body

5.2.1 Initial inspection of the manufacturing plant and of factory production control

The notified factory production control certification body shall verify the ability of the manufacturer for a continuous and orderly manufacturing of Wolf Binderwinkel according to the European Technical Assessment. In particular the following items shall be appropriately considered.

- Personnel and equipment
- The suitability of the factory production control established by the manufacturer
- Full implementation of the control plan

5.2.2 Continuing surveillance, assessment and evaluation of factory production control

The notified factory production control certification body shall visit the factory at least once a year for routine inspection. In particular the following items shall be appropriately considered.

- The manufacturing process including personnel and equipment
- The factory production control
- The implementation of the control plan

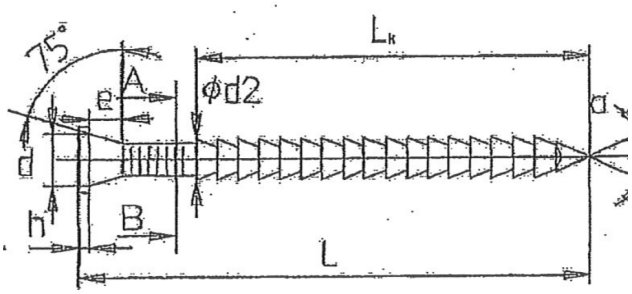
The results of continuous surveillance shall be made available on demand by the notified factory production control certification body to Österreichisches Institut für Bautechnik. When the provisions of the European Technical Assessment and the control plan are no longer fulfilled, the certificate of conformity of the factory production control shall be withdrawn.

Issued in Vienna on 30.05.2023
by Österreichisches Institut für Bautechnik

The original document is signed by:

Georg Kohlmaier

Deputy Managing Director



Special nail NFX-Norfix or an equivalent nail

Nominal diameter 4.0 mm

Nominal length 35.0 mm

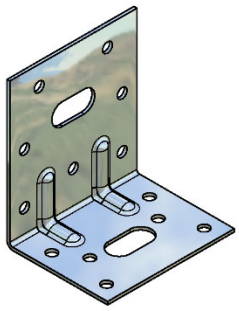
Tensile strength ≥ 600 N/mm²

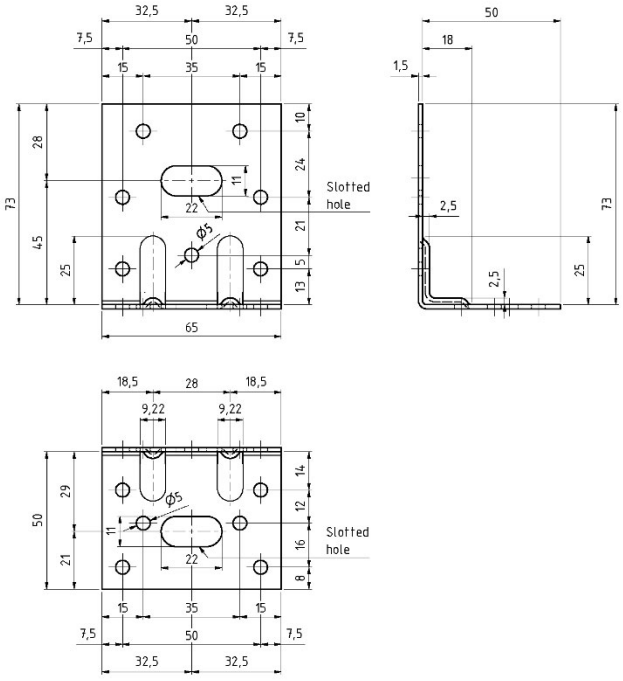
Finish Zinc coating

Wolf Binderwinkel	Annex 1
Fastener specification	of European Technical Assessment ETA-10/0067 of 30.05.2023

Wolf Binderwinkel – type with slotted hole 11 × 22 mm – Nominal dimensions

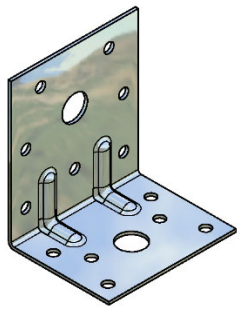
Bracket type:	50 × 73 × 65 mm
Thickness:	s = 1,5 mm
Steel specification:	S280GD
Zinc coating:	Z275

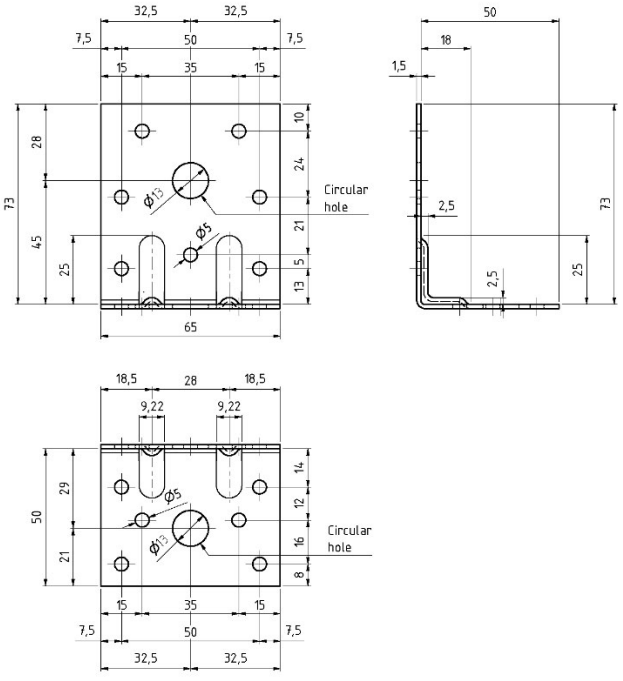




Wolf Binderwinkel – type with circular hole Ø13 mm – Nominal dimensions

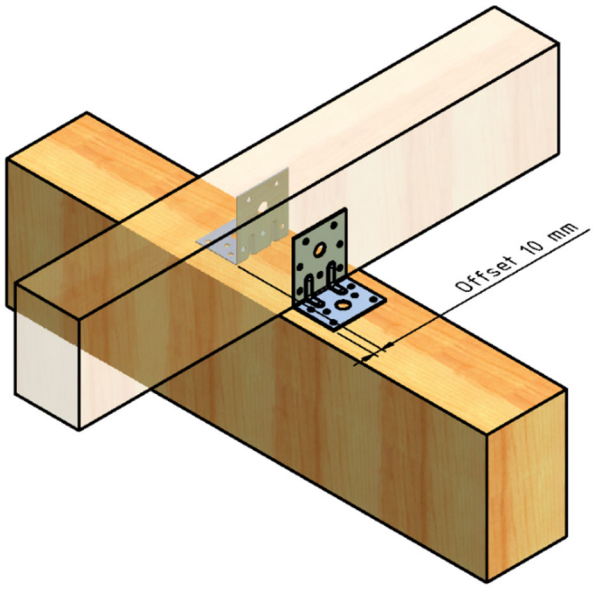
Bracket type:	50 × 73 × 65 mm
Thickness:	s = 1,5 mm
Steel specification:	S280GD
Zinc coating:	Z275



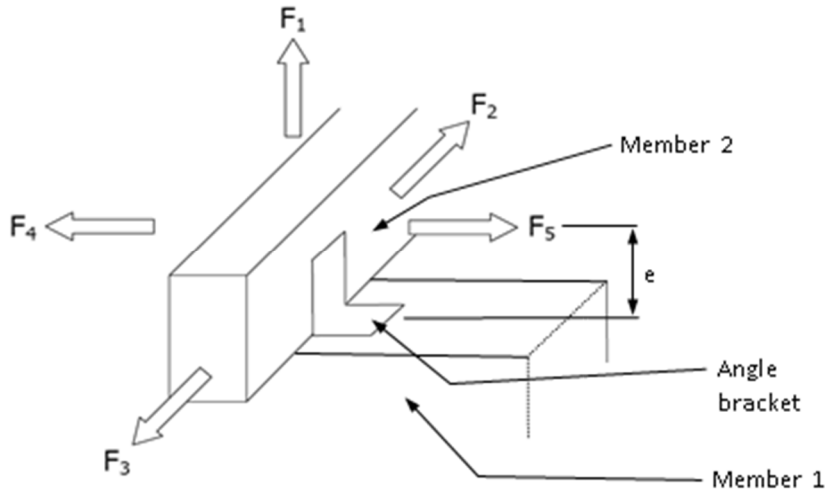


Dimensions in mm

Wolf Binderwinkel	Annex 2
Product details definitions	of European Technical Assessment ETA-10/0067 of 30.05.2023



Wolf Binderwinkel	Annex 3
The typical installation with two angle brackets	of European Technical Assessment ETA-10/0067 of 30.05.2023



Wooden structural components

Member 1 Purlin, solid wood, strength class C24 according to EN 338, ≥ 100 x 160 mm

Member 2 Beam, solid wood, strength class C24 according to EN 338, ≥ 36 x 160 mm

Instead of solid timber also equivalent glued laminated timber or wood based products may also be used. Member 1 may be of concrete.

Single angle bracket per connection

F_1	Wind suction, lifting force in the middle of the leg of the angle bracket. The members shall be prevented from rotation.
F_2 and F_3	Force acting in longitudinal direction of member 2. The members shall be prevented from rotation.
F_4 and F_5	Lateral force acting perpendicular to the axis of member 2. F_4 is the force away from the angle bracket and F_5 is the force towards the angle bracket. The members shall be prevented from rotation.

Two angle brackets per connection

F_1	Wind suction, lifting force in the middle of the two angle brackets. The members shall be prevented from rotation.
F_2 and F_3	Force acting in longitudinal direction of member 2. The members shall be prevented from rotation.
F_4 and F_5	Lateral force acting perpendicular to the axis of member 2. The members shall be prevented from rotation.
F_{4e} and F_{5e}	Lateral force acting perpendicular to the axis of member 2 with eccentricity. Member 2 is not prevented from rotation.

Wolf Binderwinkel	Annex 4
Definition of forces, their directions and eccentricities	of European Technical Assessment ETA-10/0067 of 30.05.2023

Single angle bracket per connection

Direction of force	Characteristic load bearing capacity $F_{max, mod, k}$
—	N
$F_{1,k}$	1 760
$F_{2,k}$, $F_{3,k}$	4 160
$F_{4,k}$	1 070
$F_{5,k}$	5 140

Two angle brackets per connection

Direction of force	Characteristic load bearing capacity $F_{max, mod, k}$
—	N
$F_{1,k}$	2 710
$F_{2,k}$, $F_{3,k}$	11 370
$F_{4,k}$, $F_{5,k}$	5 700
$F_{4e,k}$, $F_{5e,k}$	2 190 [1)]
NOTE [1)] Eccentricity e ≤ 80 mm	

The characteristic load bearing capacities of the angle bracket connections are given for a characteristic density of 350 kg/m³. For timber or wood based material with a lower characteristic density than 350 kg/m³ the characteristic load bearing capacities shall be reduced by the factor k_{dens}

$$k_{dens} = \left(\frac{\rho_k}{350}\right)^2$$

Where

k_{dens} Factor to consider deviating densities

ρ_k Characteristic density of timber in kg/m³

Wolf Binderwinkel	Annex 5
Characteristic load bearing capacities	of European Technical Assessment ETA-10/0067 of 30.05.2023

European Assessment Document EAD 130186-00-0603 “Three-dimensional nailing plates”

EN 338 (04.2016), Structural timber – Strength classes

EN 1995-1-1 (11.2004) +AC (06.2006) +A1 (06.2008) +A2 (05.2014), Eurocode 5 – Design of timber structures – Part 1-1: General – Common rules and rules for buildings

EN 10346 (07.2015), Continuously hot-dip coated steel flat products – Technical delivery conditions