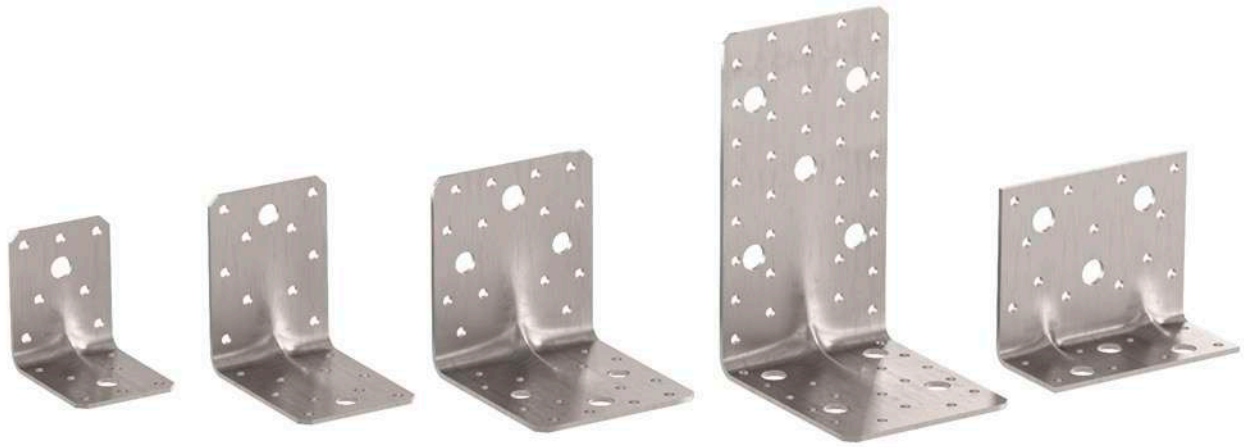
WBR

ANGLE BRACKETS FOR BUILDINGS

COMPLETE RANGE
A simple but effective component. Available in a full range of sizes, making it suitable for numerous applications.

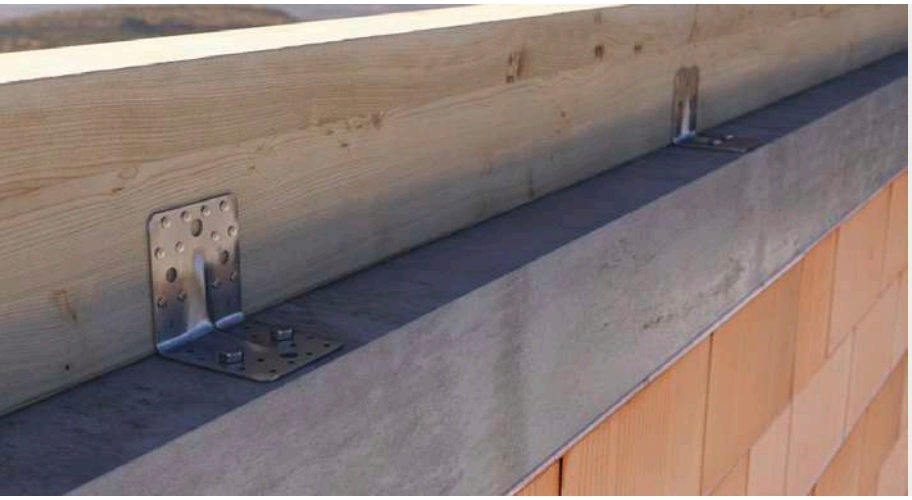
CERTIFIED STRENGTH
Ideal for structural joints which require tensile,shear and rocking capacity.

TIMBER AND CONCRETE
Due to the quantity and arrangement of the fastening holes, it can be used for both timber to timber, and timber to concrete connections.



CHARACTERISTICS

FOCUS	shear and tension fastening
HEIGHT	from 70 to 170 mm
THICKNESS	from 1,5 to 3,0 mm
FASTENERS	LBA, LBS, SKR, VIN-FIX PRO

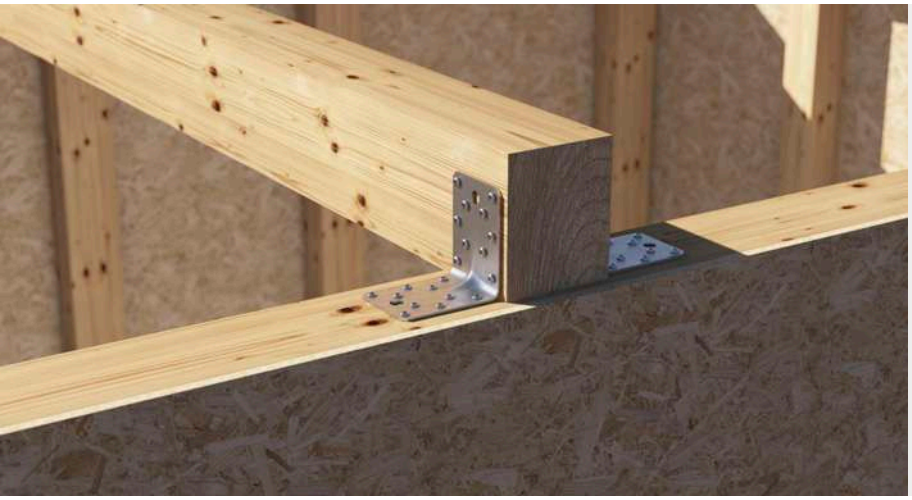


MATERIAL

Bright zinc plated carbon steel three dimensional perforated plate.

FIELD OF USE

Timber-to-concrete and timber-to-timber joints
- solid timber and glulam
- CLT, LVL
- framed structures (platform frame)
- timber based panels



POINT-TO-POINT SOLUTION

The wide selection of sizes makes it a perfect solution for point-to-point applications, even for the most unusual ones.

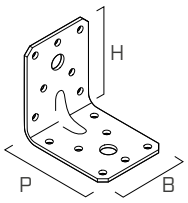
SAFE

Suitability of use and safety are guaranteed by the CE mark according to the ETA. Values certified on the basis of tests on the product.

CODES AND DIMENSIONS

WBR 70-90-100

S250 GALV



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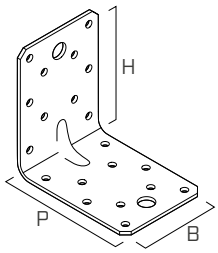

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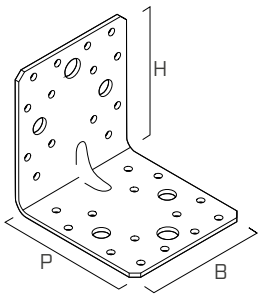
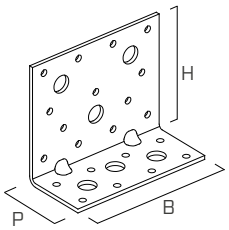


3

	CODE	B [mm]	P [mm]	H [mm]	s [mm]	n Ø5 pcs	n Ø11 pcs	n Ø13 pcs			pcs
1	**WBR070**	55	70	70	2,0	14	2	-	●	●	100
2	**WBR090**	65	90	90	2,5	20	2	-	●	●	100
3	**WBR100**	90	100	100	3,0	28	4	2	●	●	50

WBR 90110-170

DX51D GALV



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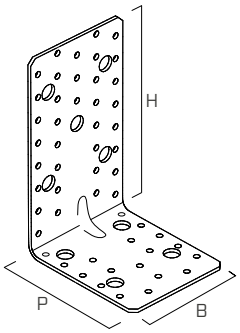
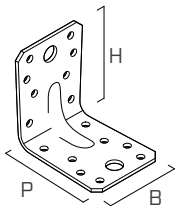


2

	CODE	B [mm]	P [mm]	H [mm]	s [mm]	n Ø5 pcs	n Ø13 pcs			pcs
1	**WBR90110**	110	50	90	3,0	21	6	●	●	50
2	**WBR170**	95	114	174	3,0	53	9	●	●	25

WBR THIN 70-90-100

S250 GALV



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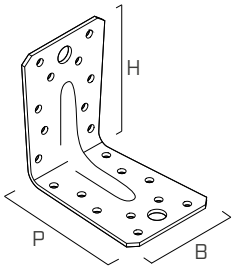

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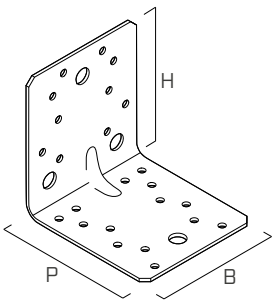


3

	CODE	B [mm]	P [mm]	H [mm]	s [mm]	n Ø5 pcs	n Ø11 pcs			pcs
1	**WBR07015**	55	70	70	1,5	16	2	●	●	100
2	**WBR09015**	65	90	90	1,5	20	2	●	●	100
3	**WBR10020**	90	100	100	2,0	24	4	●	●	50

MATERIAL AND DURABILITY

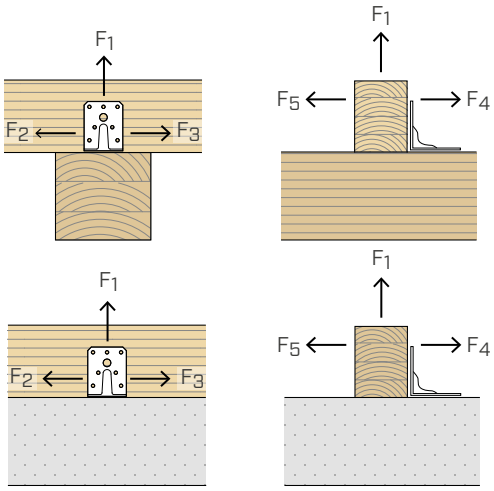
WBR - WBR THIN 70-90-110:
carbon steel S250GD+Z275.
To be used in service classes 1 and 2 (EN 1995-1-1).

WBR 90110-170: carbon steel DX51D+Z275.
To be used in service classes 1 and 2 (EN 1995-1-1).

FIELD OF USE

- Timber-to-timber joints
- Timber-to-concrete joints
- Timber-to-steel joints

EXTERNAL LOADS

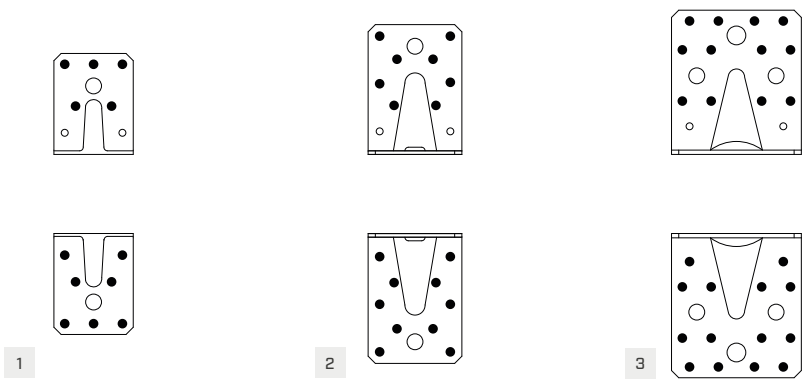


ADDITIONAL PRODUCTS - FASTENING

type	description		d [mm]	support	page
LBA	Anker nail		4		548
LBS	screw for plates		5		552
SKR	screw anchor		10		488
EPO-FIX PLUS	chemical anchor		M10 - M12		517

STATIC VALUES | TIMBER-TO-TIMBER JOINT

WBR 70-90-100

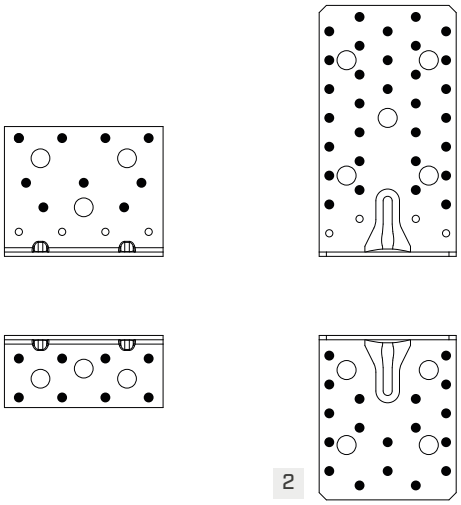


	CODE	FASTENING NUMBER type	holes fastening Ø5 Ø x L [mm]	n_v pcs	CHARACTERISTIC VALUES $R_{2/3,k}$ [kN]	$R_{1,k}$ [kN]	$R_{4/5,k}$* [kN]
1	**WBR070**	LBA nails	Ø4,0 x 60	12	**3,9**	**1,7**	**2,0**
2	**WBR090**	LBA nails	Ø4,0 x 60	18	**5,6**	**3,1**	**3,7**
3	**WBR100**	LBA nails	Ø4,0 x 60	26	**8,9**	**3,8**	**4,6**

* 2 angle brackets per joint

STATIC VALUES | TIMBER-TO-TIMBER JOINT

WBR 90110-170

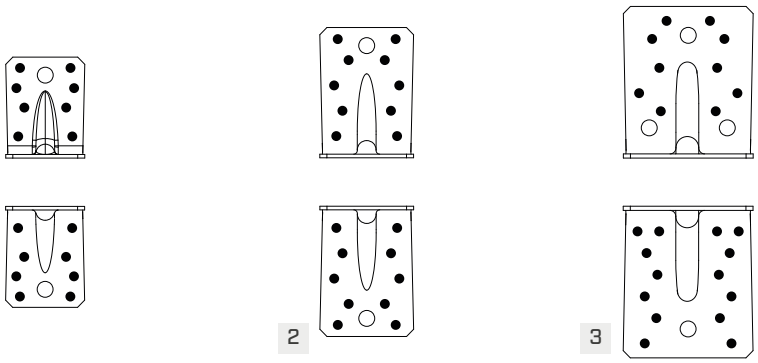


1 2

	CODE	FASTENING NUMBER holes fastening Ø5 type	Ø x L [mm]	n_v pcs	CHARACTERISTIC VALUES $R_{2/3,k}$ $R_{2/3,k\ timber}$ [kN]	$R_{1,k}$ $R_{1,k\ timber}$ [kN]	$R_{1,k\ steel}$ [kN]	$R_{4/5,k}$* $R_{4/5,k\ timber}$ [kN]	$R_{4/5,k\ steel}$ [kN]
1	**WBR90110**	LBA nails	Ø4,0x60	17	**7,1**	**2,5**	**3,4**	**10,4**	**10,9**
2	**WBR170**	LBA nails	Ø4,0x60	49	**11,0**	**1,7**	**3,7**	**12,4**	**9,2**

* 2 angle brackets per joint

WBR THIN 70-90-100

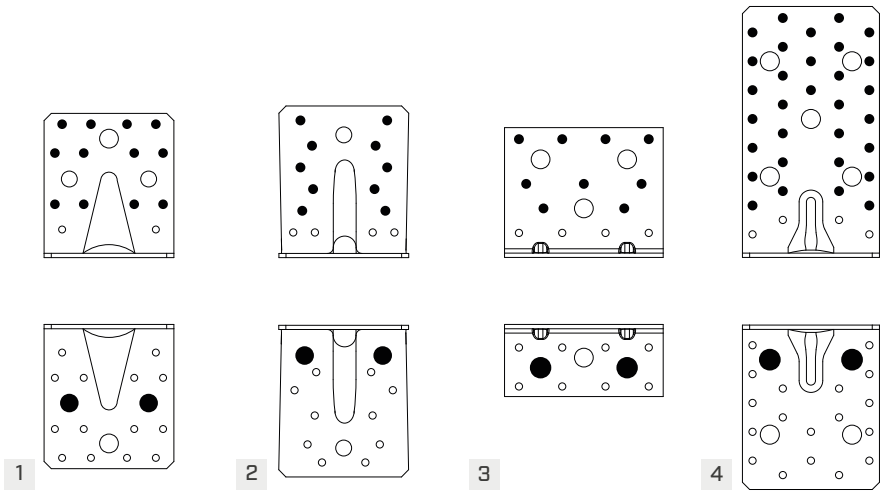


1 2 3

	CODE	FASTENING NUMBER holes fastening Ø5 type	Ø x L [mm]	n_v pcs	CHARACTERISTIC VALUES $R_{2/3,k}$ [kN]	$R_{1,k}$ [kN]	$R_{4/5,k}$* [kN]
1	**WBR07015**	LBA nails	Ø4,0x60	16	**5,1**	**4,8**	**11,1**
2	**WBR09015**	LBA nails	Ø4,0x60	20	**6,7**	**5,3**	**11,7**
3	**WBR10020**	LBA nails	Ø4,0x60	24	**10,2**	**7,5**	**12,4**

* 2 angle brackets per joint

STATIC VALUES | TIMBER-TO-CONCRETE JOINT



	CODE	FASTENING NUMBER					CHARACTERISTIC VALUES	
		type	holes fastening Ø5 Ø x L [mm]	holes fastening Ø5 n_v pcs	holes fastening Ø11 n_H pcs	holes fastening Ø13 n_H pcs	$R_{2/3,k}$ $R_{2/3,k}$ [kN]	$R_{2/3,k}$ Bolt $_{2/3}$[(1)] $k_{t\perp}$
1	**WBR100**	LBA nails	Ø4,0x60	26	2	-	**8,9**	**1,11**
2	**WBR10020**	LBA nails	Ø4,0x60	26	2	-	**10,2**	**0,63**
3	**WBR90110**	LBA nails	Ø4,0x60	17	-	2	**7,1**	**0,71**
4	**WBR170**	LBA nails	Ø4,0x60	49	-	4	**11,0**	**0,65**

Characteristic values calculated by distributing part of the moment given by eccentricity on the nails. Other hypotheses can be calculated by the designer.

NOTES:

[(1)] Fastening to concrete supports shall be verified according to anchor load which can be evaluated through the coefficients $k_{t//}$ and $k_{t\perp}$ listed in the table. The load acting on the anchor can be obtained as follows:

$$F_{bolt,d} = k_t \cdot F_d$$

k_t coefficient of eccentricity
F_d design external load acting on the angle bracket

The group of anchors check is satisfied when the design tensile strength, obtained considering the boundary effects, is greater than the design external load: $R_d \geq F_d$.

- The strength values of the connection system are valid under the calculation hypotheses listed in the table; for different boundary conditions shall be verified.

GENERAL PRINCIPLES:

- Characteristic values are consistent with EN 1995-1-1 and in accordance with ETA.
- The design values are obtained from the characteristic values as follows:

$$R_d = min \begin{cases} \dfrac{R_{k,timber} \cdot k_{mod}}{\gamma_M} \\ \dfrac{R_{k,steel}}{\gamma_{steel}} \end{cases}$$

γ_{steel} should be taken as γ_{M0}

- Coefficients γ_{M0}, γ_M and k_{mod} must be taken according to the current regulations used for the calculation.
- Dimensioning and verification of timber and concrete elements must be carried out separately.