Deutsches Institut für Bautechnik

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European Technical Assessment Body for construction products

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European Technical Assessment ETA-25/0267 of 2 May 2025

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Kingi roofing screws
Product family to which the construction product belongs	Fastening screws for metal members and sheeting
Manufacturer	Kingi Oy Ilveskaari 12 01900 NURMIJÄRVI FINNLAND
Manufacturing plant	Kingi Oy Ilveskaari 12 01900 NURMIJÄRVI FINNLAND
This European Technical Assessment contains	11 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	EAD 330046-02-0602

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Specific part

1 Technical description of the product

The products are galvanized and painted self-drilling fastening screws made of carbon steel. The fastening screws are completed with an aluminum washer and an EPDM sealing washer.

The fastening screws and the corresponding connections are subject to tension and/or shear forces. Samples of fastenings screws are shown in Figure 1.

These screws are assessed as painted construction products. The head of the screw and the aluminum part of the washer are painted. The coating system (base material, pretreatment, number of layers and total thickness) is specified according to the requirements of relevant European standards for painted steel constructions used in the corrosivity classes C3 and C4. The coating system includes: a zinc layer of 12 micrometers, a pretreatment for painting, a powder primer of 60 micrometers and a powder topcoat of 60 micrometers. The nominal total coating thickness is 120 micrometers.

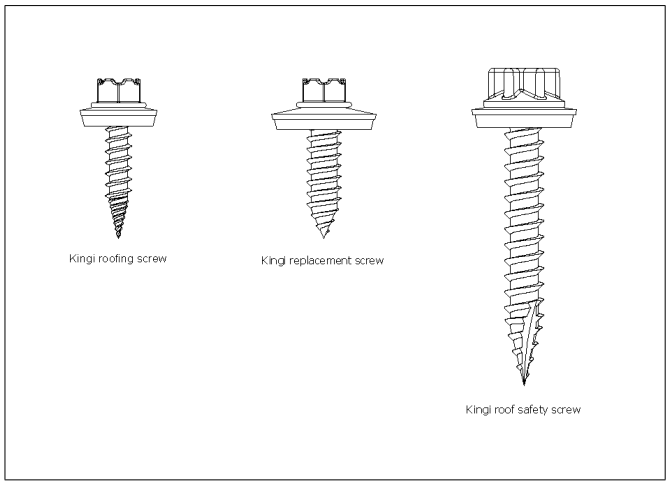


Figure 1: Kingi roof fastening screws

The fastening screws which are content of this ETA are shown in the following Table 1.
The components and the system setup of the product are given in Annex (1-6).

Table 1 - Summary of the fastenings screws for metal members and sheeting

Annex	Fastening screw	Material
9	Roof screw 4,8x25	carbon steel SAE 1022 electrical zincing EPDM 014 mm aluminum alloy EN AW 5052 H32 painted
9	Roof screw 4,8x32	carbon steel SAE 1022 electrical zincing EPDM 014 mm aluminum alloy EN AW 5052 H32 painted
10	Replacement screw 6,3x25	carbon steel SAE 1022 electrical zincing EPDM 019 mm aluminum alloy EN AW 5052 H32 painted
10	Replacement screw 6,3x50	carbon steel SAE 1022 electrical zincing EPDM 019 mm aluminum alloy EN AW 5052 H32 painted
11	Roof safety screw 7,0x50	carbon steel SAE 1022 electrical zincing EPDM 019 mm aluminum alloy EN AW 5052 H32 painted

2 Specification of the intended use in accordance with the applicable European Assessment Document 330046-02-0602

The fastening screws are intended to be used for fastening metal sheeting to metal or timber supporting substructures. The sheeting can either be used as wall or roof cladding or as load bearing wall and roof element. The fastening screws can also be used for the fastening of any other thin gauge metal members. The intended use comprises fastening screws and connections for indoor and outdoor applications. Furthermore, the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads). The fastening screws for metal members and sheeting are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given by the manufacturer on top of the screw delivery package.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastening screws of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, 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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Shear Resistance of the Connection	see Annexes
Tension Resistance of the Connection	see Annexes

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Performance Class A1 in accordance with EC decision 96/603/EC (as amended)

3.3 Durability (Corrosion protection)

Essential characteristic	Performance	Number of Layers	Layers Material	Corrosion Resistance
EN ISO 9227 (Neutral salt spray)	720 hours	2 layers	Electroplated zinc + 2 paint layers with 120 µm in total	C4-H
EN ISO 6270-1 (Water condensation)	480 hours			

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

In accordance with EAD No. 330046-02-0602, the applicable European legal act is Decision 1998/214/EC, amended by 2001/596/EC.

The system to be applied is: 2+

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

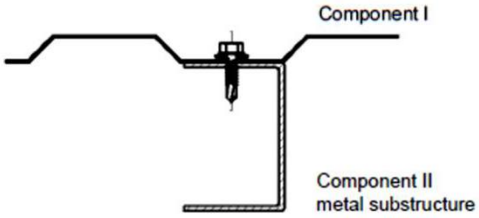
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

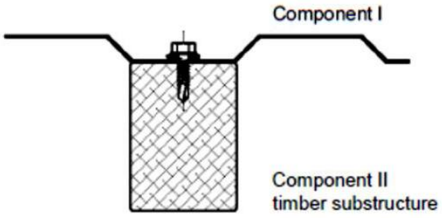
Issued in Berlin on 2 May 2025 by Deutsches Institut für Bautechnik

Dr.-Ing. Ronald Schwuchow
Head of Section

beglaubigt:
Hahn

Examples of execution of a connection





Terms for materials

Fastener	Fastening screw
Washer	Sealing washer
Component I	Metal member or sheeting
Component II	Substructure

Terms for dimensions

t_I	Thickness of metal member or sheeting
t_{II}	Thickness of metal substructure
l_{ef}	Effective screw-in length in timber substructure (without drill point)
d_{dp}	Pre-drill diameter of metal member or sheeting and substructure
$d_{dp,I}$	Pre-drill diameter of metal member or sheeting

Terms for performances

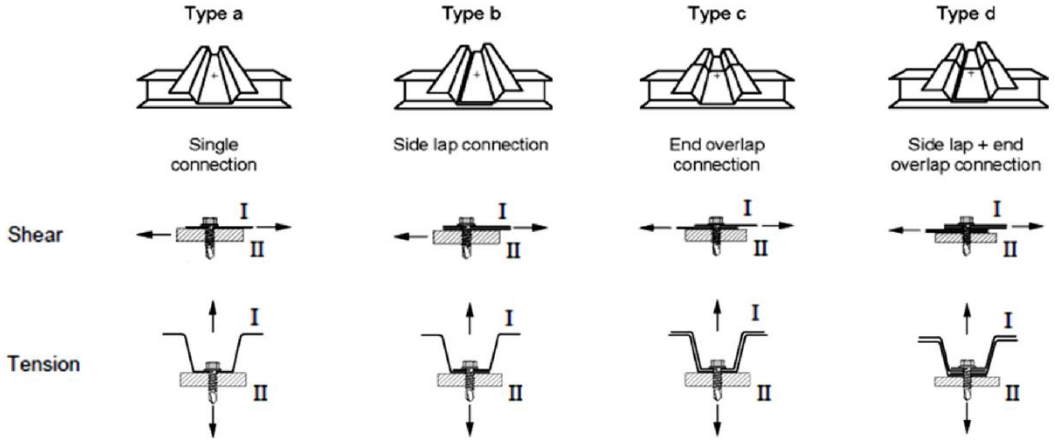
$V_{R,k}$	Characteristic value of shear resistance of the connection
$N_{R,k}$	Characteristic value of tension resistance of the connection
$V_{R,I,k}$	Characteristic value of shear resistance of metal member or sheeting
$N_{R,I,k}$	Characteristic value of tension resistance (pull-through) of metal member or sheeting
$N_{R,II,k}$	Characteristic value of tension resistance (pull-out) of the substructure

Additionally for timber substructure the following terms are used:

$M_{y,Rk}$	Characteristic value of yield moment
$f_{ax,k}$	Characteristic value of withdrawal strength
$f_{h,k}$	Characteristic value of embedding strength

Used terms in the Annexes	**Annex 1**
Fastening screws for metal members and sheeting	

Types of connection and occurred loadings



Determination of Design Values

The design value of tension and shear resistance has to be determined as follows:

$$N_{R,d} = \frac{N_{R,k}}{\gamma_M} \qquad V_{R,d} = \frac{V_{R,k}}{\gamma_M}$$

The characteristic values $N_{R,k}$ and $V_{R,k}$ are given in the Annexes. For intermediate dimension of metal member or sheeting or substructure the characteristic value of the thinner dimension is used.

The recommended partial safety factor γ_M = 1,33 is used, provided no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

For the types of connection (a, b, c, d) listed in the Annexes it is not necessary to take into account the effect of constrains due to temperature. Otherwise this has to be considered unless constrains due to temperature do not occur or are not significant (e.g. sufficient flexibility of the substructure).

For asymmetric metal substructures with thickness t_{II} < 5 mm (for instance Z- or C-shaped profiles), the characteristic value $N_{R,k}$ given in the Annexes has to be reduced to 70%.

In case of combined tension and shear forces the following interaction equation is taken into account:

$$\frac{N_{S,d}}{N_{R,d}} + \frac{V_{S,d}}{V_{R,d}} \leq 1{,}0$$

$N_{S,d}$ and $V_{S,d}$ indicates the design values of applied tension and shear forces.

Installation conditions

The installation is carried out according to the manufacturer's instructions.

The fastening screws are screwed-in with electric screw driver. The use of impact wrenches is not allowed.

The fastening screws are fixed rectangular to the surface of the metal member or sheeting.

The metal member or sheeting and substructure are in contact to each other. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

The thickness (or minimum thickness) of metal substructure needs to be covered by the clamping length of the fastening screw. Otherwise only the screwed-in clamping length of the fastening screw may be considered.

Basics for the design	**Annex 2**
Fastening screws for metal members and sheeting	

Timber substructures

Characteristic values of tension and shear resistance of the connection for other k_{mod} or ρ_k as indicated in the Annexes can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{matrix} N_{R,I,k} \\ F_{ax,Rk} * k_{mod} \end{matrix} \right. \qquad V_{R,k} = \min \left\{ \begin{matrix} V_{R,I,k} \\ F_{v,Rk} * k_{mod} \end{matrix} \right.$$

The characteristic values $N_{R,I,k}$ and $V_{R,I,k}$ are given in the corresponding Annex of the fastening screw.

$F_{ax,Rk}$ indicates the characteristic value of tension resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.40a) with $f_{ax,k}$ given in the corresponding Annex of the fastening screw.

$F_{v,Rk}$ indicates the characteristic shear resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9) with $M_{y,Rk}$ and $f_{h,k}$ given in the corresponding Annex of the fastening screw.

Aluminium members and sheeting

Characteristic values of tension resistance of the connection can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{matrix} N_{R,I,k} \\ N_{R,II,k} \end{matrix} \right.$$

The characteristic value $N_{R,I,k}$ has to be determined according to EN 1999-1-4:2007 + AC:2009, equation (8.13).

The characteristic value $N_{R,II,k}$ is given in the corresponding Annex of the fastening screw.

Perforated steel members and sheeting

Characteristic values of tension and shear resistance of the connection can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{matrix} N_{R,I,k} \\ N_{R,II,k} \end{matrix} \right. \qquad V_{R,k} = \min \left\{ \begin{matrix} V_{R,I,k} \\ V_{R,k} \end{matrix} \right.$$

The characteristic values $N_{R,I,k}$ and $V_{R,I,k}$ are given in Annex 4 and 5.

The characteristic values $N_{R,II,k}$ and $V_{R,k}$ are given in the corresponding Annex of the fastening screw.

Specific notes to the Annexes	**Annex 3**
Fastening screws for metal members and sheeting	

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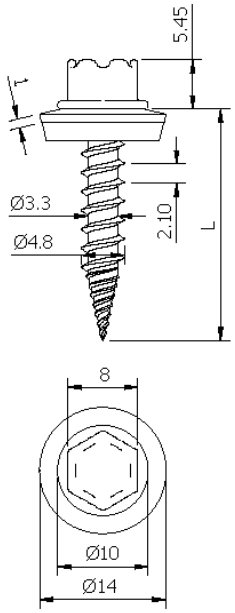


Materials:

Fastener: Galvanized and painted carbon steel
Washer: EPDM 14 mm, aluminum alloy EN AW 5052 H32

Component I: S280GD – EN 10346

Component II: S350GD – EN 10346

Component II: Timber ≥C24, 20 and 30 mm EN 14081

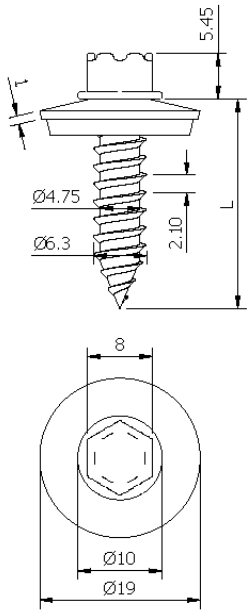
Drilling capacity: ≤ 0,75 + 0,75

	t_{II}(mm)	0,5	0,63	0,7	0,75	Timber: C24	Timber: C24
	t_I(mm)	S280GD	S280GD	S350GD	S280GD	20 mm	30 mm
$V_{R,k}$(kN)	0,5			1,36			
	0,6			1,74			
	0,7			2,05			
$N_{R,k}$(kN)	0,5	0,68	1,14	0,78	1,21	1,2	1,24
	0,6						
	0,7						

Kingi Roof screw

Annex 4

Kingi 4,8 x L + 14 Al
With patented C4 coating system, trademarked hexagon head, special drilling tip and integrated washer of 1 mm aluminum alloy EN AW 5052 H32 and EPDM-sealing washer



Materials:

Fastener: Galvanized and painted carbon steel
Washer: EPDM 19 mm, aluminum alloy EN AW 5052 H32

Component I: S280GD – EN 10346

Component II: S350GD – EN 10346

Component II: Timber ≥C24, 20 and 30 mm EN 14081

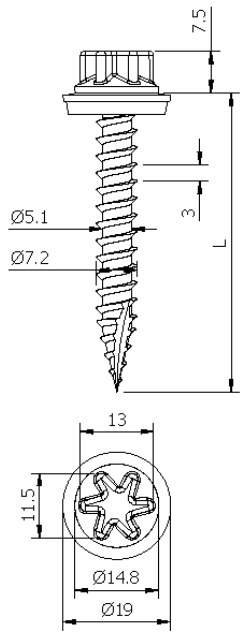
Drilling capacity not needed

	t_{II}(mm)	0,5	0,63	0,7	0,75	Timber: C24	Timber: C24
	t_I(mm)	S280GD	S280GD	S350GD	S280GD	20 mm	30 mm
$V_{R,k}$(kN)	0,5			1,44			
	0,6			1,8			
	0,7			2,21			
$N_{R,k}$(kN)	0,5	0,86	1,4	1,21	1,42	1,81	2,34
	0,6						
	0,7						

Kingi Replacement screw

Kingi 6,3 x L + 19 AI
With patented C4 coating system, trademarked hexagon head and integrated washer of 1 mm aluminum alloy EN AW 5052 H32 and EPDM-sealing washer

Annex 5



Materials:

Fastener: Galvanized and painted carbon steel
Washer: EPDM 19 mm, aluminum alloy EN AW 5052 H32

Component I: S280GD – EN 10346

Component II: S350GD – EN 10346

Component II: Timber ≥C24, 20 and 30 mm EN 14081

Drilling capacity: 0,75 + 0,75

	t_{II}(mm)	0,5	0,63	0,7	0,75	Timber: C24	Timber: C24
	t_I(mm)	S280GD	S280GD	S350GD	S280GD	20 mm	30 mm
$V_{R,k}$(kN)	0,5			1,54			
	0,6			1,91			
	0,7			2,49			
$N_{R,k}$(kN)	0,5	0,86	1,4	1,21	1,48	1,81	3,37
	0,6						
	0,7						

Kingi self-drilling Roof safety screw

Kingi 70 x L + 19 Al
With patented C4 coating system, trademarked hexagon head and integrated washer of 1 mm aluminum alloy EN AW 5052 H32 and EPDM-sealing washer

Annex 6