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Yritysesittely

Rothoblaas kiinnitysjärjestelmät:

- Ruuvituotteet sekä ulko-olosuhteisiin sopivat ruuvituotteet
- Kiinnikkeet ja palkkikengät
- Akustiikkaratkaisut

CLT RAKENNUKSET

rothoblaas

Säästävät aikaa

Elementtirakenteisia, nopeita
asentaa

Hyvä palosuojaus



Ecobuild Design - Reb Contracting



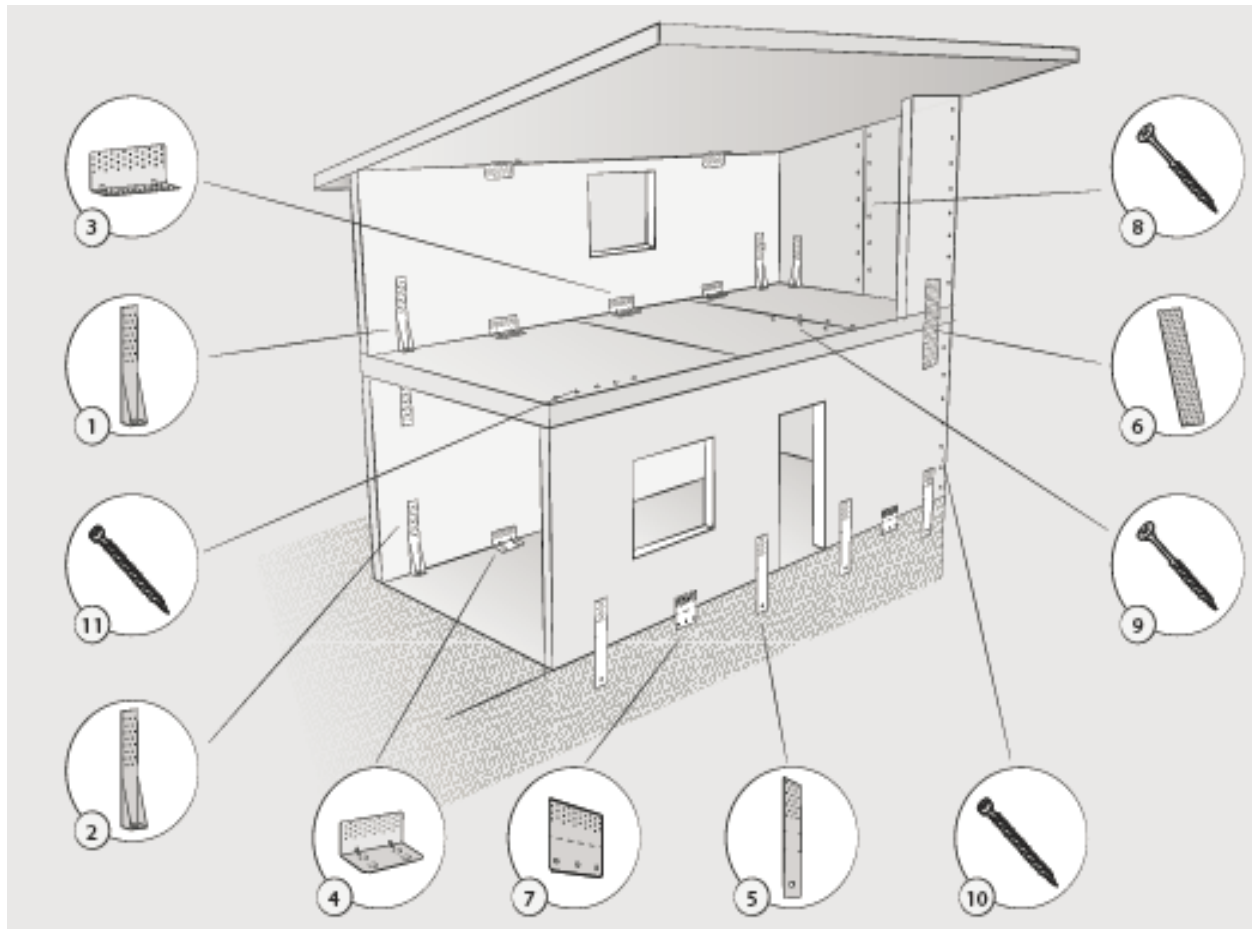
Kiinnitys

Järjestelmät



KIINNITYSJÄRJESTELMÄT

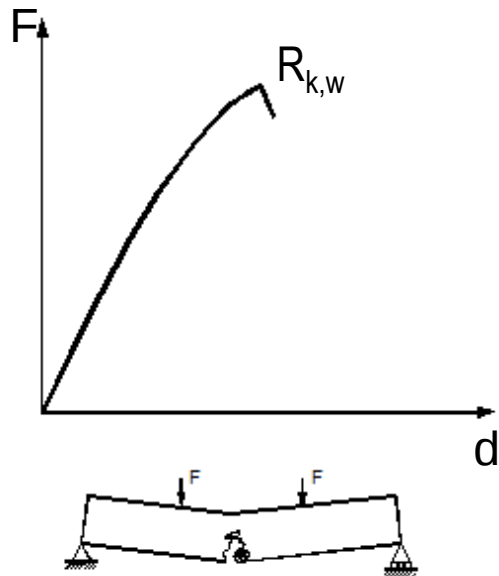
rothoblaas



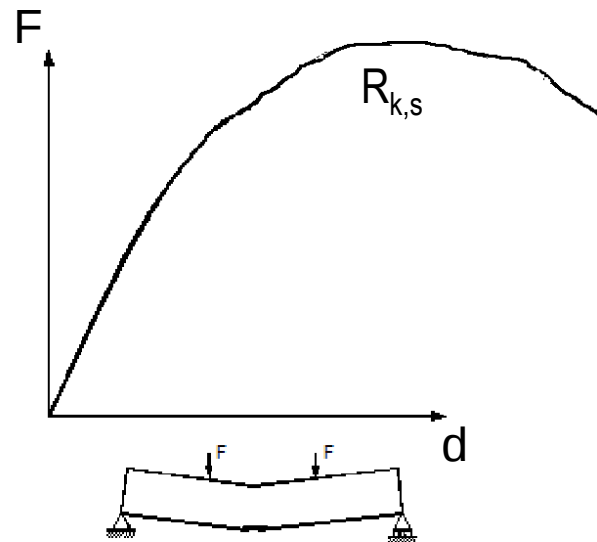
KIINNITYSJÄRJESTELMÄT

rothoblaas

Timber



Steel



Ominaiset arvot vastaavat
standardia EN 1995:2008
ETA-11/0030 mukaisesti

KIINNITYSJÄRJESTELMÄT

rothoblaas

Pultit ja vaarnat



Sivuttain kuormitetut

Itseporautuvat ruuvit



Aksiaalisesti
kuormitetut

CARPENTRY
STRUCTURES
OUTDOOR
WOOD/METAL
ACCESSORIES

HBS

Countersunk screw

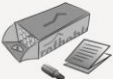
Carbon steel with white galvanic zinc coating








PACKAGING
Box + CE paper + BIT



SPECIAL STEEL
Highly ductile (moves with the wood) and high-resistant steel ($f_{yk} = 1000 \text{ N/mm}^2$)



SPECIAL THREADING
Asymmetric "umbrella" threading for better wood penetration



ECO-FRIENDLY
Trivalent Cr^{3+} chrome coating, replacing hexavalent chrome Cr^{6+}



FIELDS OF USE
Solid-wood, glulam, X-Lam, LVL, wood-based panels. Service classes 1 and 2.



32
HBS

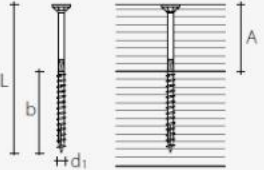
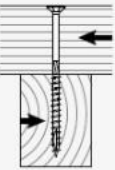
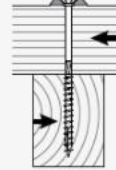
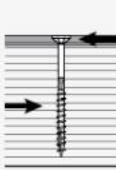
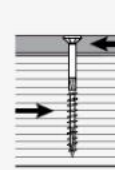
- Nopea pureutuminen mahdollistaa turvalliset rakenteelliset liitokset asentaessa

Erittäin venyvä teräs(myötäilee puun liikkeitä)
ja kestävä teräs ($f_{y,k} = 1000 \text{ N/mm}^2$)



STAATTISET ARVOT

ominaiset arvot
EN 1995:2008

GEOMETRISUUS				LEIKKUU				VETO		
				PUU-PUU	PUU-PUU ALUSLAATALLA	TERÄS-PUU OHUT LEVY (1)	TERÄS-PUU PAKSU LEVY (2)	IRROTUS KIERRE (3)	TUNKEUTUMINEN PÄÄ (4)	TUNKEUTUMINEN PÄÄ JOSSA ALUSLAATTA (4)
										
d ₁ [mm]	L [mm]	b [mm]	A [mm]	R _{V,k} [kN]	R _{V,k} [kN]	R _{V,k} [kN]	R _{V,k} [kN]	R _{aks,k} [kN]	R _{pää,k} [kN]	R _{pää,k} [kN]
8	80	52	28	2,57	3,28	3,96	5,06	5,20	2,36	7,01
	100	52	48	3,25	3,96	3,96	5,06	5,20	2,36	7,01
	120	60	60	3,25	4,16	4,16	5,26	6,00	2,36	7,01
	140	60	80	3,25	4,16	4,16	5,26	6,00	2,36	7,01
	160	80	80	3,25	4,41	4,66	5,76	8,00	2,36	7,01
	180	80	100	3,25	4,41	4,66	5,76	8,00	2,36	7,01
	200	80	120	3,25	4,41	4,66	5,76	8,00	2,36	7,01
	220	80	140	3,25	4,41	4,66	5,76	8,00	2,36	7,01
	240	80	160	3,25	4,41	4,66	5,76	8,00	2,36	7,01
	260	80	180	3,25	4,41	4,66	5,76	8,00	2,36	7,01
	280	80	200	3,25	4,41	4,66	5,76	8,00	2,36	7,01
	300	100	200	3,25	4,41	5,16	6,26	10,00	2,36	7,01
	320	100	220	3,25	4,41	5,16	6,26	10,00	2,36	7,01
	340	100	240	3,25	4,41	5,16	6,26	10,00	2,36	7,01
	360	100	260	3,25	4,41	5,16	6,26	10,00	2,36	7,01
	380	100	280	3,25	4,41	5,16	6,26	10,00	2,36	7,01
	400	100	300	3,25	4,41	5,16	6,26	10,00	2,36	7,01
	440	100	340	3,25	4,41	5,16	6,26	10,00	2,36	7,01
	500	100	400	3,25	4,41	5,16	6,26	10,00	2,36	7,01

CARPENTRY
STRUCTURES
OUTDOOR
WOOD/METAL
ACCESSORIES

TBS

Large head screw
Carbon steel with white galvanic zinc coating






PACKAGING
Box + CE paper + BIT



SPECIAL STEEL
Highly ductile (moves with the wood) and resistant steel ($f_{yk} = 1000 \text{ N/mm}^2$)



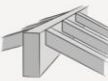
SPECIAL THREADING
Asymmetric, "umbrella" threading for better wood penetration



ECO-FRIENDLY
Trivalent Cr^{3+} chrome coating, replacing hexavalent chrome Cr^{6+}



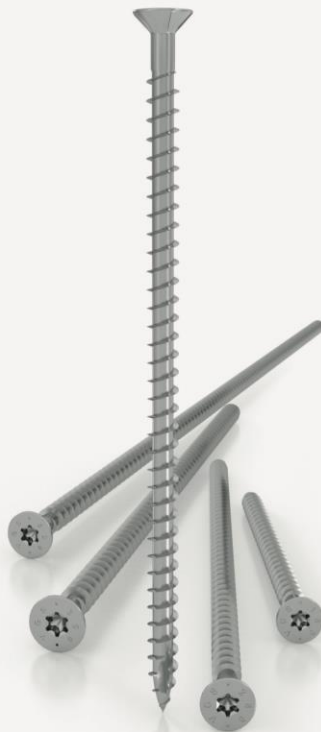
FIELDS OF USE
Solid-wood, glulam, X-Lam, LVL, wood-based panels. Service classes 1 and 2.



- Leveä iso pää mahdollistaa mainion mekaanisen suorituskvyn vetosuunnasta tuleville kuormituksille
- Pään halkaisija optimoitu kierteen pituuden mukaan, takaa tiukan liitoksen
- Sopii hyvin esim. seinien kiinnitykseen kulmarakenteisiin

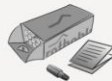
VGS

Total thread connector with countersunk head
Carbon steel with white galvanic zinc coating



PACKAGING

Box + CE paper + BIT



SPECIAL STEEL

Deep thread and high-resistance steel ($f_{t,k} = 1000 \text{ N/mm}^2$) for excellent tensile performance



COUNTERSUNK HEAD

Countersunk head for use on steel plates



DIAMETERS Ø9 and Ø11

Optimise the minimum dimensions of the beams to be joined

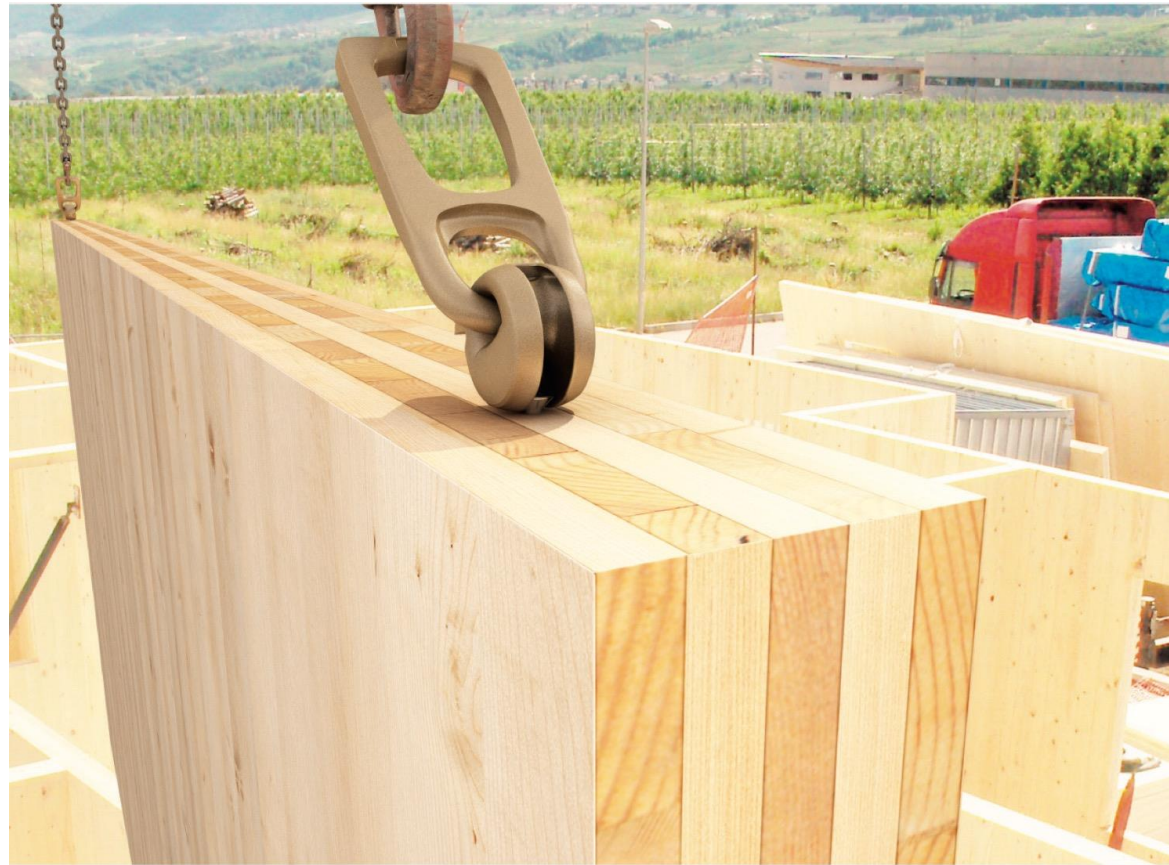


FIELDS OF USE

Solid-wood, glulam, X-Lam, LVL, wood-based-panel joints, reinforcements and couplings. Service classes 1 and 2



- Sopii erityisesti puu-teräsliitoksiin uppokantansa ansiosta
- Soveltuu myös LVL-palkkiliitoksiin
- Antaa erinomaisen mekaanisen kestävyuden 45-asteen kulmaliitoksella, yhdistettynä teräslevyn kanssa
- Toimii erinomaisesti nostokoukkujen kanssa elementtien nostamista / liikuttamista varten



CARPENTRY

STRUCTURES

OUTDOOR

WOOD/METAL

ACCESSORIES

KKT

Exterior screws, conical head

Available in carbon steel with organic coating and in A4 stainless steel



UNDERHEAD COUNTER-THREAD

Inverse underhead thread (left-handed) for excellent grip



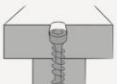
TRIANGULAR THREAD

Front triangular thread for excellent grip and wood penetration



CONICAL HEAD

Small conical head to ensure it is hidden in the wood



COLOURS AND MATERIALS

Available in carbon steel with special coating and in A4 stainless steel



FIELDS OF USE

Exterior use; appropriate for service classes 1-2-3



- Soveltuu erityisesti julkisivujen ja terassien liitoksiin
- Eri värivaihtoehtoja, jotta aika ei saa ruuveja erottumaan
- Saatavilla sekä hiiliteräksisenä että A4-luokassa ruostumattomana teräksenä

CARPENTRY
STRUCTURES
OUTDOOR
WOOD/METAL
ACCESSORIES

HBS + evo

Exterior screws, pan head
Carbon steel with revodip coating

CE

software
"Project"



SPECIAL THREADING
Longer length (50%) asymmetric 'umbrella' thread



SPECIAL STEEL
Highly ductile (moves with the wood) and resistant steel ($f_{yk} = 1000 \text{ N/mm}^2$)



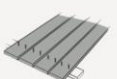
PAN HEAD
Guarantees an excellent surface finish and the possibility of usage on steel plates with circular holes



REVODIP COATING
Surface treatment with high corrosion resistance, comparable to class C5



FIELDS OF USE
Exterior use; appropriate for service classes 1-2-3



- Pannun – muotoisen päänsä ansiosta antaa erinomaisen esteettisen lopputuloksen'
- Revodip-pinnoite takaa erinomaisen kestävyuden korroosiota vastaan
- Sopii erityisesti puuteräsliitoksiin jotka ovat C3-luokassa (pilarikengät, ALU-levyt)

CARPENTRY

STRUCTURES

OUTDOOR

WOOD/METAL

ACCESSORIES

SCI

Exterior screws, countersunk head

A2 and A4 stainless steel versions

CE






SPECIAL GEOMETRY

Self-perforating tip with setback notch, asymmetric "umbrella" thread, elongated cutter, underhead ribs



FULL RANGE

Wide selection of diameters and lengths



HIGH TECH

Special geometries and treatments provide mechanical resistance that is greater than stainless steel in the same class



STAINLESS STEEL A2 AND A4

AISI304 (A2) and AISI316 (A4) stainless steel for high corrosion resistance



FIELDS OF USE

Exterior use; appropriate for service classes 1-2-3



230

SCI A2/A4

Soveltuu erityisesti mekaanisen kestävyytensä ja korroosiosuojansa ansiosta aggressiivisen ympäristön liitoksiin (laiturit yms)

myProject

calculation software by rothoblaas
calcolazione software by rothoblaas



- Mahdollisuus valita liitosarvojen laskumetodina joko eurokoodi 5 tai NTC 2008, joiden mukaan tuotteiden sertifikaatit toimivat
- Oma ikkuna pelkästään graafista esitystä varten
- Jokaisen tuotteen tukena napin painalluksen päässä linkit tarvittaviin sertifikaatteihin / dokumentteihin
- Antaa yksityiskohtaiset ohjeet jokaiselle vaiheelle kun syötät uutta dataa ja näyttää muutoksen suunnitelmassa
- Tuottaa lopuksi yksityiskohtaisen laskelman
- THERMAL tulossa...

MAIN-SECONDARY BEAM CONNECTION

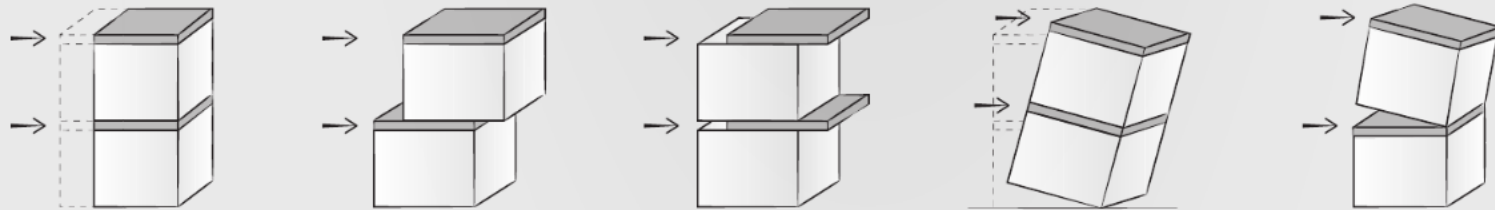


my Project
calculation software by rothoblaas

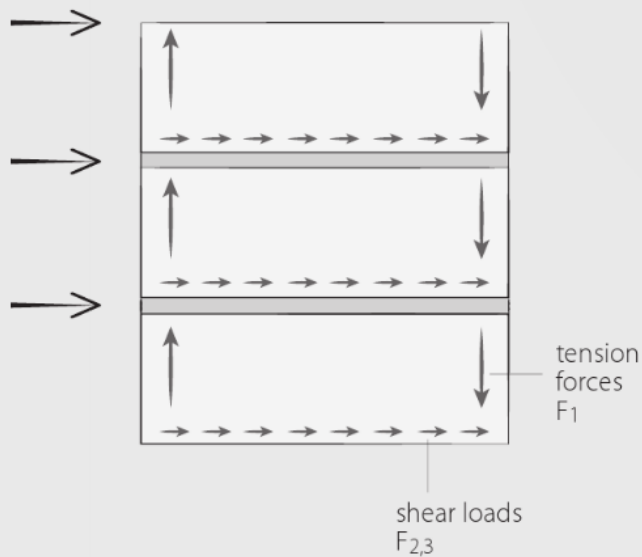
my Project
calculation software by rothoblaas

KIINNIKKEET

POSSIBLE FAILURE MODES

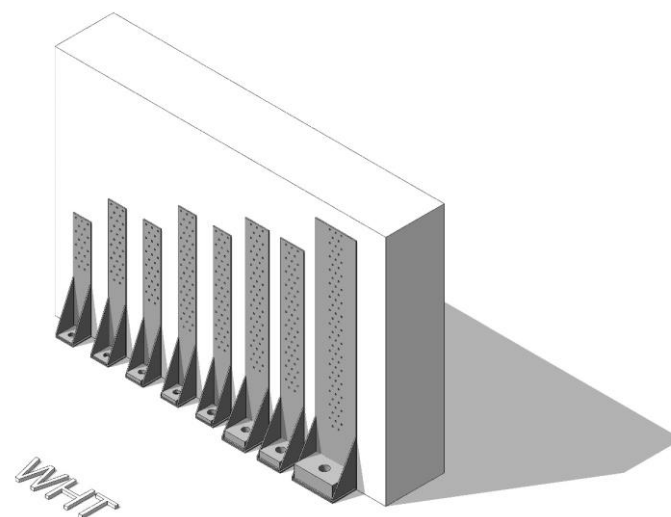
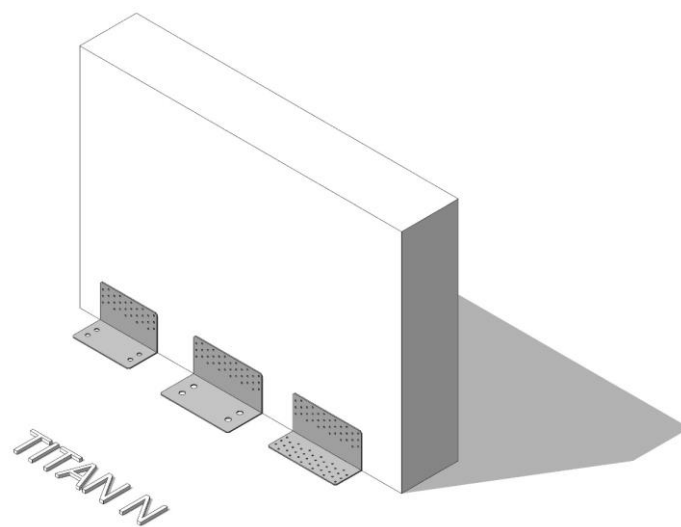
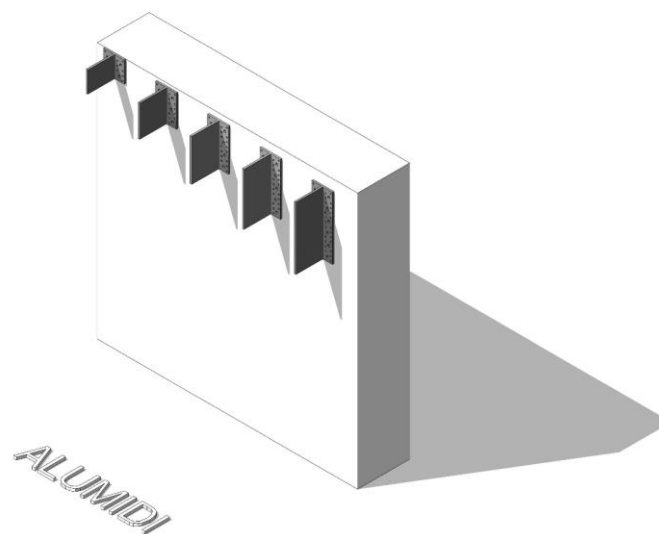
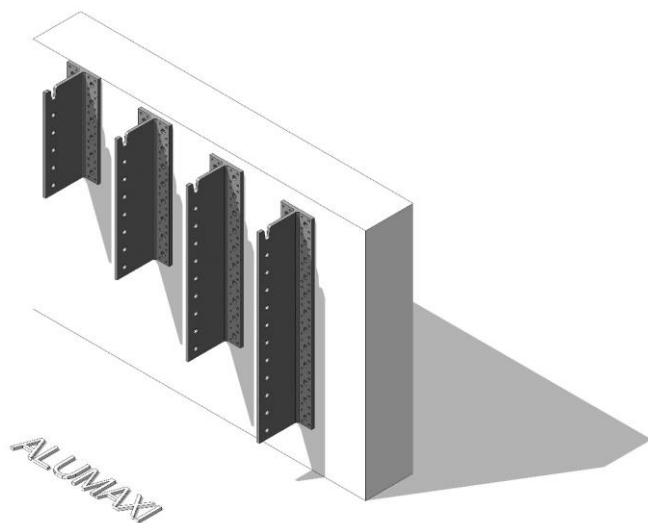


LOAD PATTERN

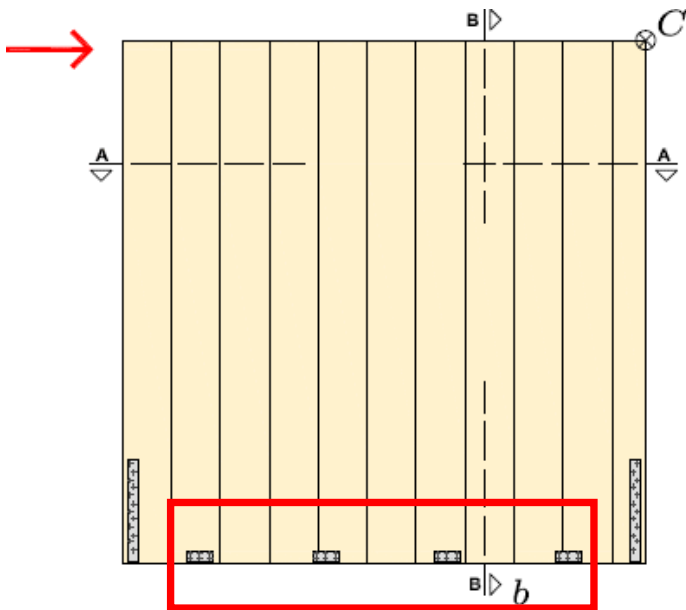


Horizontal loads acting at the floor level introduce shear and **tension forces** on the structural elements of the building; these forces must be absorbed by an effective connection system, correctly dimensioned and installed.

In order to realize an adequate structural design, it is important for the designer to know the real experimental behavior both in terms of **stiffness** (to evaluate the deformation of the structure) and **ductility** (to choose correctly the structural factor q).

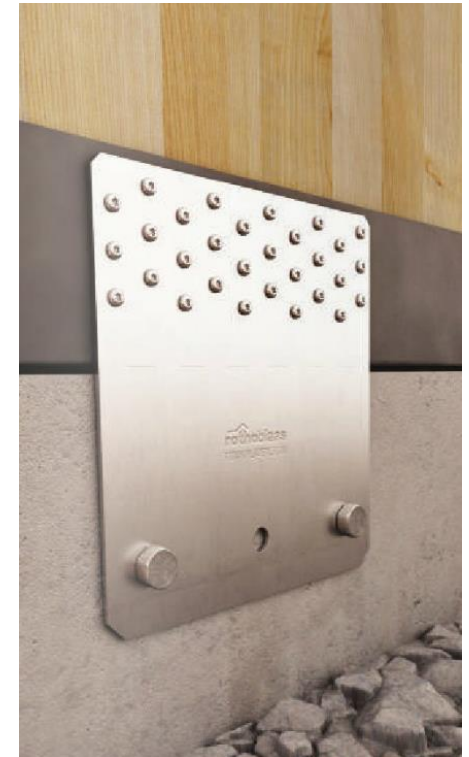


CLT-paneelien jäykkä muuntautuminen saadaan estettyä kulmarautojen avulla

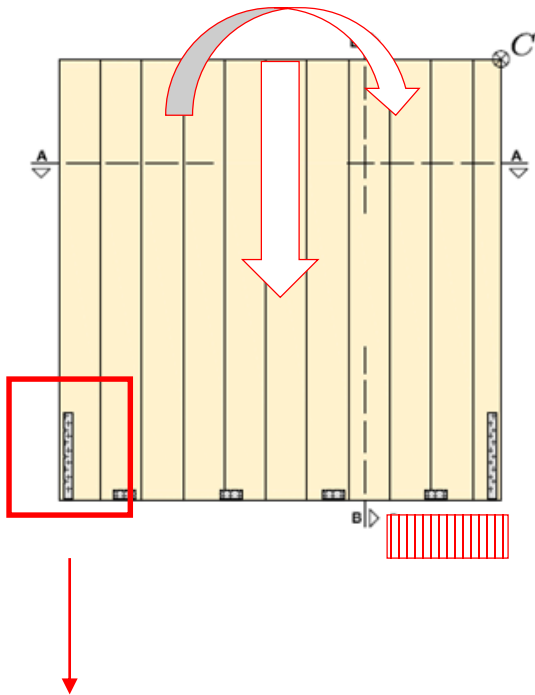


VAAKAVOIMAISET KUORMITUKSET

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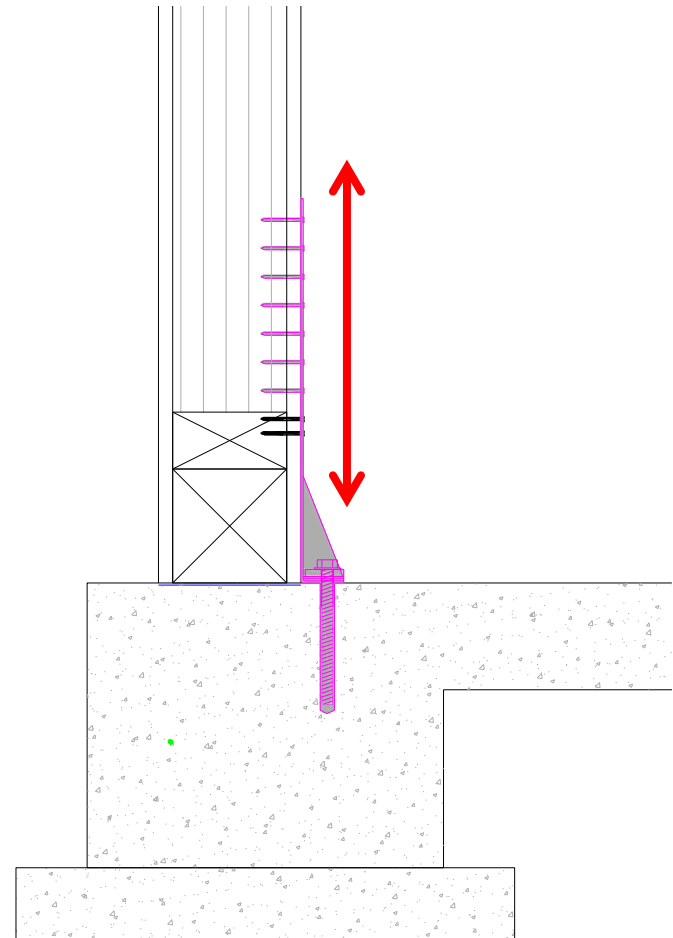


CLT-paneelien jäykkä kiertoliike saadaan estettyä ankkureiden/betoniankkureiden avulla.



VETOVOIMAISET KUORMITUKSET

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VETOVOIMAISET KUORMITUKSET

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ALU PLATE

 rothoblaas



VIDEO



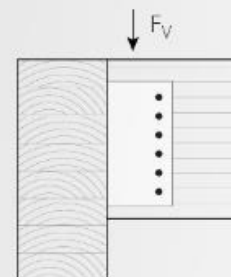
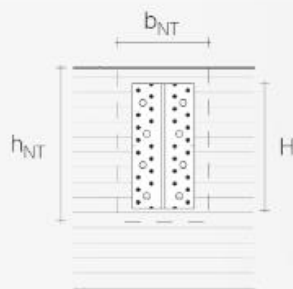
ALU PLATE

rothoblaas



TOTAL NAILING: BEAM TO BEAM

TOTAL NAILING



AluMIDI without holes				FIXING THROUGH NAILS			FIXING THROUGH SCREWS	
				MAIN BEAM	CHARACTERISTIC VALUES	ADMISSABLE VALUES	MAIN BEAM	CHARACTERISTIC VALUES
AluMIDI H [mm]	b _{NT} [mm]	h _{NT} [mm]	dowels WS Ø7 ⁽¹⁾ [pcs - Ø x L]	nails LBA Ø4 x 60 [pcs]	EN 1995:2008 R _{v,k} [kN]	DIN 1052:1988 V _{adm} [kg]	screws LBS Ø5 x 60 [pcs]	EN 1995:2008 R _{v,k} [kN]
80	120	120	3 - Ø7 x 113	14	9,1	540	14	11,6
120	120	160	4 - Ø7 x 113	22	16,6	1070	22	21,5
160	120	200	5 - Ø7 x 113	30	25,7	1530	30	32,7
200	120	240	7 - Ø7 x 113	38	36,7	2030	38	45,9
240	120	280	9 - Ø7 x 113	46	50,0	2720	46	62,4
280 *	140	320	10 - Ø7 x 133	54	64,3	2890	54	78,1
320 *	140	360	11 - Ø7 x 133	62	75,7	3180	62	87,7
360 *	160	400	12 - Ø7 x 153	70	93,2	3470	70	105,8
400 *	160	440	13 - Ø7 x 153	78	106,7	3867	78	115,8

* dimension obtainable from ALUMIDI2200

BEAMS

WALLS

PERFORATED PLATES

OUTDOOR

ANCHORS

BSA



Metal hangers with external wings

Bright zinc plated carbon steel three-dimensional perforated plate



FIELD OF USE

Timber-to-timber and timber-to-concrete joints, both at vertical and lateral bending

- solid timber
- glulam timber
- XLAM (Cross Laminated Timber)
- wood-based panels

EFFECTIVE

Standardized, certified, fast and inexpensive system



MIXED-MODE BENDING

Suitable for fastening joists in mixed-mode bending



TIMBER AND CONCRETE

Suitable to be used both on timber and concrete



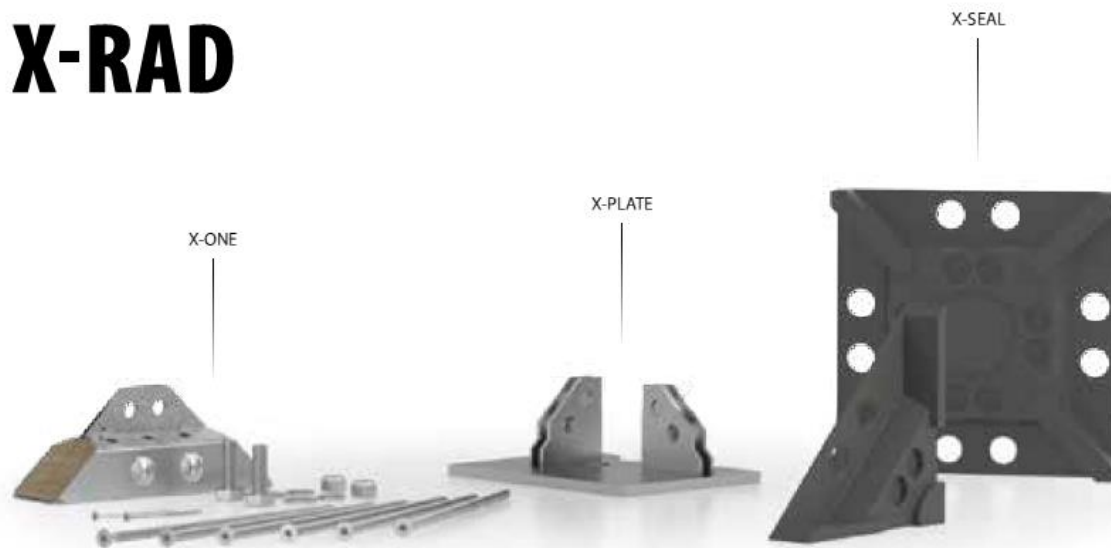
APPROVED

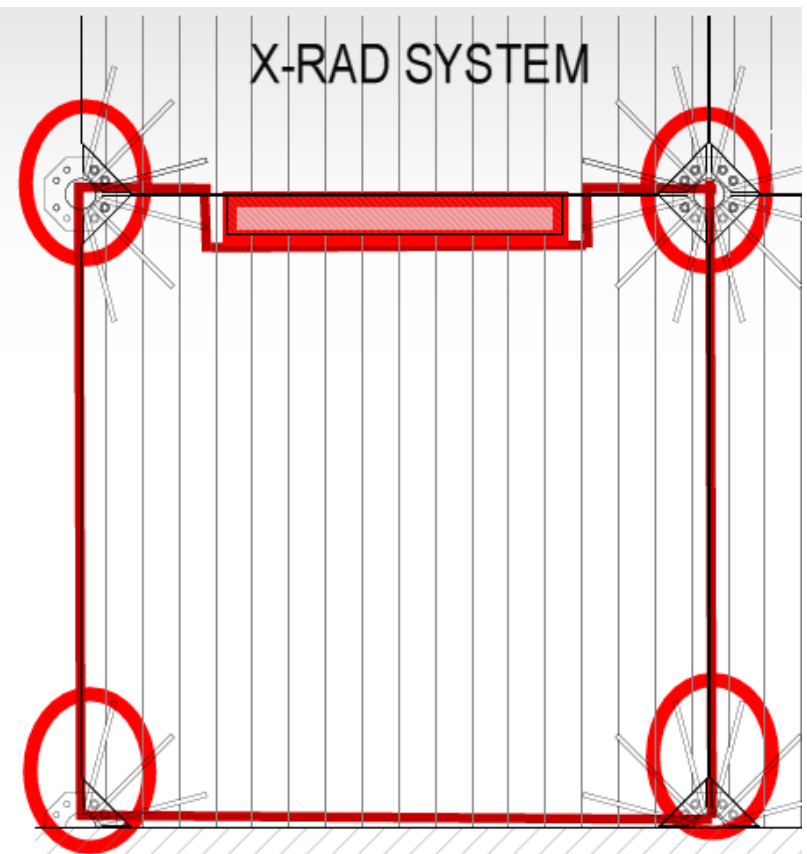
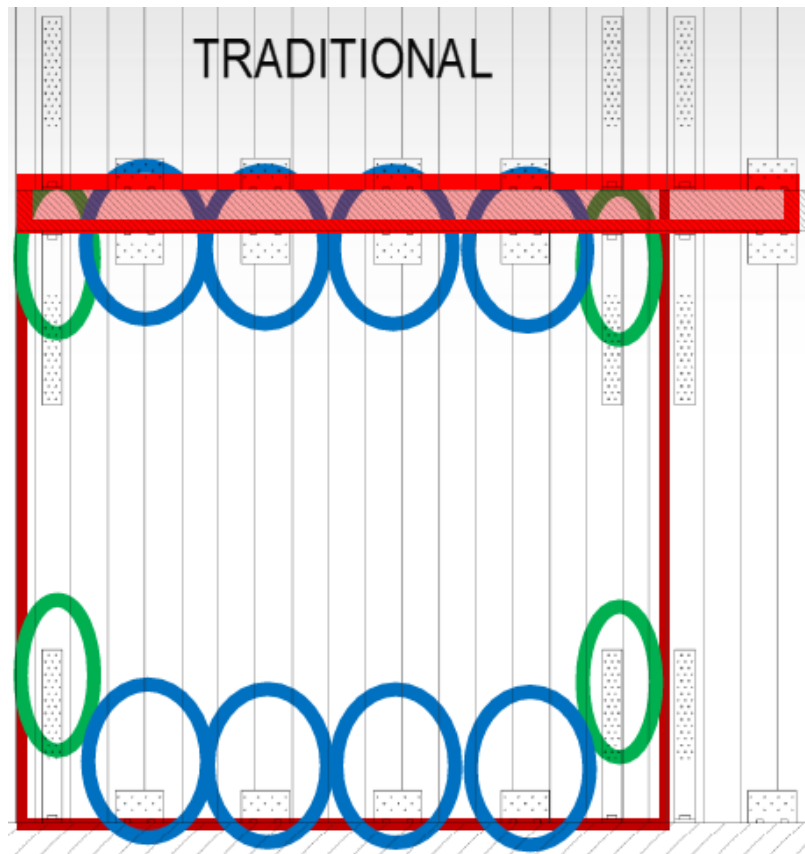
Certified for the use on OSB. The corrugated version incorporates assembling staples to facilitate the installation

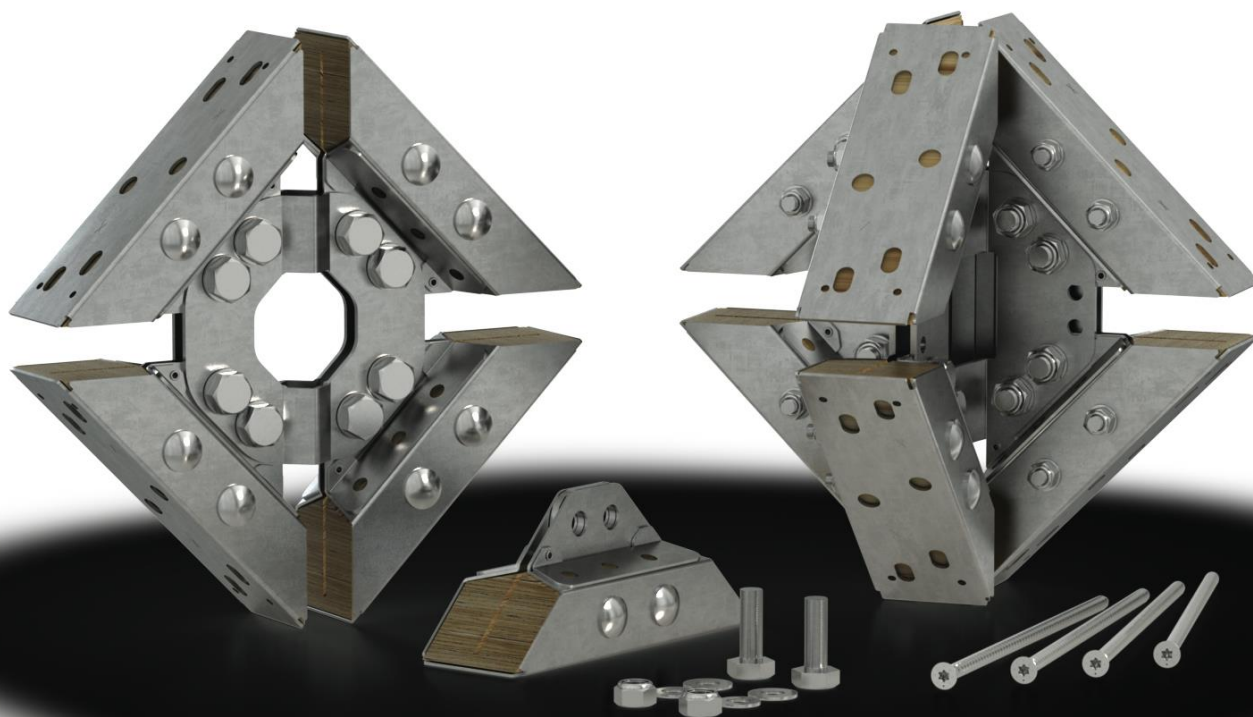




X-RAD







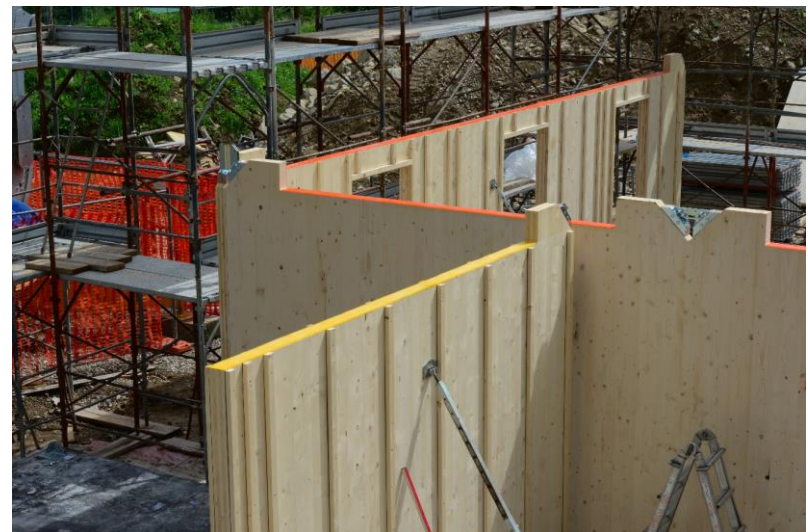
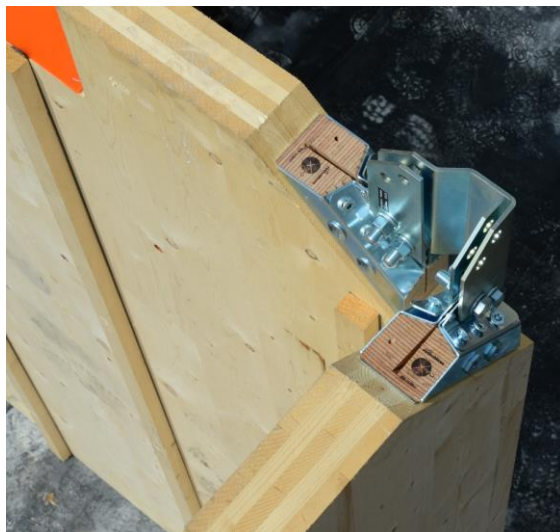
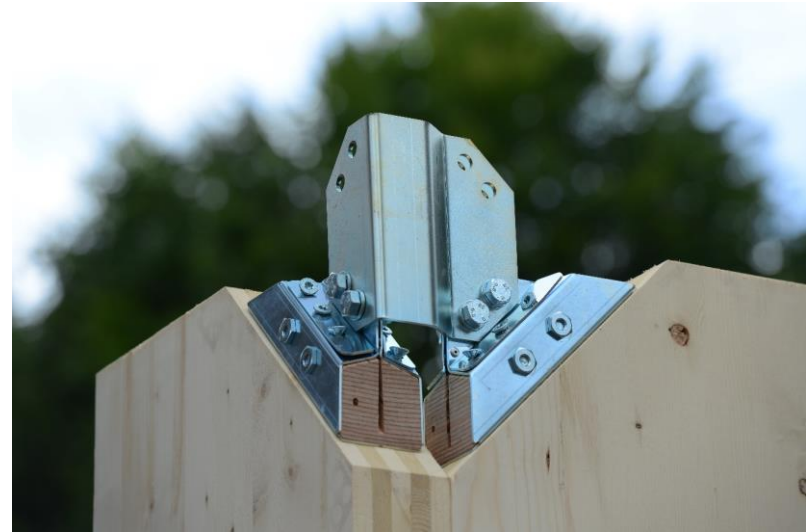
X-RAD

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X-RAD

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X-RAD

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TAIWAN VIDEO





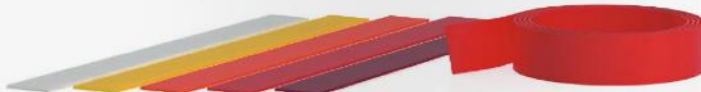
AKUSTIIKKA RATKAISUT

AKUSTIIKKARATKAISUT

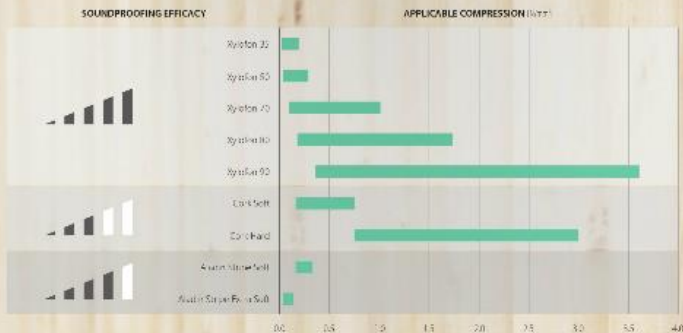
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XYLOFON

Soundproofing, high performing resilient soundproofing profile
Polyurethane mixture



SOUNDPROOFING PROFILES INDEX OF USE





Aladin Stripe

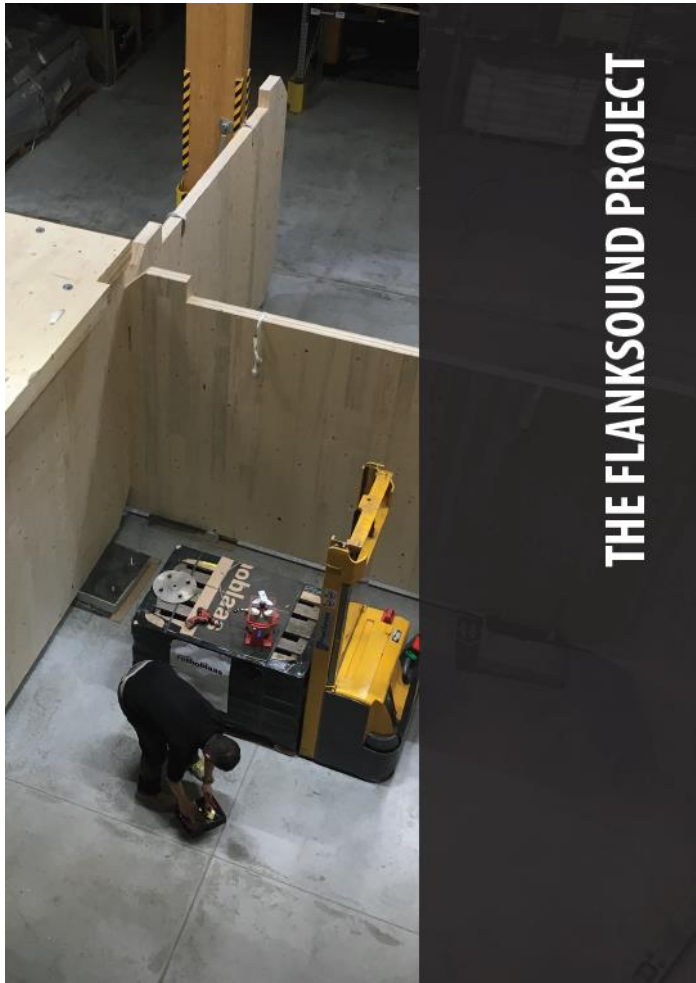


Absorber Plate



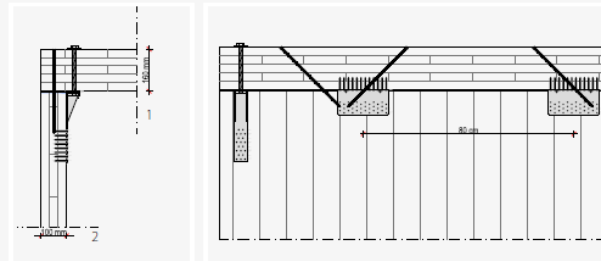
FLANKSOUND PROJECT

rothoblaas



THE FLANKSOUND PROJECT

DETAIL 30 | X-X_3/9/10_B



FIXING SYSTEM

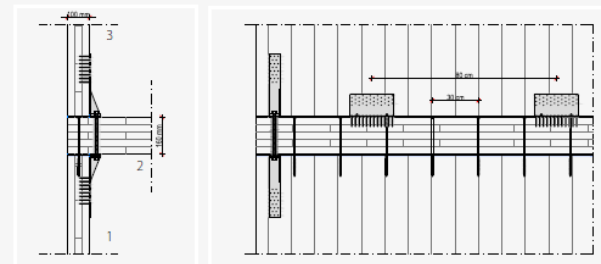
VGZ screws $\Phi 7 \times 260$ mm, step 60 cm
TTN 240 angle brackets, step 80 cm
WHT 440 hold-down

RESILIENT INTERLAYER

Xylofon

Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	AVG ₂₀₀₋₁₂₅₀
K ₁₂ (dB)	10.6	15.0	8.8	9.6	9.2	8.4	7.7	10.0	11.3	14.3	14.2	16.3	20.0	18.6	20.8	18.7	11.2

DETAIL 32 | X-X_3/9/10_B



FIXING SYSTEM

HBS screws $\Phi 8 \times 240$ mm, step 30 cm
TTN 240 angle brackets, step 80 cm
WHT 440 hold-down

RESILIENT INTERLAYER

Xylofon Silent

Frequency (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	AVG ₂₀₀₋₁₂₅₀
K ₁₂ (dB)	17.4	14.8	9.0	15.5	11.9	13.2	9.9	16.2	20.6	22.5	22.9	21.7	24.9	35.1	37.3	41.2	17.2
K ₁₃ (dB)	24.4	21.8	16.0	22.5	18.9	20.2	16.9	23.2	27.6	29.5	29.9	28.7	31.9	42.1	44.3	48.2	24.2
K ₂₃ (dB)	12.5	0.5	0.7	7.2	4.6	7.5	0.7	9.7	9.1	12.3	12.8	18.8	19.5	21.3	25.1	26.3	9.2

KIITOS



giovannni Vitale
giovanni.vitale@rothoblaas.com



The image shows two metal angle brackets, one labeled 'TITAN TTS200' and the other 'TITAN TTV240', both featuring a grid of pre-drilled holes. Several large, silver-colored screws are scattered on a wooden surface in front of the brackets. The background is a light-colored wooden wall.

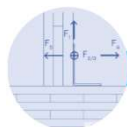
TITAN ANGLE BRACKET FOR TENSILE AND SHEAR LOADS



NEW EUROPEAN TECHNICAL ASSESSMENT ETA-11/0496



EXPANDED
RANGE



EXPANDED
APPLICATIONS



IMPROVED
PERFORMANCE



ETA-Danmark A/S
Göteborg Plads 1
DK-2150 Nordhavn
Tel. +45 72 24 59 00
Fax +45 72 24 59 04
Internet www.etadanmark.dk

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-11/0496 of 2018/11/06

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:

Rotho Blaas TITAN Angle Brackets

Product family to which the
above construction product
belongs:

Three-dimensional nailing plate (Angle Bracket for
timber-to-timber or timber-to-concrete or steel
connections)

Manufacturer:

Rotho Blaas s.r.l.
Via dell'Adige 2/1
IT-39040 Cortaccia (BZ)
Tel. + 39 0471 818400
Fax + 39 0471 818484
Internet www.rothoblaas.com

Manufacturing plant:

Rotho Blaas s.r.l.
Manufacturing Plants: T1, T2, T3

This European Technical
Assessment contains:

27 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:

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

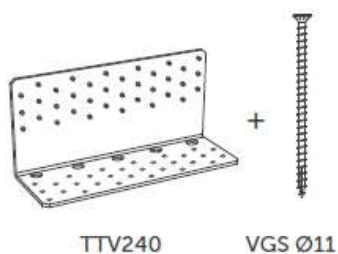
This version replaces:

The previous ETA with the same number and issued
on 2014-10-31



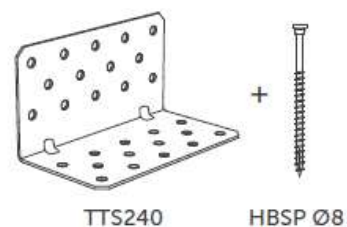
TITAN V - TTV240

New timber-timber angle bracket for shear loads (60 kN) and tensile loads (101 kN) with full thread VGS Ø11 screws.



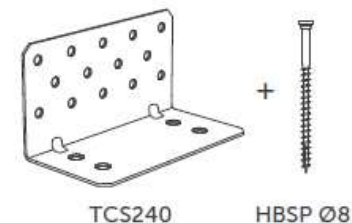
TITAN S - TTS240

New timber-timber angle bracket for shear loads with HBSP Ø8 screws (60 kN).



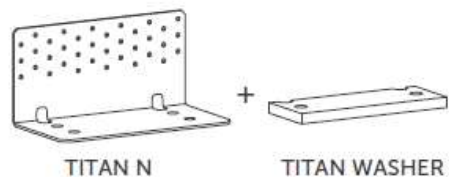
TITAN S - TCS240

New timber-concrete angle bracket for shear loads with HBSP Ø8 screws (70 kN).



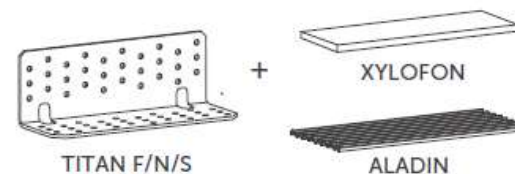
TITAN WASHER

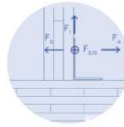
For timber-concrete applications for tensile loads up to 76 kN and shear loads up to 86 kN.



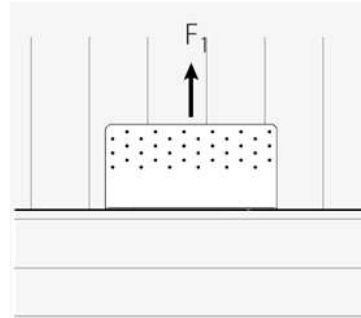
TITAN SILENT

Application with resilient profiles for soundproofing.

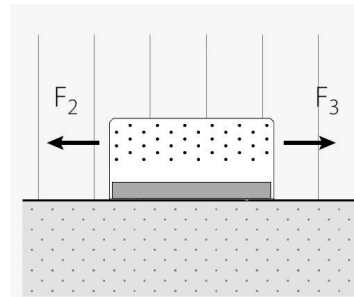




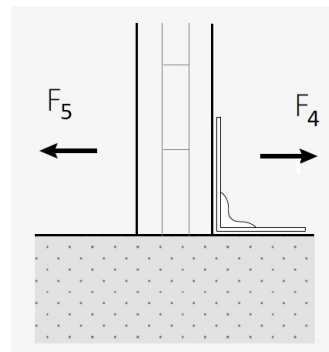
- Topic: Tension Load F_1



- Topic: Shear Load $F_{2/3}$ with washer



- Topic: Shear Load $F_{4/5}$



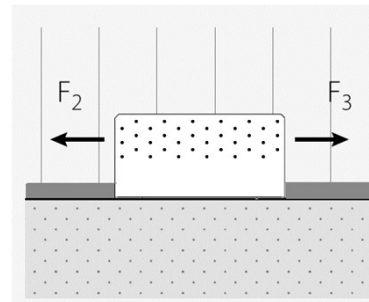
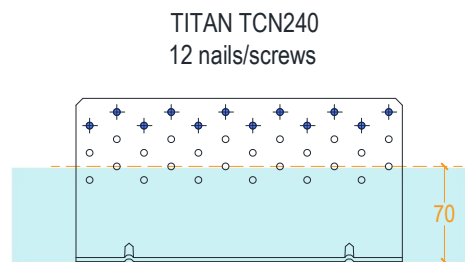
WHY?

- A single range of connections both for shear and tension load
- Reduced height compared to WHT suitable to be hidden in the floor thickness
- A single range of connections both for shear and tension load
- Performance increase (up to 85,9 kN)
- Panel stabilization during assembly
- Wind action resistance

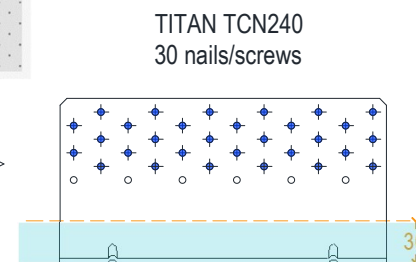


WHY?

- Topic: Shear Load $F_{2/3}$ with partial nailing patterns

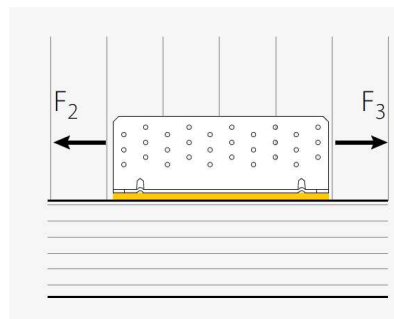


from 12 to 30 nails/screws
=
from 70 to 30 mm interspace



- To overcome the problem of leveling mortar thickness or sacrificial sill beam

- Topic: Shear Load $F_{2/3}$ with acoustic interlayers



- Certify the application



TIMBER TO TIMBER APPLICATION

- for **shear** loads up to **60 kN**

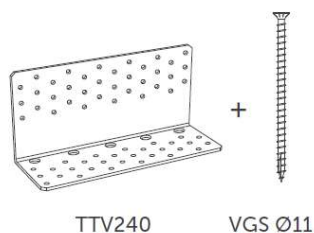
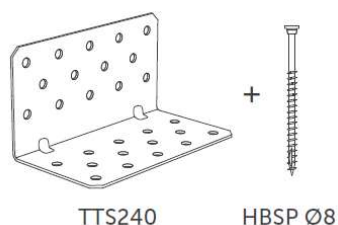


Table B.4: Force $F_{2/3}$, 1 angle bracket / connection timber to timber

TITAN Type	Number of fasteners		Timber			
			F _{2/3,Rk} [kN]			K _{2/3,ser} [kN/mm]
	number n _V	number n _H	Nails Ø4 x 60	Screws Ø5 x 50	Screws Ø8 x 80	
TTS240	14	14	-	-	60,0	5,6
TTV240 full	36	30 + 2 ²⁾	59,7	59,7	-	Full nailing: 6,6
TTV240 partial	24	24 + 2 ³⁾	51,5	51,5	-	Partial nailing: 4,8

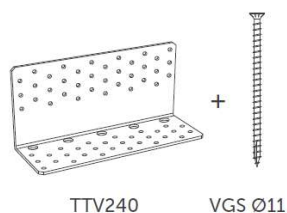
¹⁾ h = height of purlin (see Figure B. 20, Annex B)

²⁾ with 2 screws 11 x 200 mm (see Figure B. 22, Annex B)

³⁾ with 2 screws 11 x 150 mm (see Figure B. 22, Annex B)

- for **tensile** loads up to **101 kN**

Table B.3: Force F_1 , 1 angle bracket without washer / connection timber to timber



TITAN Type	Number of fasteners		timber			
			F _{1,Rk} [kN]			K _{1,ser} [kN/mm]
	n _V	n _H	nails Ø4 x 60	screws Ø5 x 50	screws Ø8 x 80	Screws or nails
TTV240 full	36	30 + 5 ¹⁾	101	101	-	Full nailing: 12,5
TTV240 partial	24	24 + 5 ²⁾	64,5	64,5	-	Partial nailing: 10,5

¹⁾ with 5 screws 11 x 200 mm (see Figure B. 22, Annex B)

²⁾ with 5 screws 11 x 150 mm (see Figure B. 22, Annex B)

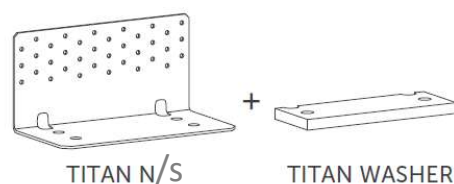


TIMBER TO CONCRETE APPLICATION



- for **shear** loads up to **85,9 kN**

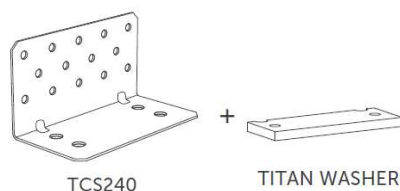
Table B.6: Force $F_{2/3}$, 1 angle bracket / connection timber to concrete or steel



TITAN Type	Number of fasteners		Timber F _{2/3,Rk} [kN]			Bolts inner row					K _{2/3,ser} [kN/mm]
	number n _V	number n _H				k _{t,⊥}	e _y	k _{t,}	e _z	a _x	Screws
			Nails Ø4 x 60	Screws Ø5 x 50	Screws Ø8 x 80						
TCN 200 + TCW 200	30	2	56,7	66,4	-	0,56	38,5	0,56	83,5	150	9,6
TCN 240 + TCW 240	36	2	70,5	82,6	-	0,56	39,5	0,52	83,5	162	10
TCS 240 + TCW 240	14	2	-	-	85,9	0,56	39,5	0,48	78,5	162	8,6
TCS240	14	2	-	-	70,3	0,56	39,5			162	8,2

- for **tensile** loads up to **75,9 kN**

Table B.1: Force F_1 , 1 angle bracket / connection timber to concrete or steel



TITAN Type	timber	steel	Bolts inner row	concrete	$K_{1,ser}$ [kN/mm]
	capacity per fastener in the vertical flange $F_{v,Rk}$ [kN] $F_{1,Rk} = n_{ef} \cdot F_{v,Rk}$ [kN]	$F_{1,Rk}$ [kN]	$k_{t,\parallel}$	ℓ_D [mm]	
TCS 240 + Washer TCW240	14 screws Ø8 x 80 ²⁾	75,9	1,08	6,5	11,5 ³⁾
	-				

TITAN V

ANGLE BRACKET WITH FULL THREAD SCREWS FOR TENSILE AND SHEAR LOADS

INVISIBLE

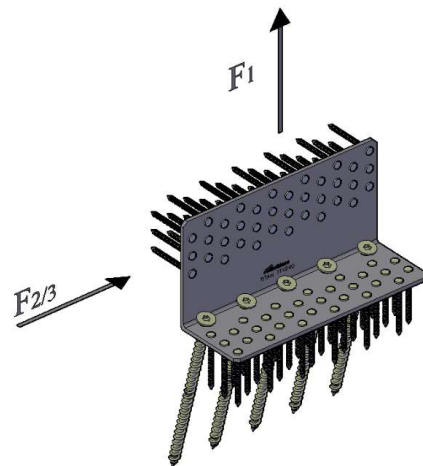
The reduced height of the vertical flange allows hidden installation of the bracket within the floor panels.

SHEAR/TENSILE

Exceptional tensile strength (100 kN) and shear strength (60 kN). 4-mm thick steel. Partial fastening possibilities.

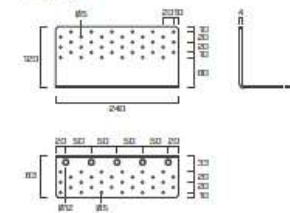
STAGGERED WALLS

VGS Ø11 full thread screws enable the installation of the interstorey walls without any additional intervention, even if the thickness between one floor and the next differs.



GEOMETRY

TTV240



CODES AND DIMENSIONS

TITAN V

CODE	B (mm)	P (mm)	H (mm)	n ₁ Ø5 (mm)	n ₁ Ø5 (pcs.)	n ₁ Ø12 (pcs.)	s (mm)	pcs.
TTV240	240	83	120	36	30	5	4	10

VGS

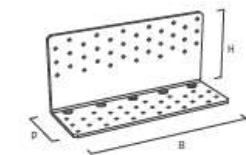
CODE	d _t (mm)	L (mm)	b (mm)	TX (mm)	pcs.
VGS11150	11	150	140	50	25
VGS11200	11	200	190	50	25

LBA

CODE	d _t (mm)	L (mm)	pcs.
PF601460	4	60	250

LBS

CODE	d _t (mm)	L (mm)	TX (mm)	pcs.
PF603550	5	50	20	200



MATERIAL

Galvanized carbon steel.

SINGLE ANGLE BRACKET >

Using a single type of angle bracket for fastening both tensile and shear loads in walls. Optimisation and consistency of fastenings.



FIELDS OF USE

Timber-timber tensile or shear joints:

- CLT (Cross Laminated Timber);
- solid timber;
- glulam (Glued Laminated Timber);
- LVL (Laminated Veneer Lumber).

TITAN V

ANGLE BRACKET WITH FULL THREAD SCREWS FOR TENSILE AND SHEAR LOADS

INVISIBLE

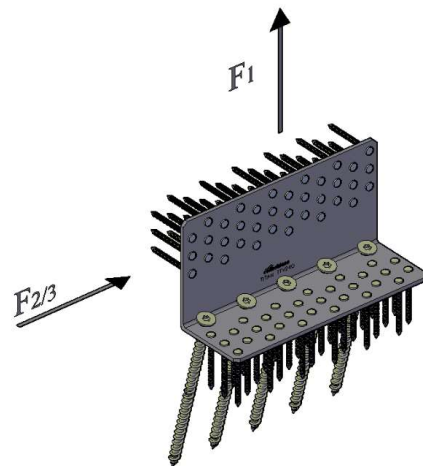
The reduced height of the vertical flange allows hidden installation of the bracket within the floor panels.

SHEAR/TENSILE

Exceptional tensile strength (100 kN) and shear strength (60 kN), 4-mm thick steel. Partial fastening possibilities.

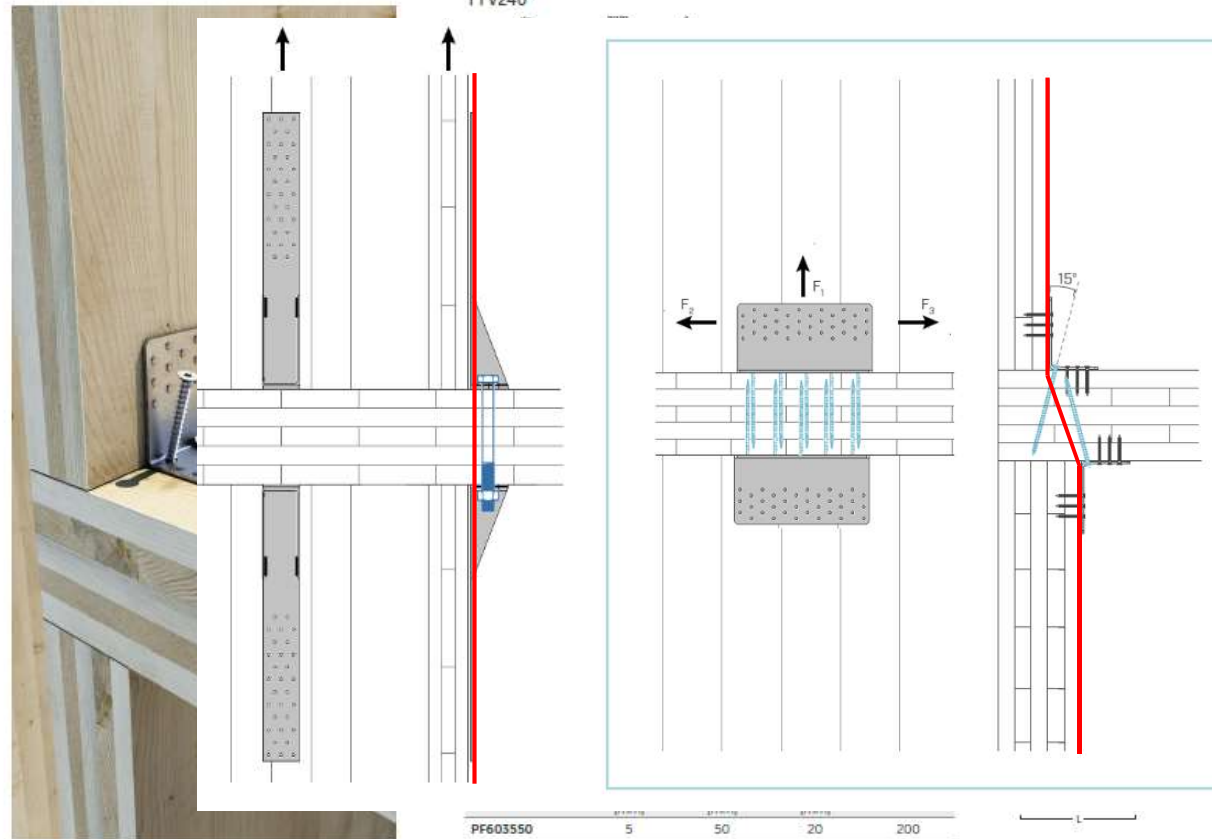
STAGGERED WALLS

VGS Ø11 full thread screws enable the installation of the interstorey walls without any additional intervention, even if the thickness between one floor and the next differs.



GEOMETRY

TTV240



MATERIAL

Galvanized carbon steel.

SINGLE ANGLE BRACKET >

Using a single type of angle bracket for fastening both tensile and shear loads in walls. Optimisation and consistency of fastenings.

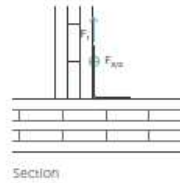
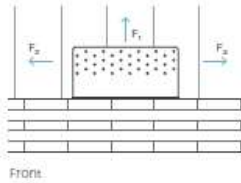


FIELDS OF USE

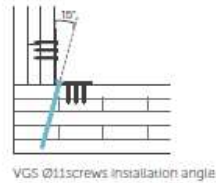
Timber-timber tensile or shear joints:

- CLT (Cross Laminated Timber);
- solid timber;
- glulam (Glued Laminated Timber);
- LVL (Laminated Veneer Lumber).

EXTERNAL LOADS



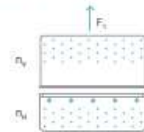
INSTALLATION



STATIC VALUES - TENSILE JOINT - TIMBER-TO-TIMBER

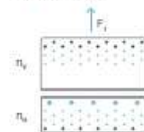
CHARACTERISTIC STRENGTH R_t

fastening diagram
TTV240 full



	holes fastening Ø5			holes fastening Ø12				
	Ø x L [mm]	n _v [pcs.]	n _h [pcs.]	Ø x L [mm]	n _v [pcs.]	n _h [pcs.]	R _{t, timber} [kN]	K _{L, timber} [kN/mm]
nails LBA	Ø4 x 60	36	30	VGS screws Ø11 x 200	5		101.0	12.5
screws LBS	Ø5 x 50	36	30					

fastening diagram
TTV240 partial

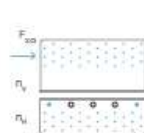


	holes fastening Ø5			holes fastening Ø12				
	Ø x L [mm]	n _v [pcs.]	n _h [pcs.]	Ø x L [mm]	n _v [pcs.]	n _h [pcs.]	R _{t, timber} [kN]	K _{L, timber} [kN/mm]
nails LBA	Ø4 x 60	24	24	VGS screws Ø11 x 150	5		64.5	10.5
screws LBS	Ø5 x 50	24	24					

STATIC VALUES - SHEAR JOINT - TIMBER-TO-TIMBER

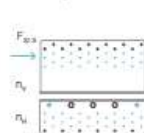
CHARACTERISTIC STRENGTH $R_{2/3}$

fastening diagram
TTV240 full



	holes fastening Ø5			holes fastening Ø12				
	Ø x L [mm]	n _v [pcs.]	n _h [pcs.]	Ø x L [mm]	n _v [pcs.]	n _h [pcs.]	R _{2/3, timber} [kN]	K _{2/3, timber} [kN/mm]
nails LBA	Ø4 x 60	36	30	VGS screws Ø11 x 200	2		59.7	6.6
screws LBS	Ø5 x 50	36	30					

fastening diagram
TTV240 partial



	holes fastening Ø5			holes fastening Ø12				
	Ø x L [mm]	n _v [pcs.]	n _h [pcs.]	Ø x L [mm]	n _v [pcs.]	n _h [pcs.]	R _{2/3, timber} [kN]	K _{2/3, timber} [kN/mm]
nails LBA	Ø4 x 60	24	24	VGS screws Ø11 x 150	2		51.5	4.8
screws LBS	Ø5 x 50	24	24					

DETAILS

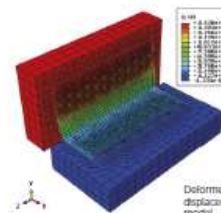
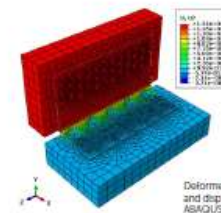
- European Technical Assessment ETA-11/0496: Rotho Blaas TITAN Angle Brackets
- Tensile and shear behaviour of an innovative angle bracket for CLT structures - WCTE World Conference on Timber Engineering - Seoul, Republic of Korea - August 2018

EXPERIMENTAL INVESTIGATION

In collaboration with:

- CNR-IVALSA San Michele all'Adige Mechanical Testing Laboratory
- I.E.D.A. Research Institute "Kore" University of Enna Structures Laboratory
- Karlsruher Institut für Technologie Holzbau und Baukonstruktionen Versuchsansatz für Stahl, Holz und Steine

Download: www.rothoblaas.com



GENERAL PRINCIPLES:

- Characteristic values according to ETA-11/0496.
- Design values can be obtained from characteristic values as follows:

$$R_{d, \text{timber}} = R_{t, \text{timber}} \cdot \frac{k_{\text{timber}}}{k_{\text{steel}}}$$

The coefficients k_{timber} and k_{steel} should be taken according to the current regulations used for the calculation.

- For the calculation process a timber density $\rho_k = 350 \text{ kg/m}^3$ has been considered. For higher ρ_k values, resistance can be converted by the k_{timber} value equal to:

$$k_{\text{timber}} = \left(\frac{\rho_k}{350} \right)^{1/3} \quad \text{per } 350 \text{ kg/m}^3 \leq \rho_k \leq 420 \text{ kg/m}^3$$

$$k_{\text{timber}} = \left(\frac{\rho_k}{350} \right)^{1/3} \quad \text{per LVL con } \rho_k \geq 500 \text{ kg/m}^3$$

- Combined loading: if the F_t and F_s/F_z loads are working simultaneously, the following disparity must be met:

$$\frac{F_t}{R_{t, \text{timber}}} + \frac{F_s}{R_{s, \text{timber}}} \leq 1$$

- Structural elements in timber, to which the connection devices are fixed, must be prevented from rotating.
- Dimensioning and verification of the timber elements must be carried out separately. Verify that there are no brittle fractures before reaching the connection resistance.
- The use of two TITAN angle brackets, symmetrically-positioned, doubles the design strength of the joint.

TTV240: FIRST BUILDING SITE: RESIDENTIAL COMPLEX «Q7»

GRAZ - Strobl Bau - Holzbau GmbH

206 apartments – 800 angle brackets TTV240



TITAN S

ANGLE BRACKET WITH SCREWS FOR SHEAR LOADS

HBSP SCREWS Ø8

Fastening with HBSP Ø8 screws using a screwdriver makes installation easy and allows you to work safely and comfortably.

CONVENIENT INSTALLATION

Installation is easier thanks to 50% fewer fastenings.

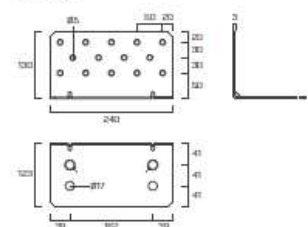
PRECISION

Fastening with screws makes positioning and tightening the CLT panel on the angle bracket easy by facilitating assembly.

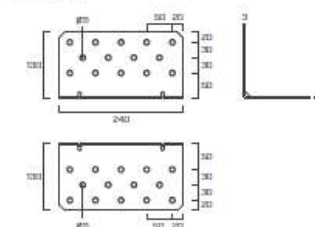


GEDOMETRY

TCS240



TTS240



CODES AND DIMENSIONS

TITAN S - TCS

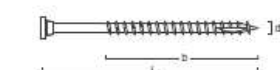
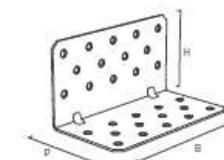
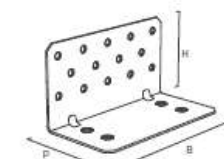
CODE	B [mm]	P [mm]	H [mm]	holes [mm]	n _{Ø11} [pcs.]	s [mm]	pcs.
TCS240	240	123	130	4xØ17	14	3	10

TITAN S - TTS

CODE	B [mm]	P [mm]	H [mm]	n _{Ø11} [mm]	n _{Ø11} [pcs.]	s [mm]	pcs.
TTS240	240	130	130	14	14	3	10

HBSP

CODE	d ₁ [mm]	L [mm]	d [mm]	TX [mm]	pcs.
HBSP880	8	80	55	40	100



MATERIAL

Galvanized carbon steel.

CONCRETE HOLES >

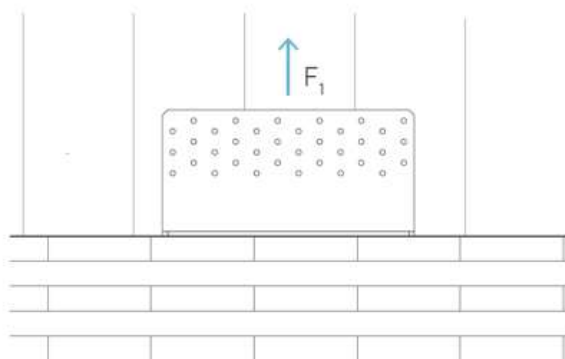
The angle TCS bracket is designed to offer two fixing possibilities, in order to avoid interference with the rebars in the concrete support.

FIELDS OF USE

Timber-to-concrete and timber-to-timber shear joints for panels and timber beams:

- CLT (Cross Laminated Timber);
- framed structures (platform frame);
- wood based panels;
- LVL (Laminated Veneer Lumber);
- solid timber;
- glulam (Glued Laminated Timber).

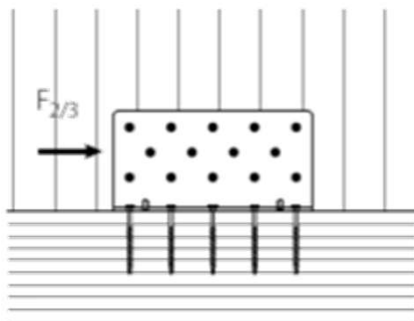
COMPARISON: F_1 TENSION RESISTANCE / TIMBER TO TIMBER:



TITAN TYPE	$R_{1\text{ k, timber}}$ [kN]
TTN240 + 72 LBA nail	7,37 kN
TTS240 + 28 HBS+	10,3 kN
TCN200 + washer	13,2 kN
TTN240 + 72 LBS screw	16,2 kN
TCN240 + washer	17,7 kN
TCS240 + washer	17,7 kN
TTV240 + 48 LBA/LBS +5VGS Ø11x150	64,5 kN
TTV240 + 66 LBA/LBS +5VGS Ø11x200	101,0 kN



COMPARISON: $F_{2/3}$ SHEAR RESISTANCE / TIMBER TO TIMBER:



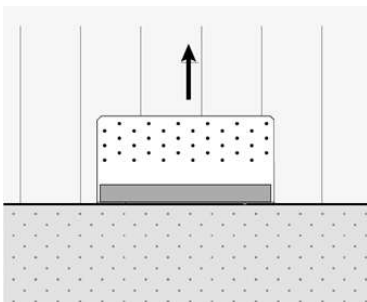
TITAN SILENT see ETA 11/0496 for:

- TTN240
- TTF200
- TTS240

TITAN TYPE	$R_{2/3}$ k_{timber} [kN]
TCN200 + Washer + 30 LBA nail	22,1 kN
TCS240 + washer + 14 HBS+	25,5 kN
TCN200 + Washer + 30 LBS screw	26,5 kN
TCN240 + Washer+ 36 LBA nail	30,3 kN
TTF200 + 60 LBA nail	35,5 kN
TCN240 + Washer + 36 LBS screw	36,3 kN
TTN240 + 72 LBA nail	37,9 kN
TTF200 + 60 LBS screw	42,5 kN
TTN240 + 72 LBS screw	46,7 kN
TTV240 + 48 LBA/LBS +2VGS Ø11x150	51,5 kN
TTV240 + 66 LBA/LBS +2VGS Ø11x200	59,7 kN
TTS240 + 28 HBS+	60,0 kN



COMPARISON: F_1 TENSION RESISTANCE / TIMBER TO CONCRETE:

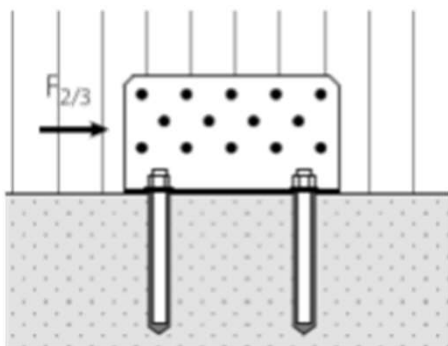


TITAN TYPE	$R_{1 k, \text{timber}}$ [kN]
TCN200 + 30 LBS screw	11,8 kN
TCN240 + 30 LBS screw	14,1 kN
TCS240 + 14 HBS+	16,2 kN
TCN200 + Washer + 30 LBA nail	57,9 kN
TCN240 + Washer+ 36 LBA nail	69,5 kN
TCN200 + Washer + 30 LBS screw	69,6 kN
TCS240 + washer + 14 HBS+	75,9 kN
TCN240 + Washer 36 LBS screw	83,5 kN



WHT TYPE	$R_{1 k, \text{timber}}$ [kN]
WHT540 + Washer + 45 LBA nail	70,7 kN
WHT540 + Washer + 45 LBS screw	86,9 kN
WHT620 + Washer + 55 LBA nail	86,4 kN
WHT620 + Washer + 55 LBS screw	106,2 kN

COMPARISON: $F_{2/3}$ SHEAR RESISTANCE / TIMBER TO CONCRETE:



Titan Type	$R_{2/3}$ k _{timber} [kN]
TCN200 + 30 LBA nail	22,1 kN
TCN200 + 30 LBS screw	26,5 kN
TCN240 + 36 LBA nail	30,3 kN
TCF200 + 30 LBA nail	35,5 kN
TCN240 + 36 LBS screw	36,3 kN
TCF200 + 30 LBS screw	42,5 kN
TCN200 + Washer + 30 LBA nail	56,7 kN
TCN200 + Washer + 30 LBS screw	66,4 kN
TCS240 + 14 HBS+	70,3 kN
TCN240 + Washer + 36 LBA nail	70,5 kN
TCN240 + Washer + 34 LBS screw	82,6 kN
TCS240 + Washer + 14 HBS+	85,9 kN



THE RIGHT FASTENING FOR EVERY TITAN

				TITAN V	TITAN S		TITAN N			TITAN F		TITAN WASHER	
				TTV240	TTS240	TCS240	TTN240	TCN200	TCN240	TTF200	TCF200	TCW200	TCW240
	CODE	d [mm]	L [mm]										
VGS	VGS11150	11	150										
	VGS11200	11	200										
HBSP	HBSP880	8	80										
LBA	PF601460	4	60										
LBS	PF603550	5	50										
AB1	AB112100	12	100										
	AB112120	12	120										
	AB112150	12	150										
	AB116145	16	145										
SKR CE	SKR12110CE	12	110										
	SKR12150CE	12	150										
	SKR16130CE	16	130										
VIN-FIX PRO	VIN410/VIN300 + INA M12												
	VIN410/VIN300 + INA M16												
EPO-FIX PLUS	EPO385 + INA M12												
	EPO385 + INA M16												

TITAN N

ANGLE BRACKET WITH SCREWS FOR SHEAR LOADS

SUPERIOR STRENGTH

Geometry designed to provide high shear strength. Suitable for projects in windy and seismic areas.

CONCRETE HOLES

The angle bracket is designed to offer two fixing possibilities, in order to avoid interference with the rebars in the concrete support.

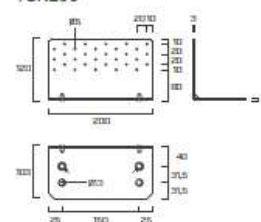
HIGHER HOLES

The hole position on the vertical flange facilitates the use of pneumatic machines in case of fastening on CLT (Cross Laminated Timber) panels.

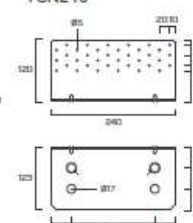


GEOMETRY

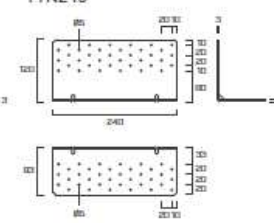
TCN200



TCN240



TTN240



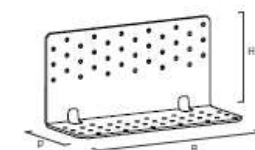
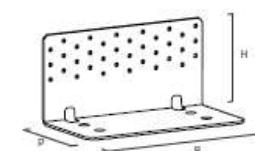
CODES AND DIMENSIONS

TITAN N - TCN

CODE	B [mm]	P [mm]	H [mm]	holes [mm]	n ₁ Ø5 [pcs.]	s [mm]	pcs.
TCN200	200	103	120	4xØ13	30	3	10
TCN240	240	123	120	4xØ17	36	3	10

TITAN N - TTN

CODE	B [mm]	P [mm]	H [mm]	n ₁ Ø5 [mm]	n ₂ Ø5 [pcs.]	s [mm]	pcs.
TTN240	240	93	120	36	36	3	10



MATERIAL

Galvanized carbon steel.

COST/PERFORMANCE >

Optimization of the number of angle brackets to be installed and subsequent installation-time saving.

FIELDS OF USE

Timber-to-concrete and timber-to-timber shear joints for panels and timber beams:

- CLT (Cross Laminated Timber);
- framed structures (platform frame);
- wood based panels;
- LVL (Laminated Veneer Lumber);
- solid timber;
- glulam (Glued Laminated Timber).

TITAN F

ANGLE BRACKET FOR SHEAR LOADS IN FRAMED WALLS

SUPERIOR STRENGTH

Geometry designed to provide high shear strength. Suitable for projects in windy and seismic areas.

CONCRETE HOLES

The angle bracket is designed to offer two fixing possibilities, in order to avoid interference with the rebars in the concrete support.

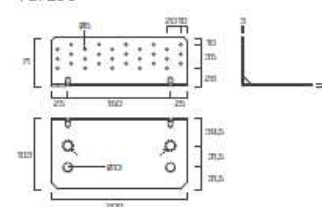
LOWER HOLES

The hole position on the vertical flange is designed for fixing on sill beams in frame structures.

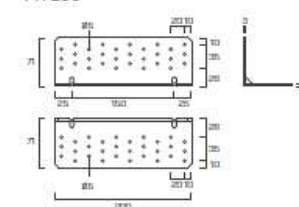


GEOMETRY

TCF200



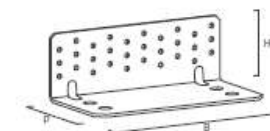
TTF200



CODES AND DIMENSIONS

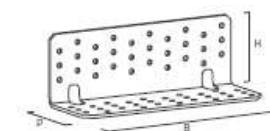
TITAN F - TCF

CODE	B [mm]	P [mm]	H [mm]	holes [mm]	n _h Ø5 [pcs.]	s [mm]	pcs.
TCF200	200	103	71	4xØ13	30	3	10



TITAN F - TTF

CODE	B [mm]	P [mm]	H [mm]	n _h Ø5 [mm]	n _v Ø5 [pcs.]	s [mm]	pcs.
TTF200	200	71	71	30	30	3	10



MATERIAL

Galvanized carbon steel.

WALL/WALL >

Ideal for realizing wall-to-wall joints by placing the angle bracket in a vertical position. The high strength allows to optimize the number of brackets required.



FIELDS OF USE

Timber-to-concrete and timber-to-timber shear joints for panels and timber beams:

- CLT (Cross Laminated Timber);
- framed structures (platform frame);
- wood based panels;
- LVL (Laminated Veneer Lumber);
- solid timber;
- glulam (Glued Laminated Timber).

TITAN WASHER

TITAN WASHER FOR TENSILE AND SHEAR LOADS

STRONG

Geometry designed to provide high shear strength. Suitable for projects in windy and seismic areas.

CONCRETE HOLES

The angle bracket is designed to offer two fixing possibilities, in order to avoid interference with the rebars in the concrete support.

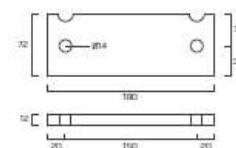
LOWER HOLES

The hole position on the vertical flange is designed for fixing on sill beams in frame structures.

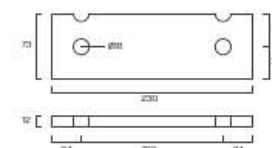


GEOMETRY

TCW200



TCW240



CODES AND DIMENSIONS

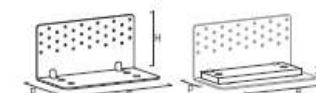
TITAN WASHER - TCW

CODE	TITAN	B [mm]	P [mm]	s [mm]	holes [mm]	pcs.
TCW200	TCN200	190	72	12	Ø14	1
TCW240	TCN240	230	73	12	Ø18	1



TITAN

CODE	B [mm]	P [mm]	H [mm]	holes [mm]	n ₀ Ø5 [pcs.]	s [mm]	pcs.
TCN200	200	103	120	4xØ13	30	3	10
TCN240	240	123	120	4xØ17	36	3	10
TCS240	240	123	130	4xØ17	14	3	10



MATERIAL

Galvanized carbon steel.

HIDDEN >

The reduced height of the vertical flange ensures mechanical stability despite a smaller encumbrance than traditional hold downs.



FIELDS OF USE

Timber-to-concrete and timber-to-timber shear joints for panels and timber beams:

- CLT (Cross Laminated Timber);
- framed structures (platform frame);
- wood based panels;
- LVL (Laminated Veneer Lumber);
- solid timber;
- glulam (Glued Laminated Timber).

TITAN SILENT

ANGLE BRACKET FOR SHEAR LOADS WITH RESILIENT PROFILE

SOUNDPROOFING

Significant attenuation of walking excitation and noise transfer, for an excellent acoustic comfort.

ACOUSTIC BRIDGES

The excellent shear strength of the angle bracket and the soundproofing properties of the plate allow to limit acoustic bridges.

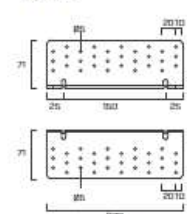
TESTED VALUES

Shear strength values and vibration reduction qualities are validated by tests, within the academia and the industrial world.

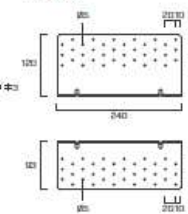


GEOMETRY

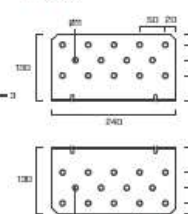
TTF200



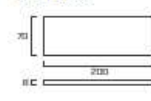
TTN240



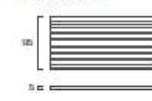
TTS240



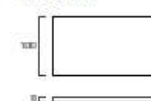
XYLPLATE



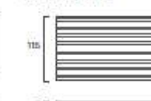
ALADIN95



XYL35100



ALADIN115



CODES AND DIMENSIONS

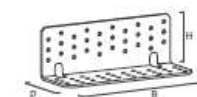
TITAN, XYLOFON AND ALADIN STRIPE

CODE	B [mm]	P [mm]	H [mm]	n Ø5 [pcs]	s [mm]	pcs.
TTF200	200	71	71	60	3	10
TTN240	240	93	120	72	3	10
TTS240	240	130	130	28 ¹⁾	3	10

CODE	TITAN	B [mm]	P [mm]	s [mm]	pcs.
XYLPLATE	TTF200	200	70	6	10
XYL35120240	TTN240-TTS240	240	120	6	10
XYL35100200	TTF200-TCN200	200	100	6	10

CODE	version	P [mm]	L [mm]	s [mm]	pcs.
ALADIN95	SOFT	95	50 ¹⁾	5	1
ALADIN115	EXTRA SOFT	115	50 ¹⁾	7	1

NOTES: ¹⁾ to be cut on site - ²⁾ holes Ø11.



TWO VERSIONS

Resilient structural profiles for TITAN: XYLOFON ready to use and ALADIN STRIPE to be cut on site.

ACOUSTICS/STATICS >

XYLOFON PLATE and ALADIN STRIPE for an optimal balance between acoustic performance and mechanical strength.



FIELDS OF USE

Timber-to-timber joints with reduction of acoustic bridges:

- CLT (Cross Laminated Timber);
- framed structures (platform frame);
- wood based panels;
- LVL (Laminated Veneer Lumber);
- solid timber;
- glulam (Glued Laminated Timber).

TO BE CONTINUED...