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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

MEMBER OF EOTA



European Technical Assessment ETA-08/0028 of 25/03/2015

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:

SIMA connectors type: Fork Anchor type 1; Rafter Anchor type 2-36, 2-48; Purlin Anchor type 170, 170-1, 210, 210-1, 250, 290, 330, 370; Purlin Anchor type 170PL, 170-1PL, 210PL, 210-1PL, 250PL, 290PL, 330PL, 370PL; Rafter Connector type 180; Universal Connector type 100, 140, 190, 100 2mm, 140 2 mm; Universal Purlin Anchor type 170, 210; Purlin Anchor twist 280

Product family to which the above construction product belongs:

Three-dimensional nailing plate (connectors for wood to wood connections)

Manufacturer:

Sima Industri ApS
Industrivej Nord 40
DK-7490 Aulum
Tel. +45 97 47 26 11
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Internet www.simaindustri.dk

Manufacturing plant:

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This European Technical Assessment contains:

34 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:

Guideline for European Technical Approval (ETAG) No. 015 Three Dimensional Nailing Plates, April 2013, used as European Assessment Document (EAD).

This version replaces:

The previous ETA with the same number issued on 2013-06-26 and expiry on 2017-12-21

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

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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

SIMA Industri connectors type Fork Anchor type 1; Rafter Anchor type 2-36, 2-48; Purlin Anchor type 170, 170-1, 210, 210-1, 250, 290, 330, 370; Purlin Anchor type 170PL, 170-1PL, 210PL, 210-1PL, 250PL, 290PL, 330PL, 370PL; Rafter Connector type 180; Universal Connector type 100, 140, 190, 100 2mm, 140 2 mm; Universal Purlin Anchor type 170, 210; Purlin Anchors twist 280 are one-piece, non-welded anchor connectors. They are intended for timber-to-timber bracket connections fastened with specified nails.

Most of the brackets are made from pre-galvanized steel Grade S250GD + min. Z275 according to EN 10346. Dimensions, hole positions, steel type and typical installations are shown in Annex B. Additionally, the purlin anchors *PL can be made from 1,5 mm pre-galvanized steel in grades from Grade S350GD to S500GD + min. Z275 according to EN 10346.

2 Specification of the intended use in accordance with the applicable EAD

The brackets are intended for use in making side-grain to side-grain connections in load bearing timber structures, as a connection between a wood based purlin and a solid timber or wood based beam, where requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 of Regulation (EU) 305/2011 shall be fulfilled.

The brackets can be installed as connections between wood based members such as:

- Structural solid timber classified to C14-C40 according to EN 338 / EN 14081,
- Glulam classified to GL24-GL36 according to EN 1194 / EN 14080,
- LVL according to EN 14374,
- Parallam PSL,
- Intrallam LSL,
- Duo- and Triobalken,
- Layered wood plates,
- Kreuzbalken with minimum thickness of 80 mm
- I-beams with backer blocks on both sides of the web in the header and web stiffeners in the joist

- Plywood according to EN 636

However, the calculation methods are only allowed for a characteristic wood density of up to 350 kg/m³. Even though the wood based material may have a larger density, this must not be used in the formulas for the load-carrying capacities of the fasteners.

Annex C give the tables for the characteristic load-carrying capacities of the bracket connections.

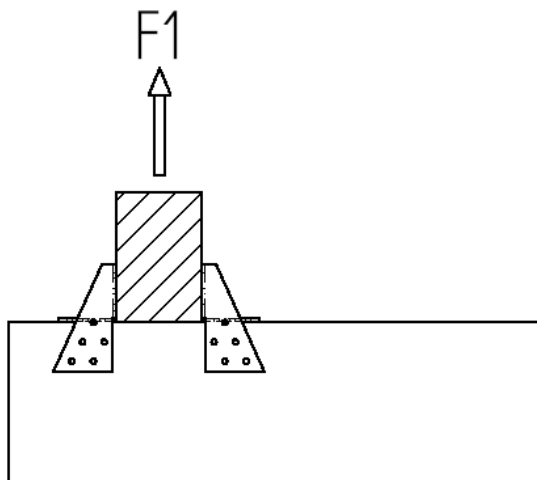
For timber or wood based material with a lower characteristic density than 350 kg/m³ the load-carrying capacities shall be reduced by the k_{dens} factor:

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

Where ρ_k is the characteristic density of the timber in kg/m³.

The design of the connections shall be in accordance with Eurocode 5 or a similar national Timber Code.

It is assumed that the force acting on the bracket connection is F_1 as shown in the figure below. The force shall act in the middle of the purlin.



It is assumed that the beam is prevented from rotating. The brackets are intended for use for connections subject to static or quasi static loading.

The zinc-coated hangers are for use in timber structures subject to dry, internal conditions defined by the service classes 1 and 2 of EN 1995-1-1, (Eurocode 5).

The scope of the brackets regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions.

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)	
Characteristic load-carrying capacity	See Annex C
Stiffness	No performance determined
Ductility in cyclic testing	No performance determined
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The connectors are made from steel classified as Euroclass A1 in accordance with EN 1350-1 and EC decision 96/603/EC, amended by EC Decision 2000/605/EC
3.3 Hygiene, health and the environment (BWR3)	
Influence on air quality	The product does not contain/release dangerous substances specified in TR 034, dated March 2012 0**)
3.7 Sustainable use of natural resources (BWR7)	
	No Performance Determined
3.8 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 3.8 – 3.9.

**) 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.

3.9 Methods of verification

The characteristic load-carrying capacities have been calculated 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.

The values in annex C have been determined by multiplying the calculated resistance of the connection by k_{mod} to consider load duration and service classes in accordance with EC 5.

3.10 Mechanical resistance and stability

See annex C for characteristic load-carrying capacity in the direction F_1 .

The characteristic capacities of the brackets hangers are determined by calculation as described in the EOTA Guideline 015 clause 5.1.2. They should be used for designs in accordance with Eurocode 5 or a similar national Timber Code.

The design models allow the use of fasteners described in the table on page 10 in Annex B

Connector nails in accordance to ETA-09/0273

The load bearing capacities of the brackets has been determined based on the use of Paslode Connector nails 4,0 x 40 mm in accordance with the ETA-09/0273 for nails. The fastener can be replaced by fastener mentioned in the ETA-09/0273 with the same or higher performance. The capacity of the connection may not be higher than the load mentioned in this ETA.

The capacities of the nails used in calculations are:

$$F_{ax,Rk} = 0,998kN$$

$$F_{V,Rk} = 1,885kN$$

The brackets are mounted using either full or half nailing.

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.

3.11 Aspects related to the performance of the product

3.11.1 Corrosion protection in service class 1 and 2.
In accordance with ETAG 015 the anchor connectors have a zinc coating weight of min Z275. The steel employed is S250GD or S350GD with min. Z275 according to EN 10346.

3.12 General aspects related to the fitness for use of the product

SIMA Industri 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 either the maximum or the minimum pattern as defined in Annex A.

A bracket connection is deemed fit for its intended use provided:

Beam – support conditions

- The beam shall be restrained against rotation and be free from wane under the bracket.

Wood to wood connections

- The brackets can be fastened to wood-based members by nails.
- There shall be nails in all holes or a partial nailing pattern as prescribed in Annex B can be used.
- The characteristic capacity of the bracket connection is calculated according to the manufacturer's technical documentation, dated 2006-12-18.
- The bracket connection is designed in accordance with Eurocode 5 or an appropriate national code.
- The gap between the end of the purlin and the surface, where contact stresses can occur during loading shall be limited.
- The width of the purlin shall be at least the penetration length of the nails, for full nailing and partial nailing without staggering the nails in the purlin. For partial nailing with staggered nails in the purlin the width shall be at least the penetration length of the nails.

- The cross section of the purlin at the connection shall have sharp edges at the lower side against the bottom plate, i.e. it shall be without wane.
- The cross section of the beam shall have a plane surface against the whole bracket.
- The width B_p of the purlin shall correspond to that of the distance between the two brackets, B . B_p shall not be smaller than $B-3$ mm
- The depth of the purlin shall be so large that the top of the purlin is at least 20 mm above the upper nail in the purlin.
- Nails to be used shall have a diameter, which fits the holes of the brackets. Round nails shall have a diameter which is not smaller than the diameter of the hole minus 1 mm.

4 Attestation and verification of constancy of performance (AVCP)

4.1 AVCP system

According to the decision 97/638/EC of the European Commission¹, 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 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

Issued in Copenhagen on 2015-03-25 by



Thomas Bruun
Managing Director, ETA-Danmark

Annex A**Changes from last ETA**

Additions and modifications for this ETA	
Pages	Update
19 and 32	Universal connector 100 2mm and 140 2mm added
21 and 34	Purlin Anchor twist 280 added

Additions and modifications for the ETA from 2013-06-26 to 2017-12-21	
Pages	Update
9	Annex A added
13-16 and 25-29	Purlin Anchor type 170PL, 170-1PL, 210PL, 210-1PL, 250PL, 290PL, 330PL, 370PL added
11-20	Colored hole patterns

Additions and modifications for the ETA valid from 2012-12-21 to 2017-12-21	
Pages	Update
	ETA extended 5 years
23-33	Revision of all values due to new Paslode Connector nails
11 and 24	Rafter Anchor type 2-36 and 2-48 added

Annex B**Product details and definitions**

Table A1 Fastener specification

Nail and screw type	Nail and screw size (mm)		Finish	ETA
	Diameter	Length		
Paslode Connector nail	4,0	40	Electroplated zinc	09/0273

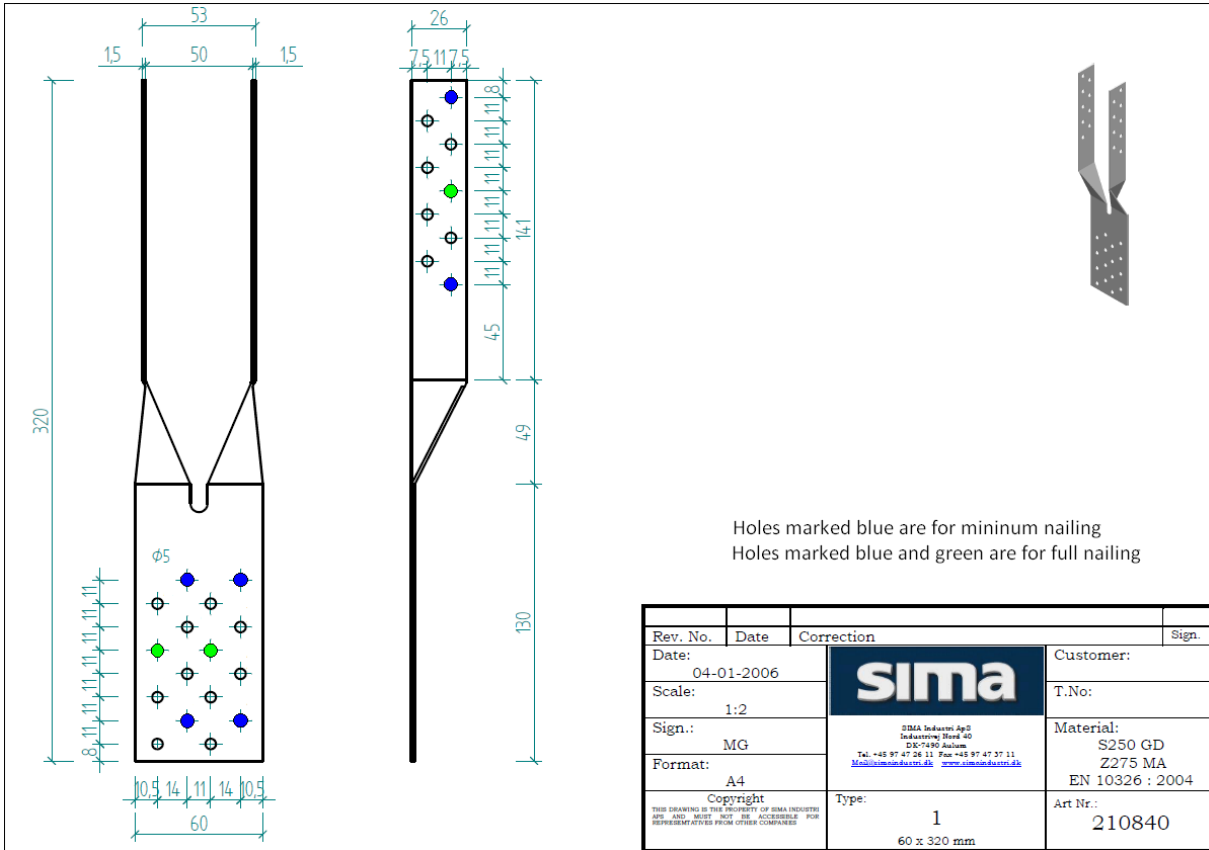
Connector specification:

Holes marked in blue are used in case of partial nailing

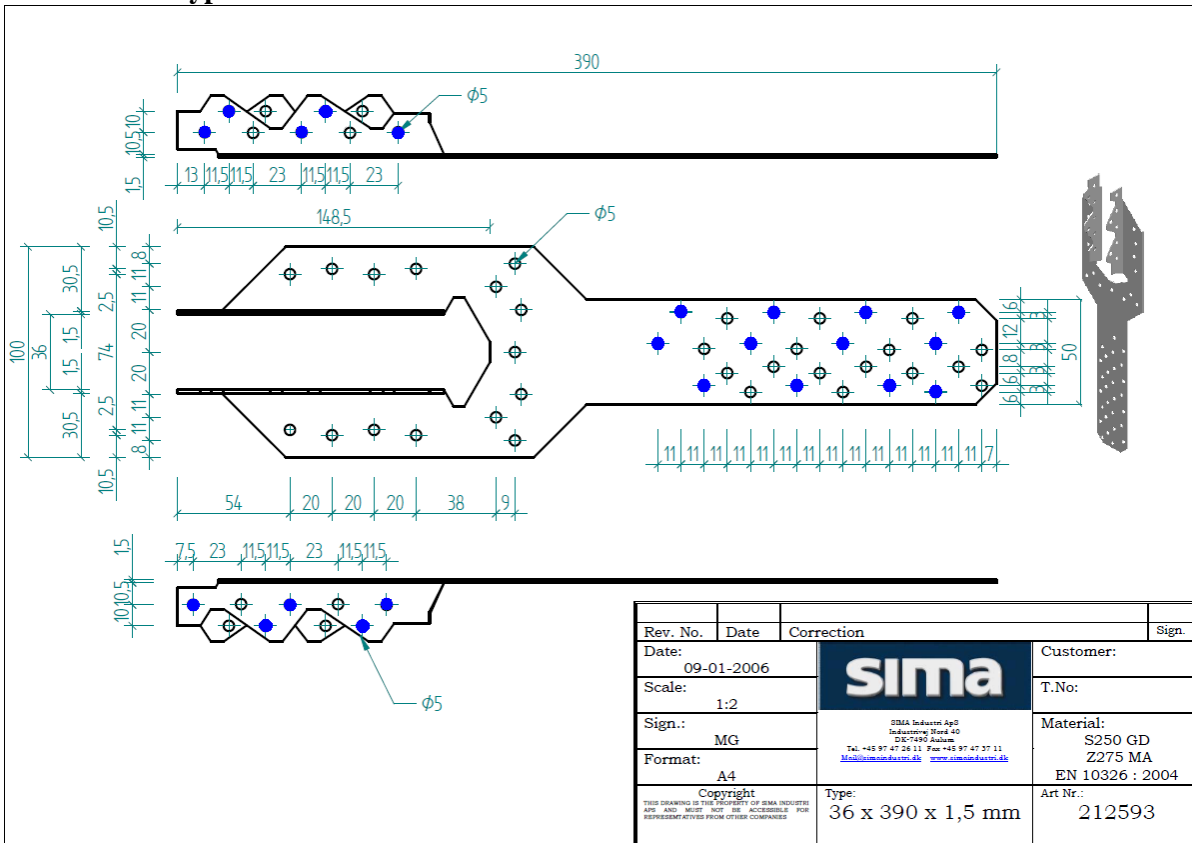
Holes marked with green and blue are used in case of optimal nailing

Purlin anchors and trim fix are marked with numbers referenced from Annex C

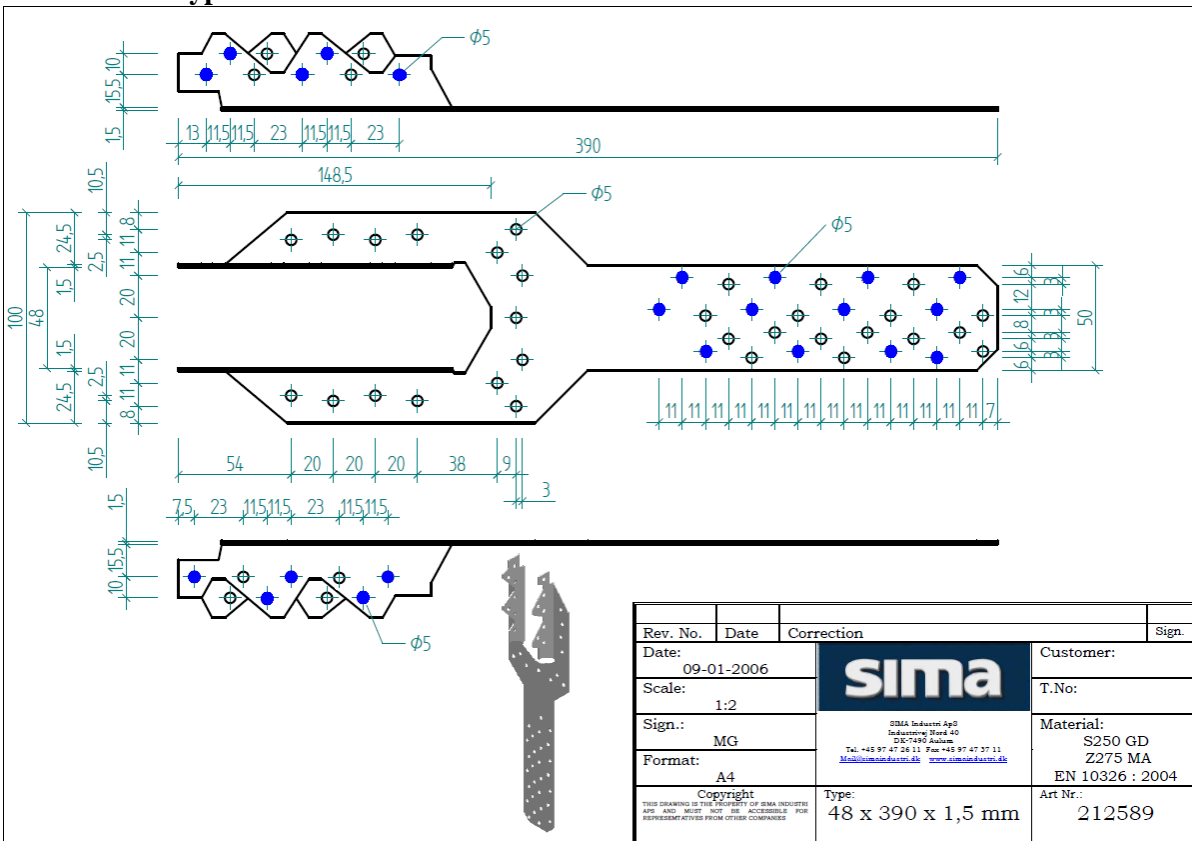
Fork anchor 1



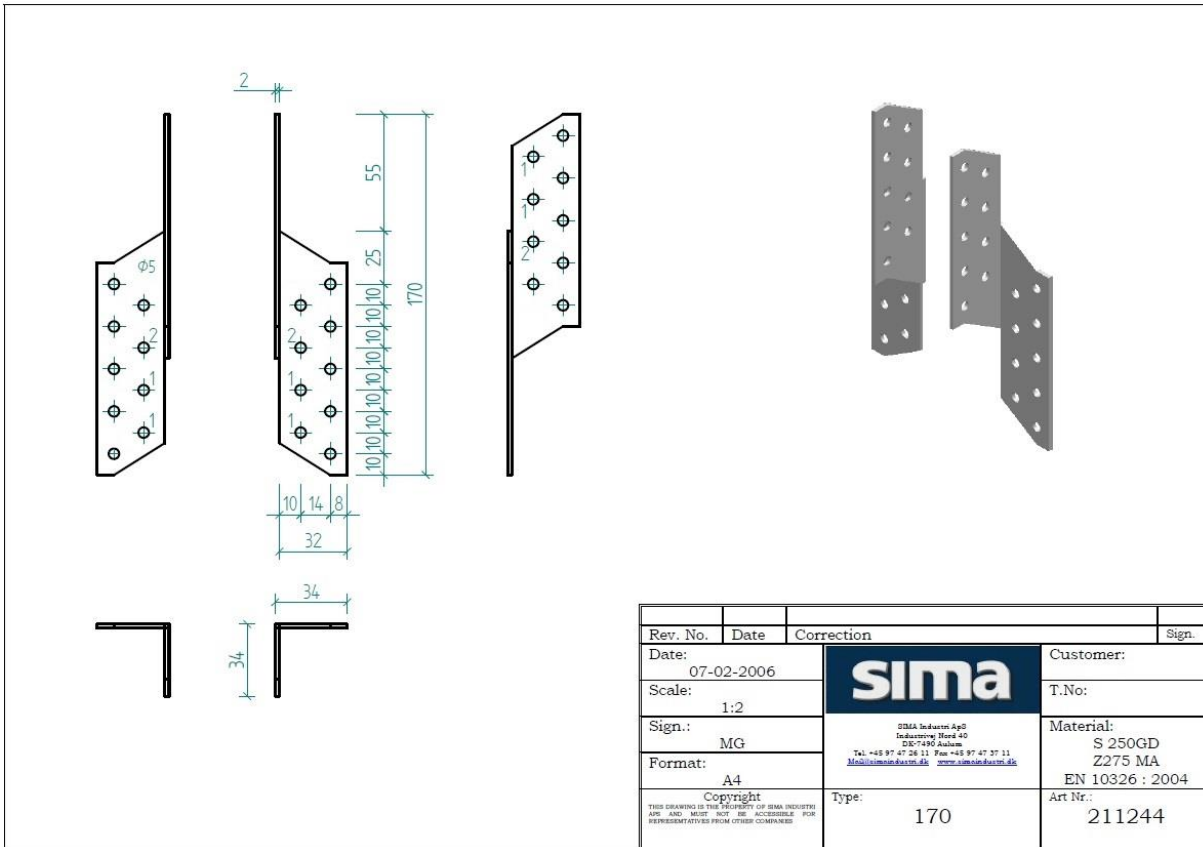
Rafter anchor type 2-36



Rafter anchor type 2-48

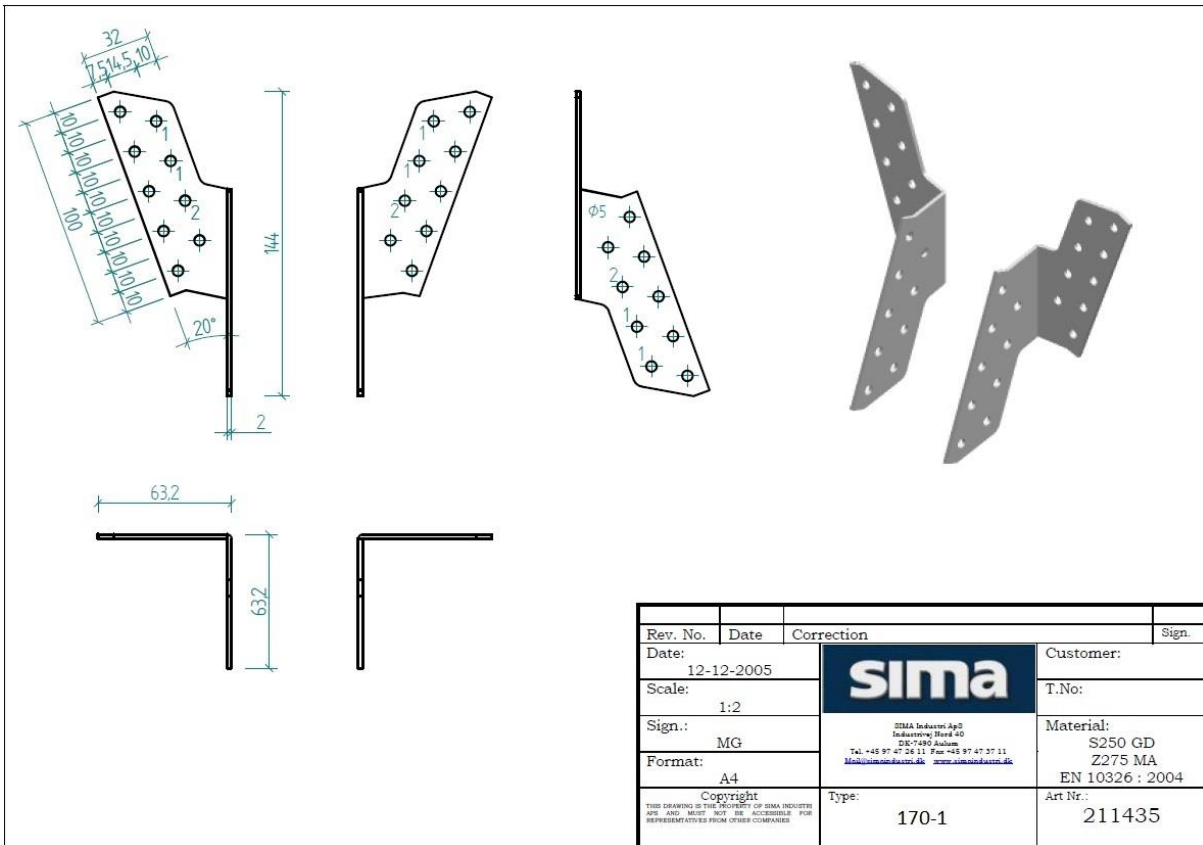


Purlin anchor 170



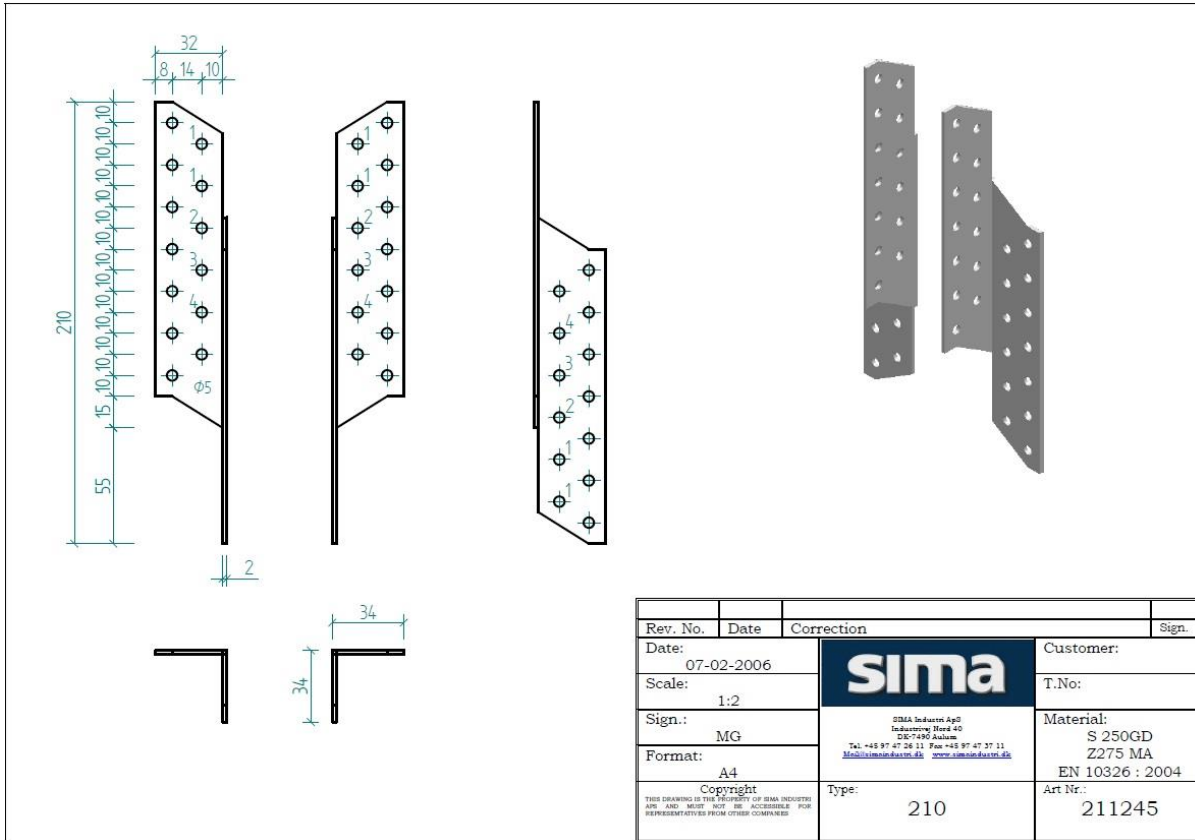
Additionally the bracket can be made from 1,5 mm pre-galvanized steel grades S350GD to Grade S500GD + min. Z275 according to EN 10346 named Purlin Anchor 170PL

Purlin anchor 170-1



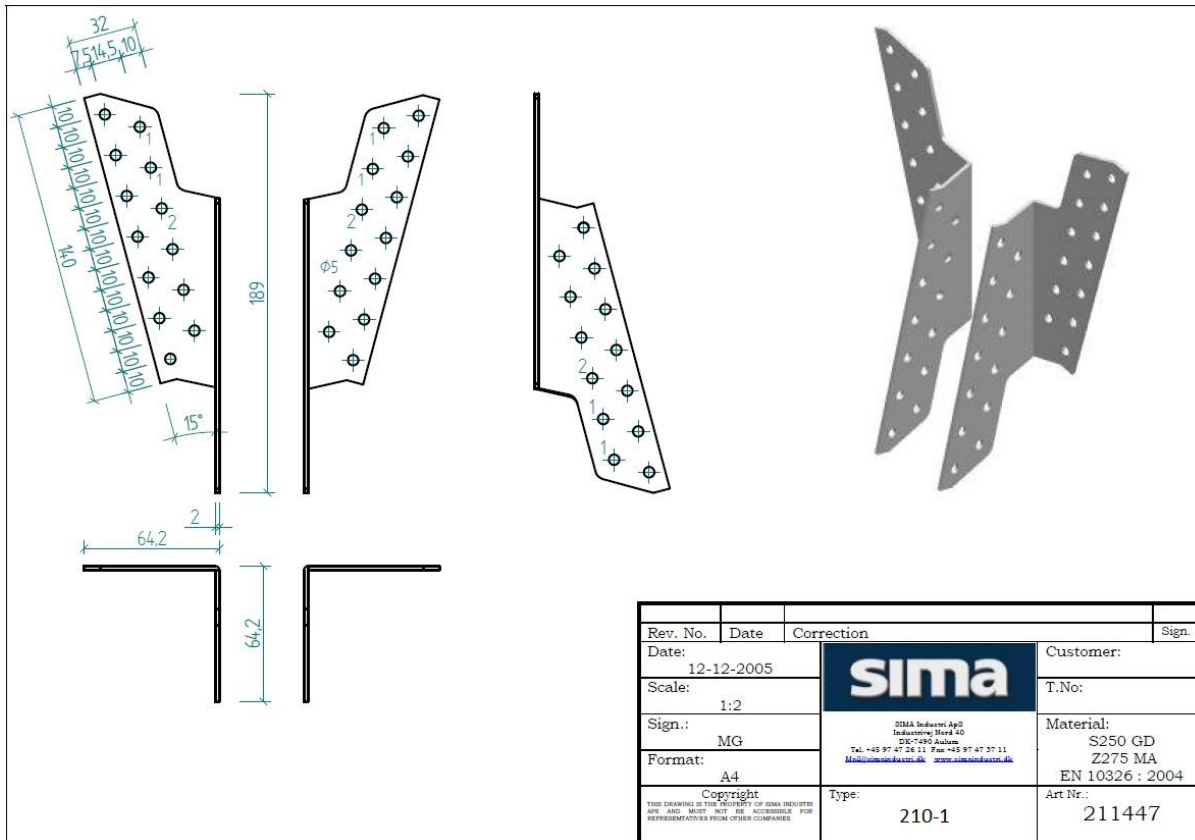
Additionally the bracket can be made from 1,5 mm pre-galvanized steel grades S350GD to Grade S500GD + min. Z275 according to EN 10346 named Purlin Anchor 170-1PL

Purlin anchor 210



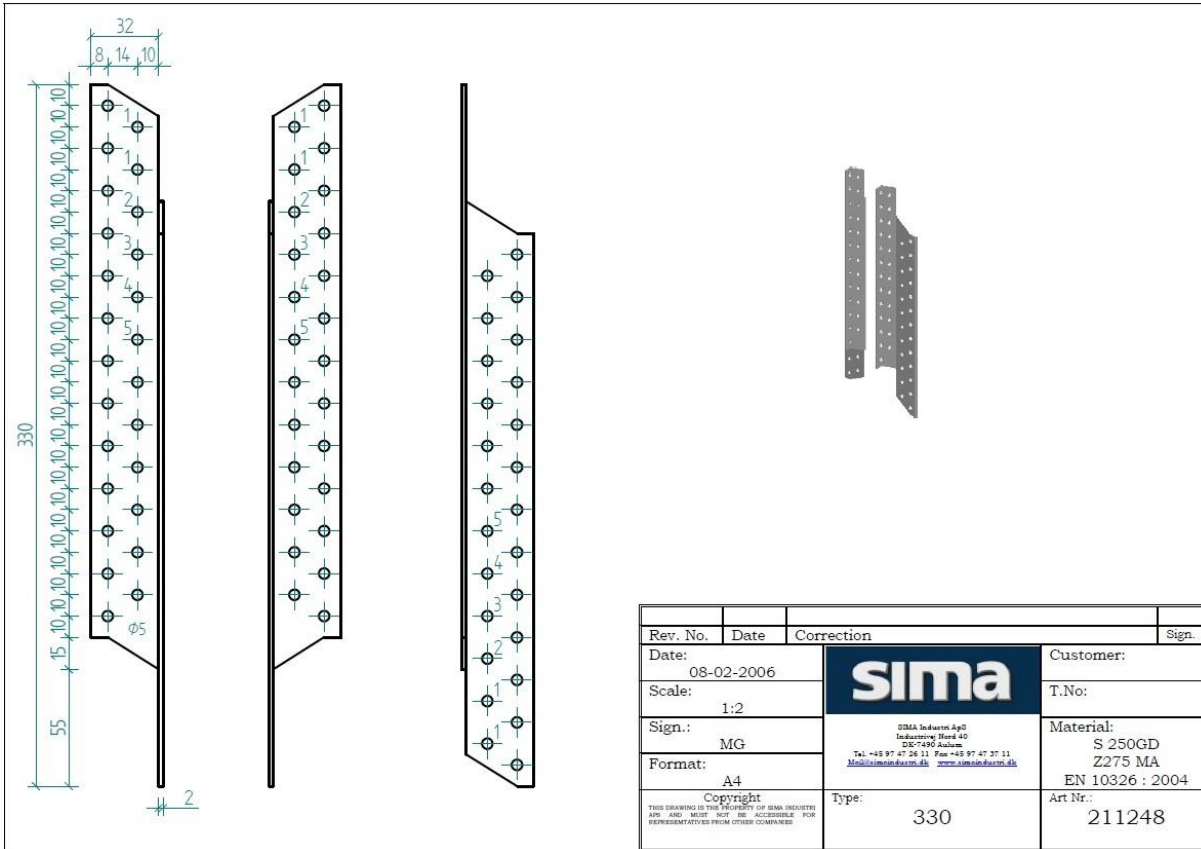
Additionally the bracket can be made from 1,5 mm pre-galvanized steel grades S350GD to Grade S500GD + min. Z275 according to EN 10346 named Purlin Anchor 210PL

Purlin anchor 210-1



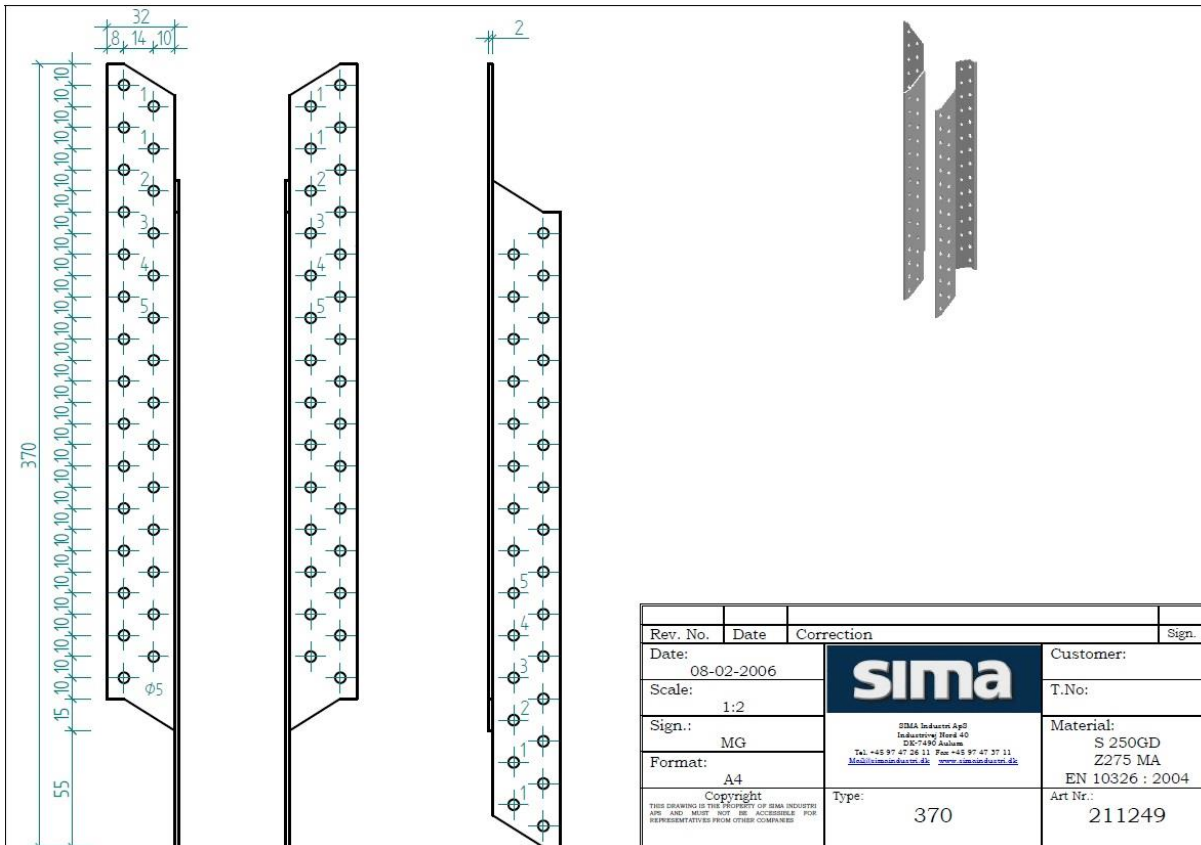
Additionally the bracket can be made from 1,5 mm pre-galvanized steel grades S350GD to Grade S500GD + min. Z275 according to EN 10346 named Purlin Anchor 210-1PL

Purlin anchor 330



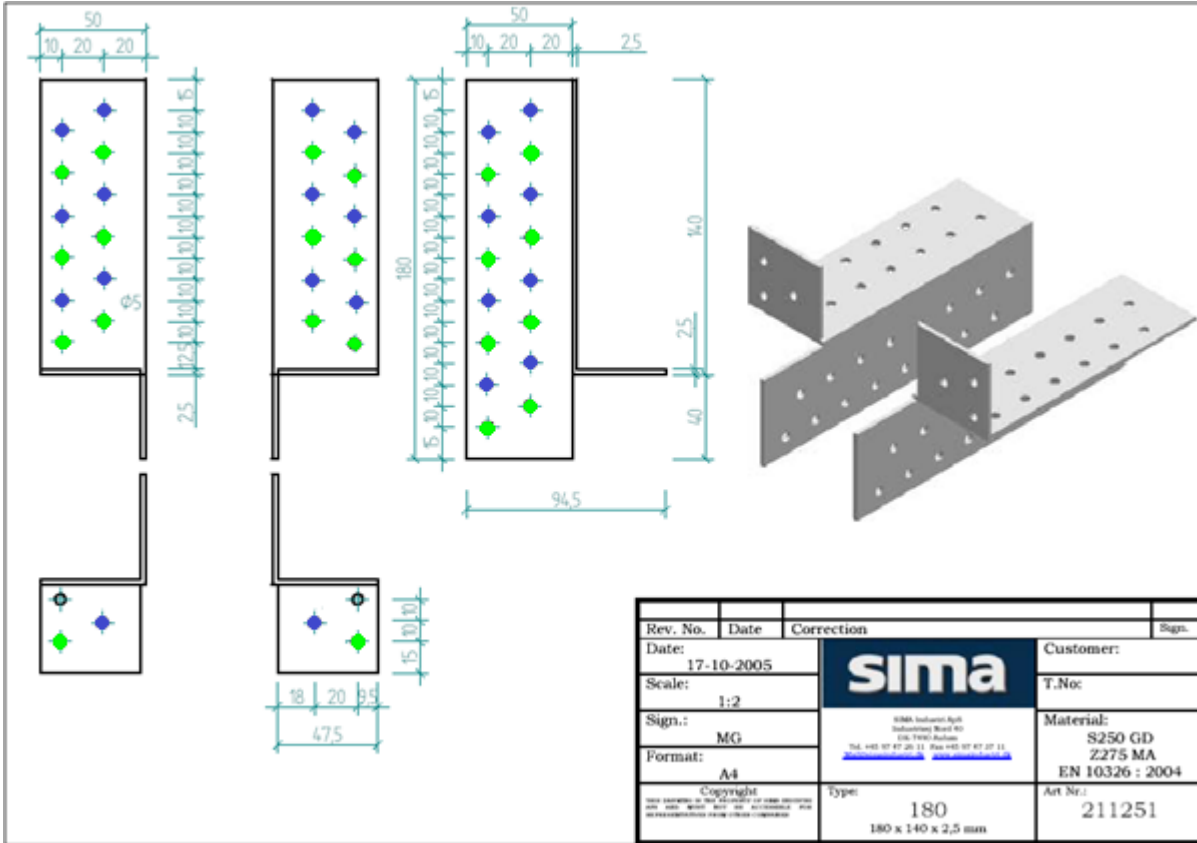
Additionally the bracket can be made from 1,5 mm pre-galvanized steel grades S350GD to Grade S500GD + min. Z275 according to EN 10346 named Purlin Anchor 330PL

Purlin anchor 370

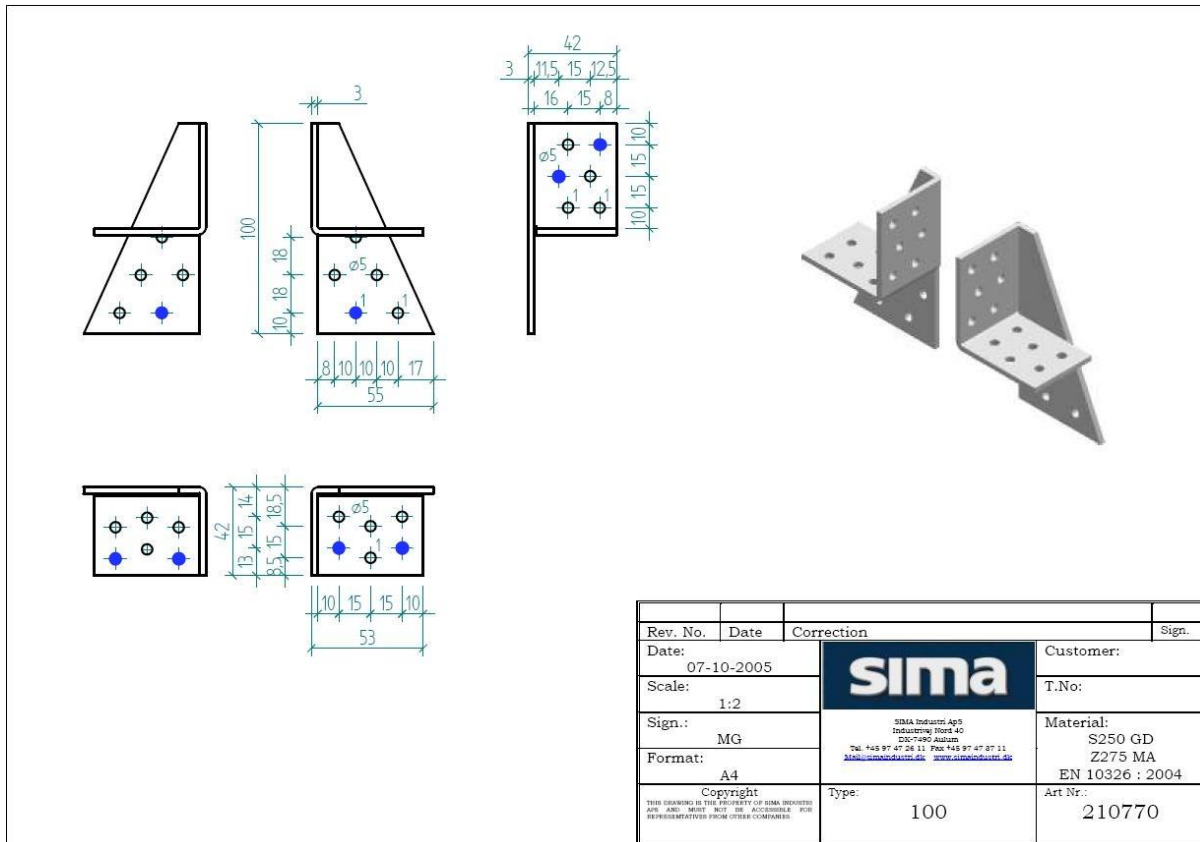


Additionally the bracket can be made from 1,5 mm pre-galvanized steel grades S350GD to Grade S500GD + min. Z275 according to EN 10346 named Purlin Anchor 370PL

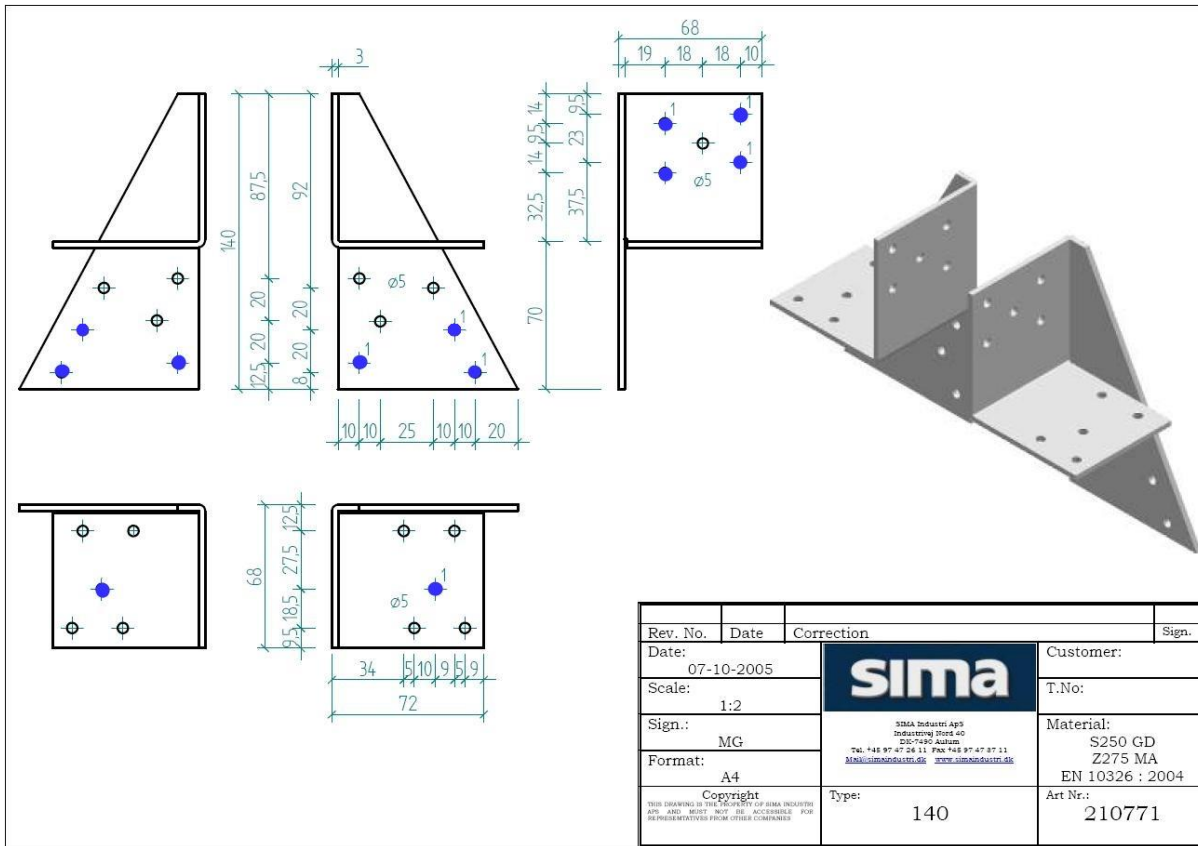
Rafter connector 180



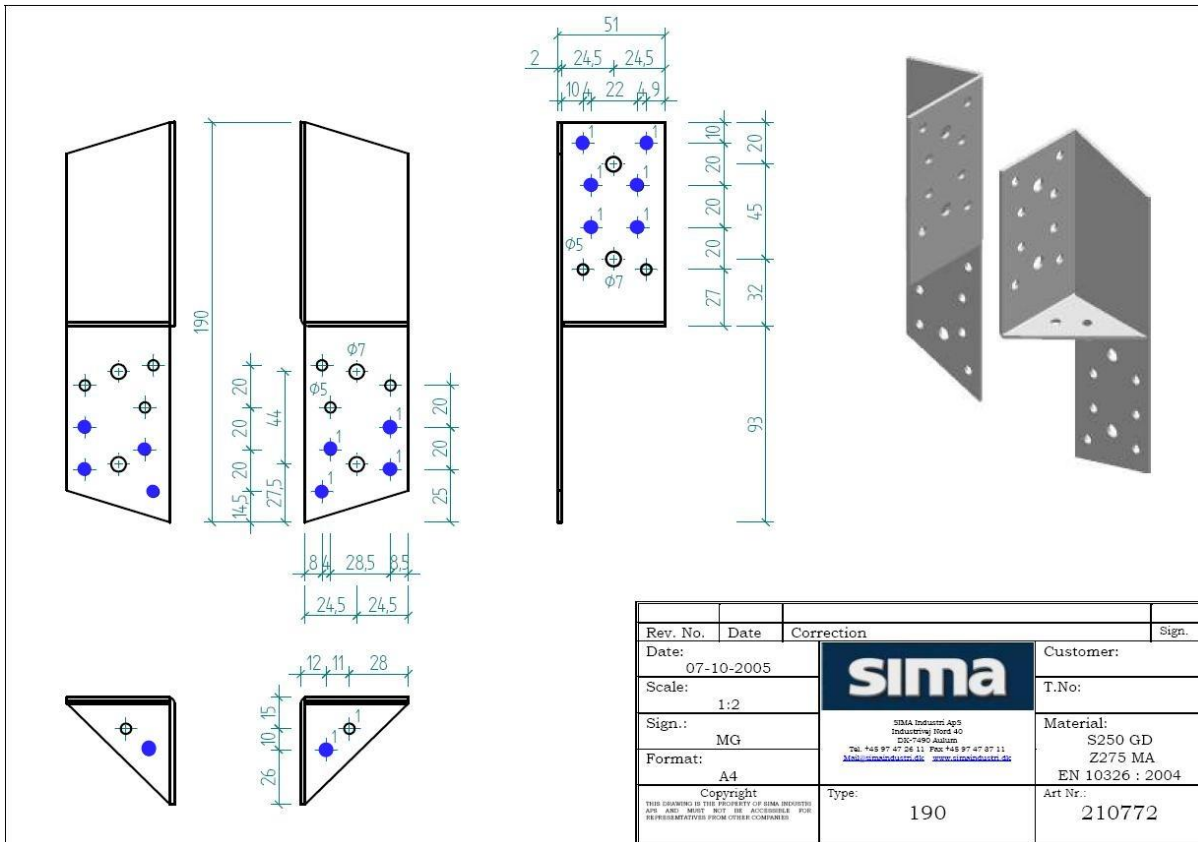
Universal connector 100



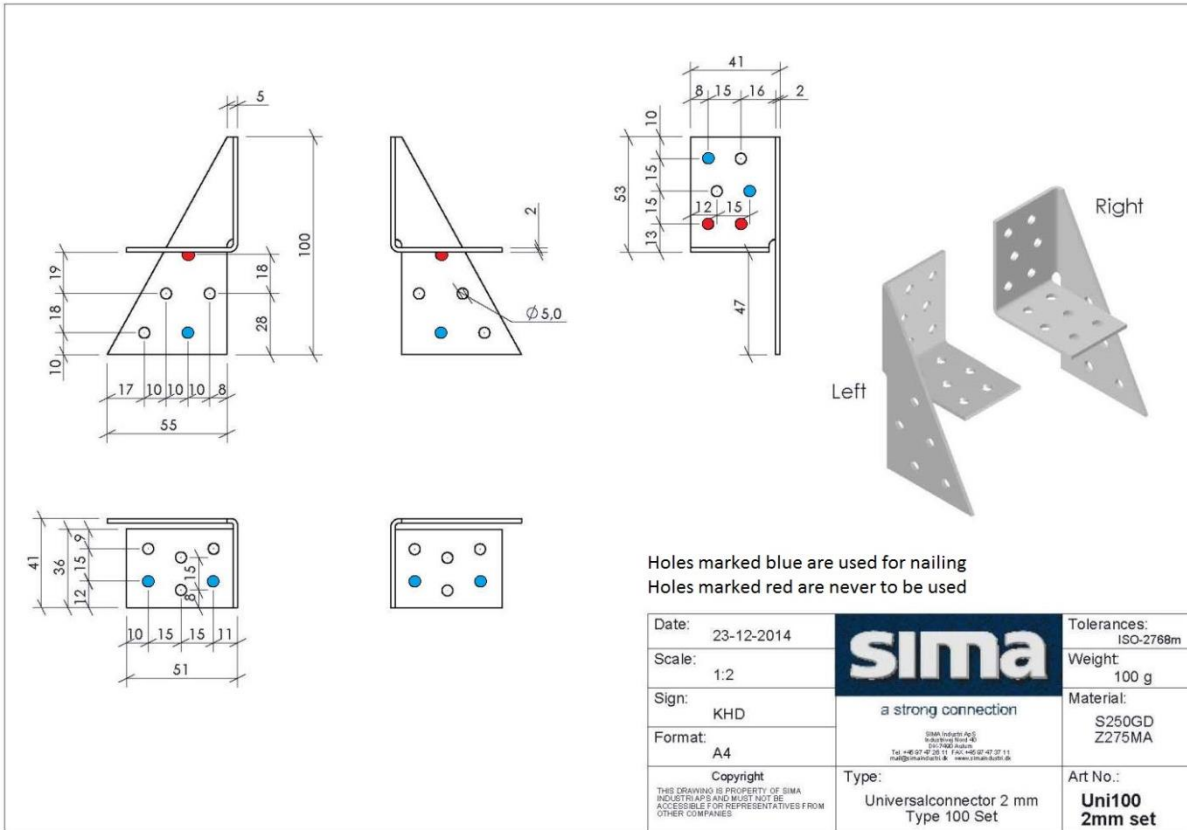
Universal connector 140



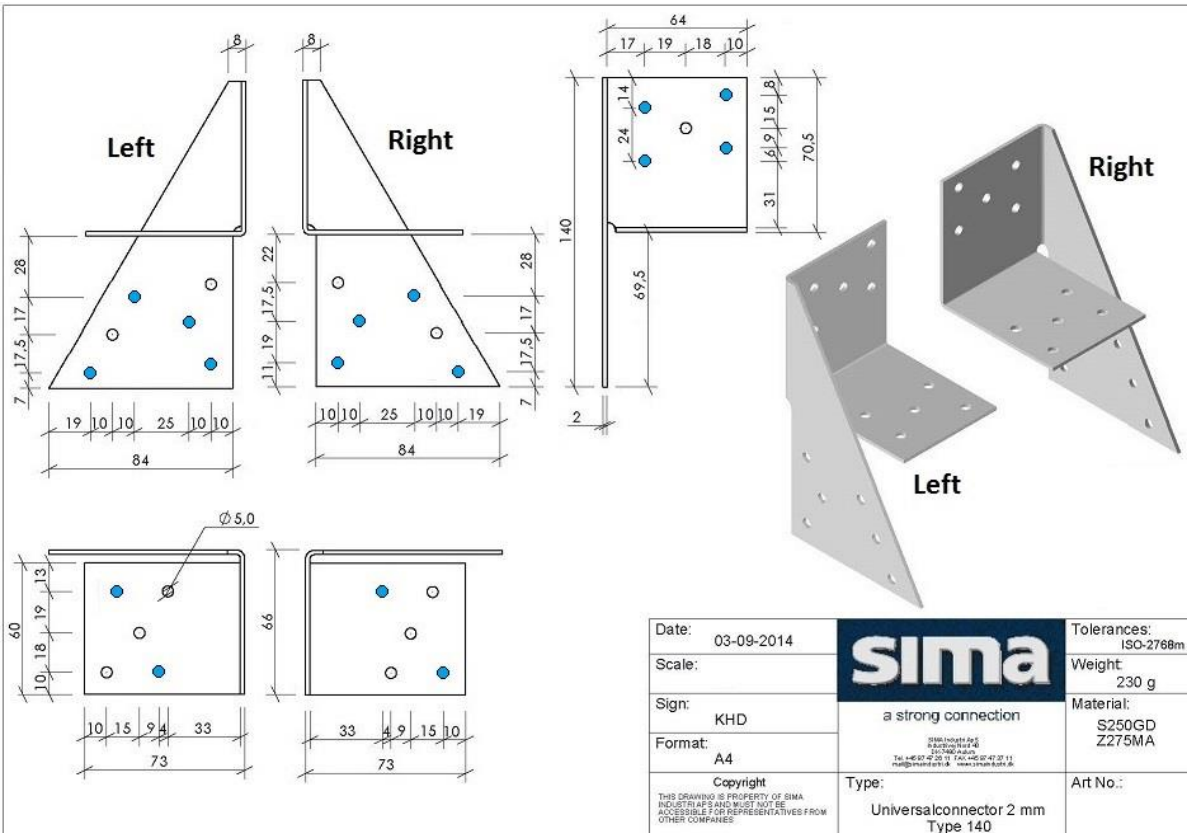
Universal connector 190



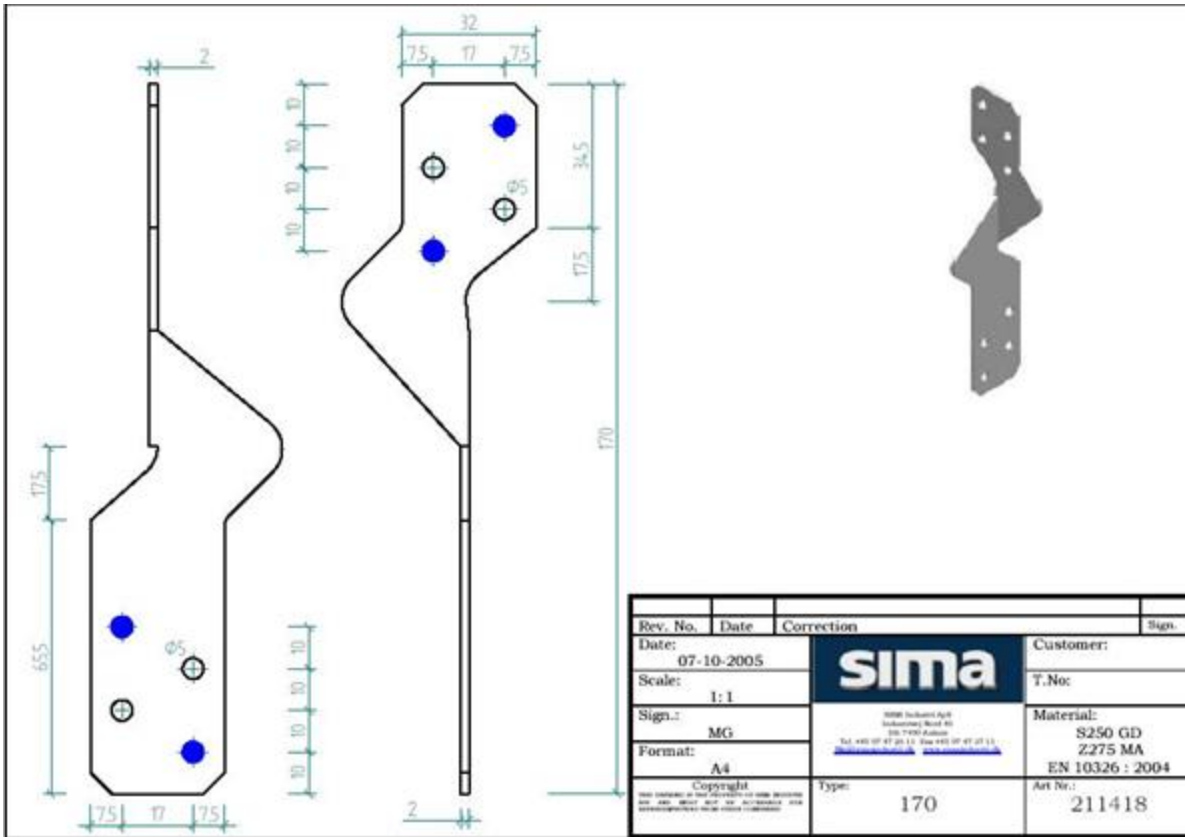
Universal connector 100 2mm



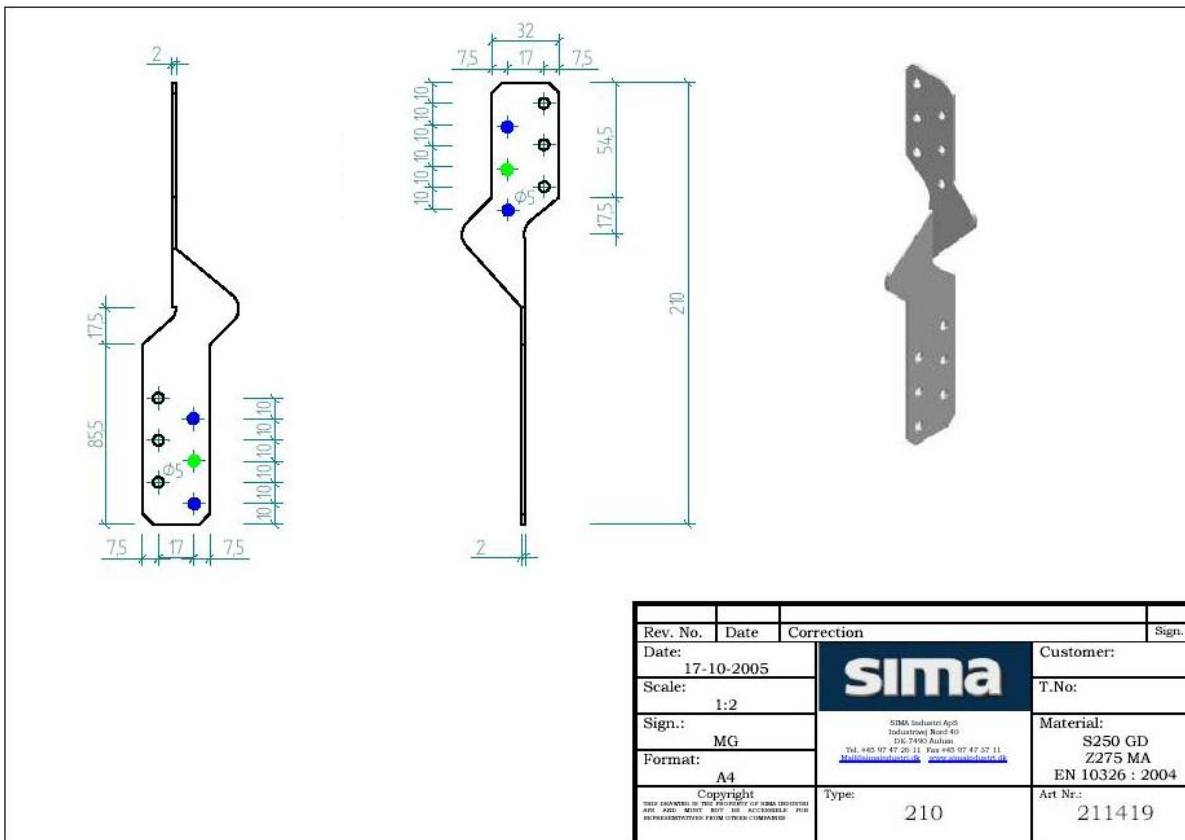
Universal connector 140 2mm



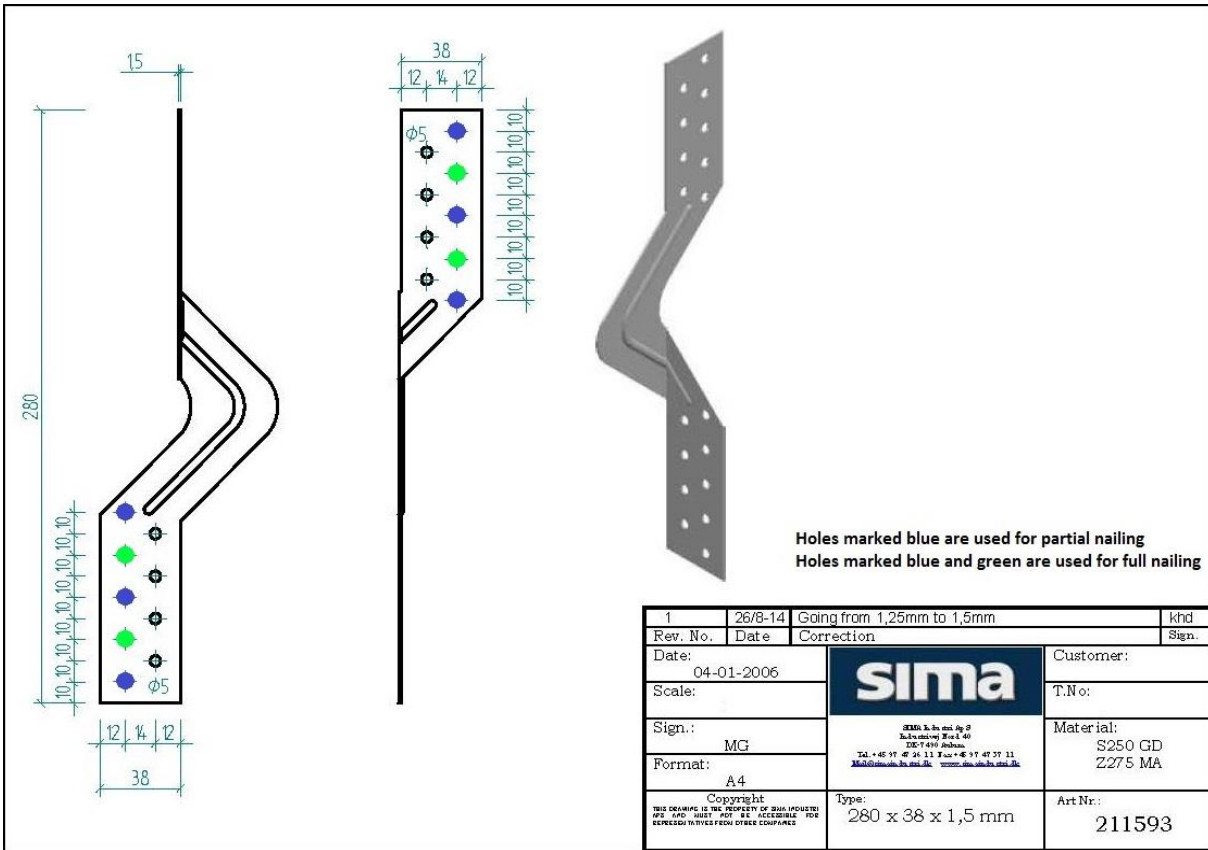
Universal Purlin anchor 170



Universal Purlin anchor 210



Purlin Anchor twist 280



Characteristic capacities of the bracket connections with nails.

The upward directed force is assumed to act in the middle of the purlin.

More than one patterns are specified. A full nailing pattern, where there are nails in all the holes. Partial nailing patterns where the number of nails in the purlin and the beam are less than full nailing. The nails in the purlin may be staggered and there shall always be a nail in the upper and the lower holes. The other nails are distributed evenly over the height. The nails in the beam shall be put in the holes closest to the bend line.

The width of the purlin shall be at least the penetration length of the nails, for full nailing and partial nailing without staggering the nails in the purlin. For partial nailing with staggered nails in the purlin the width shall be at least the penetration length of the nails.

A.1 Brackets fastened with nails

$$R_{Up,k} = \min \{ n_{P,ef,1} \cdot R_{lat,P,k} ; n_B \cdot R_{lat,B,k} \}$$

where the following symbols are:

$n_{P,ef,1}$ effective number of nails in the side of the purlin

n_B total number of nails in the side of the beam

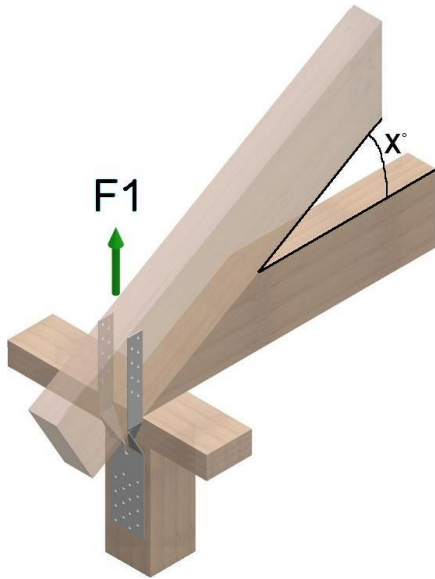
$R_{lat,k}$ characteristic lateral load-carrying capacity of the nails in the purlin or in the beam indicated by the indices P or B

$R_{ax,k}$ characteristic axial load-carrying capacity of the nails in the purlin or in the beam indicated by the indices P or B

Annex C

Characteristic capacities

Fork/Rafter anchor



1 Fork Anchor pr connection

Paslode Connector nails 4,0 x 40	No. of nails pr connection	Load Duration	F1, [kN] 0° rafters	F1, [kN] 15° rafters	F1, [kN] 30° rafters	F1, [kN] 45° rafters
Nailing Holes marked blue	8	P	4,52	4,52	4,52	4,52
		L	5,28	5,28	5,28	5,28
		M	6,03	6,03	6,03	6,03
		S	6,78	6,78	6,78	6,78
		I	8,29	8,29	8,29	8,29
The characteristic values found by calculation			7,54	7,54	7,54	7,54
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "						

Paslode Connector nails 4,0 x 40	No. of nails pr connection	Load Duration	F1, [kN] 0° rafters	F1, [kN] 15° rafters	F1, [kN] 30° rafters	F1, [kN] 45° rafters
Nailing Holes marked blue and green	12	P	6,78	6,29	5,74	4,91
		L	7,92	7,34	6,70	5,73
		M	9,05	8,39	7,65	6,55
		S	10,18	9,44	8,61	7,37
		I	12,44	11,54	10,53	9,01
The characteristic values found by calculation			11,31	10,49	9,57	8,19
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "						

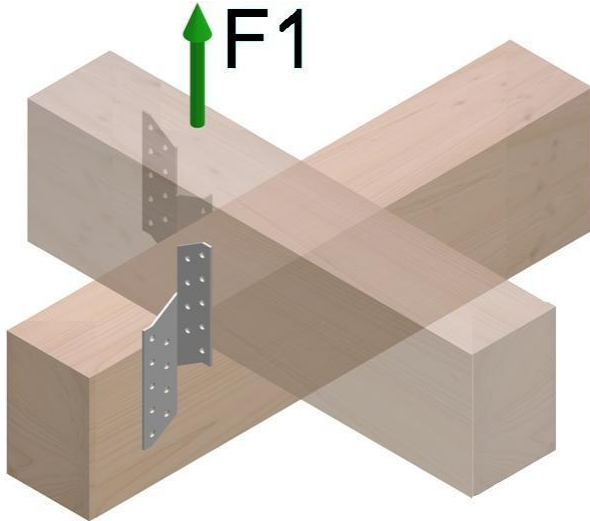
1 Rafter Anchor 2-36 pr. connection

Paslode Connector nails 4,0 x 40	No. of nails pr connection	Load Duration	F1, [kN] 0° rafters	F1, [kN] 15° rafters	F1, [kN] 30° rafters	F1, [kN] 45° rafters
Nailing Holes marked blue	22	P	11,31	4,78	4,26	3,54
		L	13,20	5,58	4,97	4,13
		M	13,37	6,38	5,68	4,72
		S	13,37	7,17	6,39	5,31
		I	13,37	8,77	7,81	6,49
The characteristic values found by calculation			13,37	7,97	7,10	5,90
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "						

1 Rafter Anchor 2-48 pr. connection

Paslode Connector nails 4,0 x 40	No. of nails pr connection	Load Duration	F1, [kN] 0° rafters	F1, [kN] 15° rafters	F1, [kN] 30° rafters	F1, [kN] 45° rafters
Nailing Holes marked blue	22	P	11,31	6,37	5,68	4,72
		L	13,20	7,43	6,62	5,51
		M	13,37	8,50	7,57	6,30
		S	13,37	9,56	8,51	7,08
		I	13,37	11,68	10,41	8,66
The characteristic values found by calculation			13,37	10,62	9,46	7,87
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "						

Purlin anchors



2 Purlin Anchors or Purlin Anchors PL pr. connection in any length

Fastener not taking into account	No. of fasteners pr connection	Load Duration	F1 _{steel} , [kN]
Fastener	n	P	26,10
		L	26,10
		M	26,10
		S	26,10
		I	26,10
The characteristic values found by calculation			26,10
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K _{mod} "			

2 Purlin Anchor 170 or 170PL pr. connection

Paslode Connector nails 4,0 x 40 pr connection		
Load Duration	F1, [kN] 8 nails Holes: 1	F1, [kN] 12 nails Holes: 1,2
P	4,52	4,52
L	5,28	5,28
M	6,03	6,03
S	6,79	6,79
I	8,29	8,29
Characteristic values found by calculation	7,54	7,54
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "		

2 Purlin Anchors 170-1 or 170-1PL pr. connection

Paslode Connector nails 4,0 x 40 pr connection		
Load Duration	F1, [kN] 8 nails Holes: 1	F1, [kN] 12 nails Holes: 1,2
P	4,52	4,52
L	5,28	5,28
M	6,03	6,03
S	6,79	6,79
I	8,29	8,29
Characteristic values found by calculation	7,54	7,54
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "		

2 Purlin Anchors 210 or 210PL pr. connection

Paslode Connector nails 4,0 x 40 pr connection				
Load Duration	F1, [kN] 8 nails Holes: 1	F1, [kN] 12 nails Holes: 1,2	F1, [kN] 16 nails Holes: 1-3	F1, [kN] 20 nails Holes: 1-4
P	4,52	6,79	6,79	6,79
L	5,28	7,92	7,92	7,92
M	6,03	9,05	9,05	9,05
S	6,79	10,18	10,18	10,18
I	8,29	12,44	12,44	12,44
Characteristic values found by calculation	7,54	11,31	11,31	11,31
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "				

2 Purlin Anchors 210-1 or 210-1PL pr. connection

Paslode Connector nails 4,0 x 40 pr connection		
Load Duration	F1, [kN] 8 nails Holes: 1	F1, [kN] 12 nails Holes: 1,2
P	4,52	6,79
L	5,28	7,92
M	6,03	9,05
S	6,79	10,18
I	8,29	12,44
Characteristic values found by calculation	7,54	11,31
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "		

2 Purlin Anchors 250 or 250PL pr. connection

Paslode Connector nails 4,0 x 40 pr connection					
Load Duration	F1, [kN] 8 nails Holes: 1	F1, [kN] 12 nails Holes: 1,2	F1, [kN] 16 nails Holes: 1-3	F1, [kN] 20 nails Holes: 1-4	F1, [kN] 24 nails Holes: 1-5
P	4,52	6,79	9,05	9,05	9,05
L	5,28	7,92	10,56	10,56	10,56
M	6,03	9,05	12,06	12,06	12,06
S	6,79	10,18	13,57	13,57	13,57
I	8,29	12,44	16,59	16,59	16,59
Characteristic values found by calculation	7,54	11,31	15,08	15,08	15,08
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "					

2 Purlin Anchors 290 or 290PL pr. connection

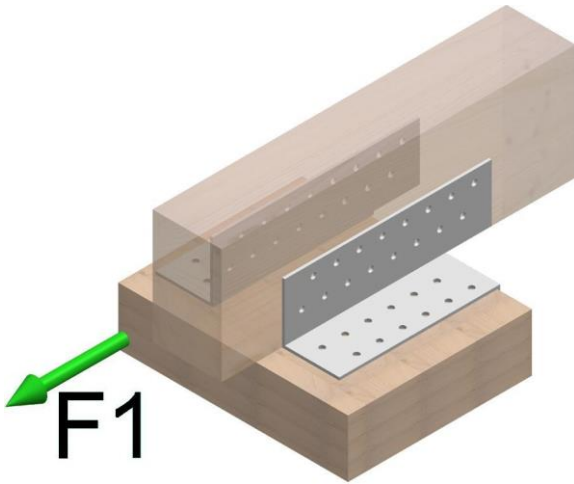
Paslode Connector nails 4,0 x 40 pr connection					
Load Duration	F1, [kN] 8 nails Holes: 1	F1, [kN] 12 nails Holes: 1,2	F1, [kN] 16 nails Holes: 1-3	F1, [kN] 20 nails Holes: 1-4	F1, [kN] 24 nails Holes: 1-5
P	4,52	6,79	9,05	11,31	11,31
L	5,28	7,92	10,56	13,20	13,20
M	6,03	9,05	12,06	15,08	15,08
S	6,79	10,18	13,57	16,97	16,97
I	8,29	12,44	16,59	20,74	20,74
Characteristic values found by calculation	7,54	11,31	15,08	18,85	18,85
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "					

2 Purlin Anchors 330 or 330PL pr. connection

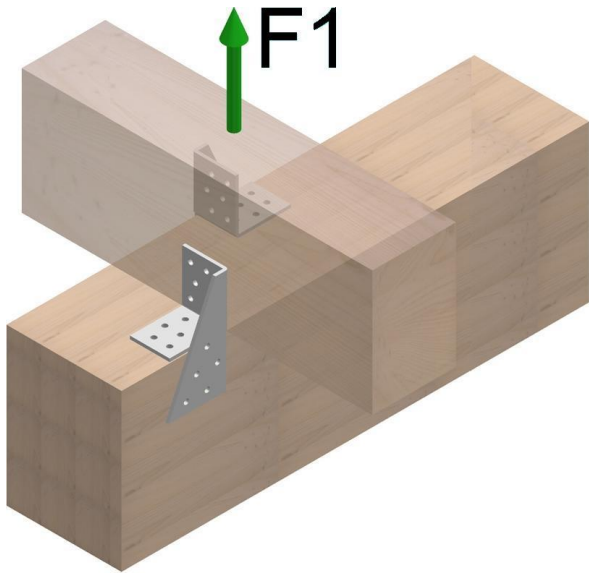
Paslode Connector nails 4,0 x 40 pr connection					
Load Duration	F1, [kN] 8 nails Holes: 1	F1, [kN] 12 nails Holes: 1,2	F1, [kN] 16 nails Holes: 1-3	F1, [kN] 20 nails Holes: 1-4	F1, [kN] 24 nails Holes: 1-5
P	4,52	6,79	9,05	11,31	13,57
L	5,28	7,92	10,56	13,20	15,83
M	6,03	9,05	12,06	15,08	18,10
S	6,79	10,18	13,57	16,97	20,36
I	8,29	12,44	16,59	20,74	24,88
Characteristic values found by calculation	7,54	11,31	15,08	18,85	22,62
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "					

2 Purlin Anchors 370 or 370PL pr. connection

Paslode Connector nails 4,0 x 40 pr connection					
Load Duration	F1, [kN] 8 nails Holes: 1	F1, [kN] 12 nails Holes: 1,2	F1, [kN] 16 nails Holes: 1-3	F1, [kN] 20 nails Holes: 1-4	F1, [kN] 24 nails Holes: 1-5
P	4,52	6,79	9,05	11,31	13,57
L	5,28	7,92	10,56	13,20	15,83
M	6,03	9,05	12,06	15,08	18,10
S	6,79	10,18	13,57	16,97	20,36
I	8,29	12,44	16,59	20,74	24,88
Characteristic values found by calculation	7,54	11,31	15,08	18,85	22,62
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "					

Rafter connector**2 Rafter Connectors 180 pr. connection**

Paslode Connector nails 4,0 x 40 pr connection		
Load Duration	F1, [kN] 32 nails Blue holes	F1, [kN] 62 nails Blue + Green holes
P	17,14	17,14
L	20,00	20,00
M	22,86	22,86
S	25,71	25,71
I	31,43	31,43
Characteristic values found by calculation	28,57	28,57
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "		

Universal connector**2 Universal Connectors 100 pr. connection**

Paslode Connector nails 4,0 x 40	No. of nails pr connection	Load Duration	F1, [kN]
Nailing Holes marked blue	10	P	4,52
		L	5,28
		M	6,03
		S	6,79
		I	8,29
The characteristic values found by calculation			7,54
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "			

2 Universal Connectors 140 pr. connection

Paslode Connector nails 4,0 x 40	No. of nails pr connection	Load Duration	F1, [kN]
Nailing Holes marked blue	16	P	7,99
		L	9,32
		M	10,65
		S	11,98
		I	14,64
The characteristic values found by calculation			13,31
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "			

2 Universal Connectors 190 pr. connection

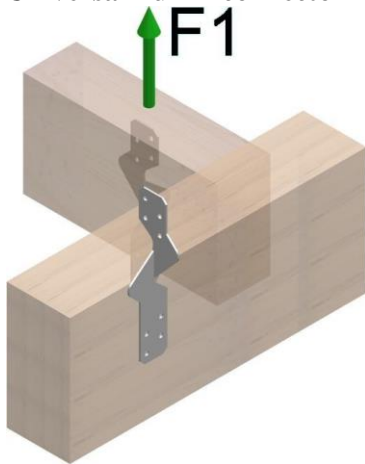
Paslode Connector nails 4,0 x 40	No. of nails pr connection	Load Duration	F1, [kN]
Nailing Holes marked blue	22	P	10,25
		L	11,96
		M	13,66
		S	15,37
		I	18,79
The characteristic values found by calculation			17,08
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "			

2 Universal Connectors 100 2mm pr. connection

Paslode Connector nails 4,0 x 40	Load Duration	F1, [kN]
10 nails pr connection Holes marked blue	P	3,46
	L	4,04
	M	4,62
	S	5,19
	I	6,34
The characteristic values found by calculation		5,77
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "		

2 Universal Connectors 140 2mm pr. connection

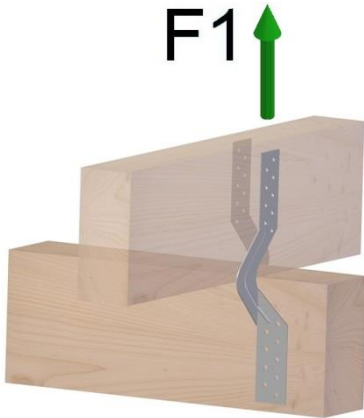
Paslode Connector nails 4,0 x 40	Load Duration	F1, [kN]
18 nails pr connection Holes marked blue	P	9,05
	L	10,56
	M	12,06
	S	13,57
	I	16,59
The characteristic values found by calculation		15,08
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "		

Universal Purlin connector**2 Universal Purlin Anchors 170 pr. connection**

Paslode Connector nails 4,0 x 40	No. of nails pr connection	Load Duration	F1, [kN] 8 nails Blue holes
Nailing Holes marked blue	8	P	4,52
		L	5,28
		M	6,03
		S	6,79
		I	8,29
The characteristic values found by calculation			7,54
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "			

2 Universal Purlin Anchors 210 pr. connection

Paslode Connector nails 4,0 x 40 pr connection		
Load Duration	F1, [kN] 8 nails Blue holes	F1, [kN] 12 nails Blue + Green holes
P	4,52	6,79
L	5,28	7,92
M	6,03	9,05
S	6,79	10,18
I	8,29	12,44
Characteristic values found by calculation	7,54	11,31
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "		

Purlin Anchor twist**2 Purlin Anchor twist 280 pr. connection**

Paslode Connector nails 4,0 x 40 pr connection		
Load Duration	F1, [kN] 12 nails Blue holes	F1, [kN] 20 nails Blue + Green holes
P	6,79	11,31
L	7,92	13,20
M	9,05	15,08
S	10,18	16,97
I	12,44	20,74
Characteristic values found by calculation	11,31	18,85
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K_{mod} "		

When maximum load is applied the connection gets unstable. Therefore the maximum characteristic load applied to a purlin anchor twist connection must never exceed 15,93 kN.