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European Technical Assessment ETA-07/0277 of 13/11/2017

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	DMX® type WB, WBZ, KPL, KP and KL
Product family to which the construction product belongs	Three-dimensional nailing plates
Manufacturer	DOMAX Sp. z o.o. Al. Parku Krajobrazowego 109 PL 84-207 Koleczkowo, Łężyce
Manufacturing plant	DOMAX Sp. z o.o. Al. Parku Krajobrazowego 109 PL 84-207 Koleczkowo, Łężyce
This European Technical Assessment contains	21 pages including 2 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	Guideline for European Technical Approval ETAG 015, Edition November 2012 "Three-dimensional nailing plates", used as European Assessment Document (EAD)
This version replaces	ETA-07/0277 issued on 14/11/2012

This European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Specific Part

1 Technical description of the product

The three-dimensional nailing plates DMX® type WB, WBZ, KPL, KP and KL are one-piece, non-welded elements, made of galvanized steel sheet grade DX51D+Z275 according to EN 10346.

The range of the DMX® three-dimensional nailing plates is given in Annex A. The characteristic material values, dimensions and tolerances of the three-dimensional nailing plates not indicated in that Annex shall correspond to the respective values laid down in the technical documentation of this European Technical Assessment. The dimension tolerances shall meet the requirements of EN 22768-1.

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

The DMX® three-dimensional nailing plates are intended to be used for connecting the mutually perpendicular, load-bearing, solid timber elements, in end-grain to side-grain (DMX® type WB and WBZ) or side-grain to side grain (DMX® type KPL, KP and KL) configurations, in joints for which requirements for mechanical resistance and stability in the sense of the basic work requirement 1 of Regulation (EU) No 305/2011 shall be fulfilled.

Ring shank nails Anchor (Gunnebo Ankarspik) with the diameter of 4 mm and the length not less than 50 mm (Annex A8) manufactured by the companies GUNNEBO INDUSTRIER AB, Gunnebo (Sweden) or GUNNEBO INDUSTRIER Sp. z o.o., Orneta (Poland), as well as BMF connector nails with the diameter of 4 mm according to ETA-04/0013 or other ring shank nails according to EN 14592 with the diameter of 4 mm and characteristic tensile capacity $F_{ax,Rk}$ not less than 1,55 kN shall be used for connections made with the DMX® three-dimensional nailing plates.

In respect of the requirements concerning corrosion resistance, DMX® three-dimensional nailing plates are for use in timber structures subjected to the internal conditions defined by service classes 1 and 2 according to EN 1995-1-1 (Eurocode 5), in corrosion aggressiveness categories C1 and C2 according to EN ISO 12944-2, without action of acid gases or vapours.

The provisions made in this European Technical Assessment are based on an assumed working life of the three-dimensional nailing plates of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer or the Technical Assessment Body, but should only be regarded as 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)

3.1.1 Strength

The characteristic load-carrying capacities of joints loaded according to static diagrams shown in Annex B, determined by tests carried out according to ETAG 015, clause 5.1.3, are given in Annex B. The characteristic load-carrying capacities of joints for other load directions shall be calculated on the basis of EN 1995-1-1 (Eurocode 5) or according to national regulations. The design values shall be determined according to EN 1995-1-1 (Eurocode 5).

3.1.2 Stiffness

No performance assessed.

3.1.3 Ductility in cyclic testing

No performance assessed.

3.2 Safety in case of fire (BWR 2)

3.2.1 Reaction to fire

The three dimensional nailing plates are classified in Class A1 of reaction to fire (non-combustible products) in accordance with EN 13501-1 and European Commission Decision 96/603/EC amended by European Commission Decision 2000/605/EC.

3.2.2 Resistance to fire

No performance assessed.

3.3 Hygiene, health and the environment (BWR 3)

Regarding the dangerous substances, there may be 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.

3.4 Sustainable use of natural resources (BWR 7)

No performance assessed.

3.5 General aspects

The DMX® three-dimensional nailing plates durability and serviceability have been assessed satisfactory when used in conditions defined by service classes 1 and 2 according to EN 1995-1-1 (Eurocode 5). The installation instructions including special installation techniques and provisions for the qualification of the personnel are given in the manufacturer's technical documentation.

3.6 Methods used for the assessment

The assessment of three dimensional nailing plates for the declared intended use has been made in accordance with the ETAG 015 *"Three-dimensional nailing plates"*.

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

According to the Decision 97/638/EC of the European Commission the system 2+ of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) applies.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 13/11/2017 by Instytut Techniki Budowlanej

Anna Panek, MSc

Deputy Director of ITB

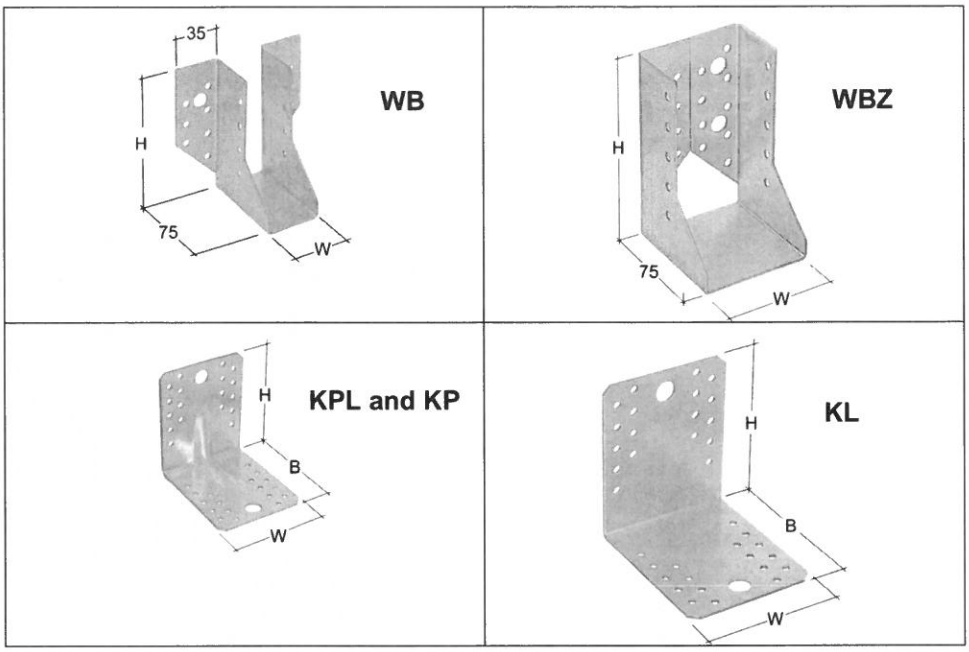


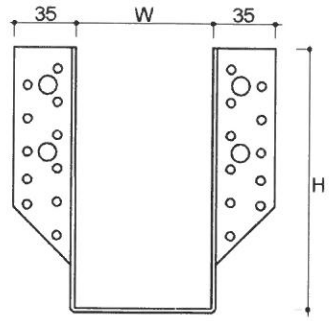
Table 1. DMX® three-dimensional nailing plate types and dimensions

DMX® type	DMX® symbol	Dimensions, mm					
		H		W		B	
		Min	Max	Min	Max	Min	Max
WB	WB 1 to WB 38	98	220	25	160	–	–
WBZ	WBZ 21 to WBZ 37	120	210	70	140	–	–
KPL	KPL 1 to KPL 4	70	105	55	90	70	105
KP	KP 1 to KP 4						
KL	KL 1 to KL 5	50	150	35	90	50	105

Table 2. Grade and steel sheet specification

DMX® type	DMX® symbol	Thickness, mm	Grade according to EN 10346	Zink coating mass, g/m²
WB	WB 1 to WB 38	2,0	DX 51D+Z275	275
WBZ	WBZ 21 to WBZ 37	2,0		
KPL	KPL 1 to KPL 4	2,0		
KP	KP 1 to KP 4	2,5		
KL	KL 1 to KL 5	2,5		

DMX® type WB, WBZ, KPL, KP and KL	Annex A1 of European Technical Assessment ETA-07/0277
Types and materials	



WB

Template = 2 x H + W

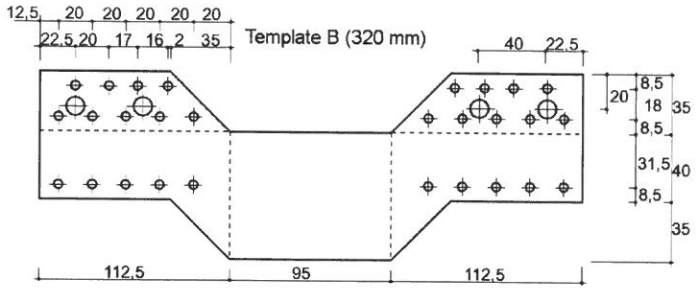
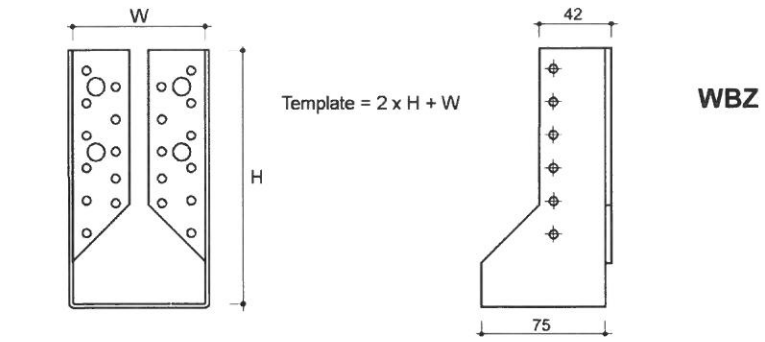


Table 3. DMX® type WB three-dimensional nailing plate symbols and dimensions

DMX® Symbol	Dimensions, mm		Template	Number of holes		DMX® symbol	Dimensions, mm		Template	Number of holes	
	W	H		Ø 5	Ø 11		W	H		Ø 5	Ø 11
WB 1	25	118	A	22	2	WB 20	64	128	B	28	4
WB 2	38	111	A	22	2	WB 21	70	125	B	28	4
WB 3	38	141	B	28	4	WB 22	70	155	C	34	4
WB 4	38	171	C	34	4	WB 23	76	122	B	28	4
WB 5	41	110	A	22	2	WB 24	76	152	C	34	4
WB 6	41	140	B	28	4	WB 25	76	182	D	40	6
WB 7	41	170	C	34	4	WB 26	80	120	B	28	4
WB 8	45	108	A	22	2	WB 27	80	150	C	34	4
WB 9	45	138	B	28	4	WB 28	80	180	D	40	6
WB 10	51	105	A	22	2	WB 29	80	210	E	46	6
WB 11	51	135	B	28	4	WB 30	100	140	C	34	4
WB 12	51	165	C	34	4	WB 31	100	170	D	40	6
WB 13	51	195	D	40	6	WB 32	100	200	E	46	6
WB 14	60	100	A	22	2	WB 33	115	163	D	40	6
WB 15	60	130	B	28	4	WB 34	115	193	E	46	6
WB 16	60	160	C	34	4	WB 35	120	160	D	40	6
WB 17	60	190	D	40	6	WB 36	120	190	E	46	6
WB 18	60	220	E	46	6	WB 37	140	180	E	46	6
WB 19	64	98	A	22	2	WB 38	160	170	E	46	6



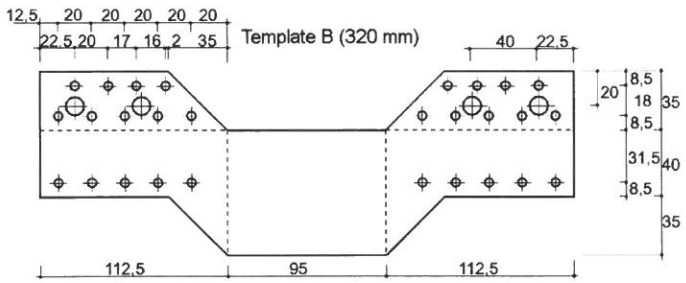
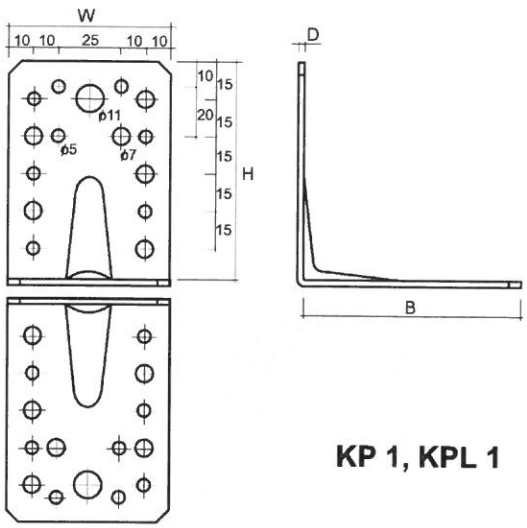
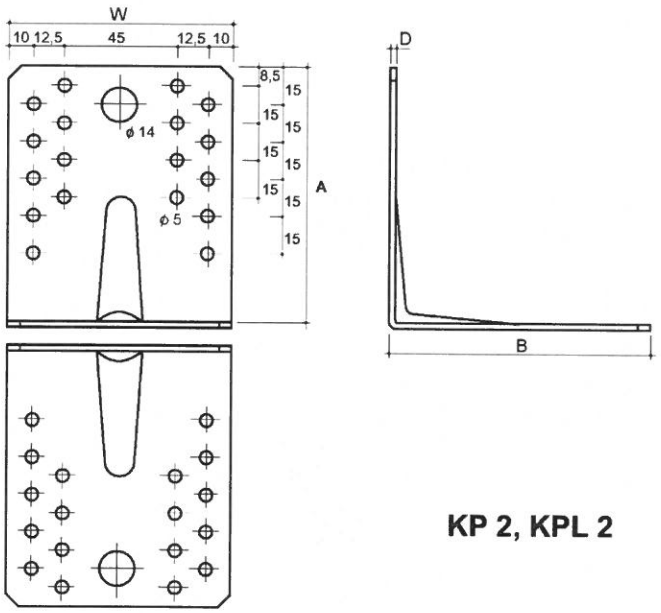


Table 4. DMX® type WBZ three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm		Template	Number of holes	
	W	H		Ø 5	Ø 11
WBZ 21	70	125	B	28	4
WBZ 22	70	155	C	34	4
WBZ 23	76	122	B	28	4
WBZ 24	76	152	C	34	4
WBZ 25	76	182	D	40	6
WBZ 26	80	120	B	28	4
WBZ 27	80	150	C	34	4
WBZ 28	80	180	D	40	6
WBZ 29	80	210	E	46	6
WBZ 30	100	140	C	34	4
WBZ 31	100	170	D	40	6
WBZ 32	100	200	E	46	6
WBZ 33	115	163	D	40	6
WBZ 34	115	193	E	46	6
WBZ 35	120	160	D	40	6
WBZ 36	120	190	E	46	6
WBZ 37	140	180	E	46	6



KP 1, KPL 1

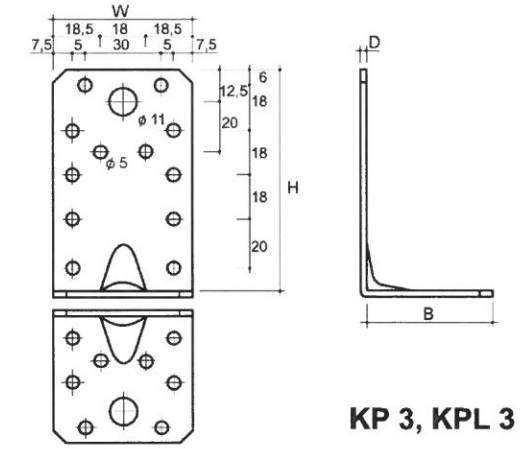


KP 2, KPL 2

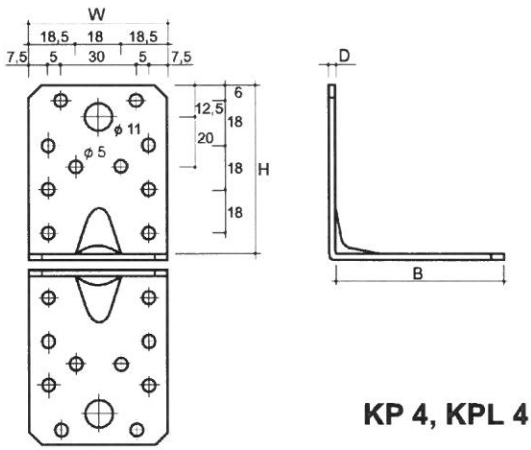
Table 5. DMX® type KP and KPL three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes			
	W	H	B	D	Ø 5	Ø 7	Ø 11	Ø 14
KP 1	65	90	90	2,5	16	12	2	–
KPL 1	65	90	90	2,0	16	12	2	–
KP 2	90	105	105	2,5	36	–	–	2
KPL 2	90	105	105	2,0	36	–	–	2

DMX® type WB, WBZ, KPL, KP and KL	**Annex A4** of European Technical Assessment ETA-07/0277
Three-dimensional nailing plates DMX® KP 1, KPL 1, KP 2 and KPL 2	



KP 3, KPL 3



KP 4, KPL 4

Table 6. DMX® type KP and KPL three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes			
	W	H	B	D	Ø 5	Ø 7	Ø 11	Ø 14
KP 3	55	90	50	2,5	20	–	2	–
KPL 3	55	90	50	2,0	20	–	2	–
KP 4	55	70	70	2,5	20	–	2	–
KPL 4	55	70	70	2,0	20	–	2	–

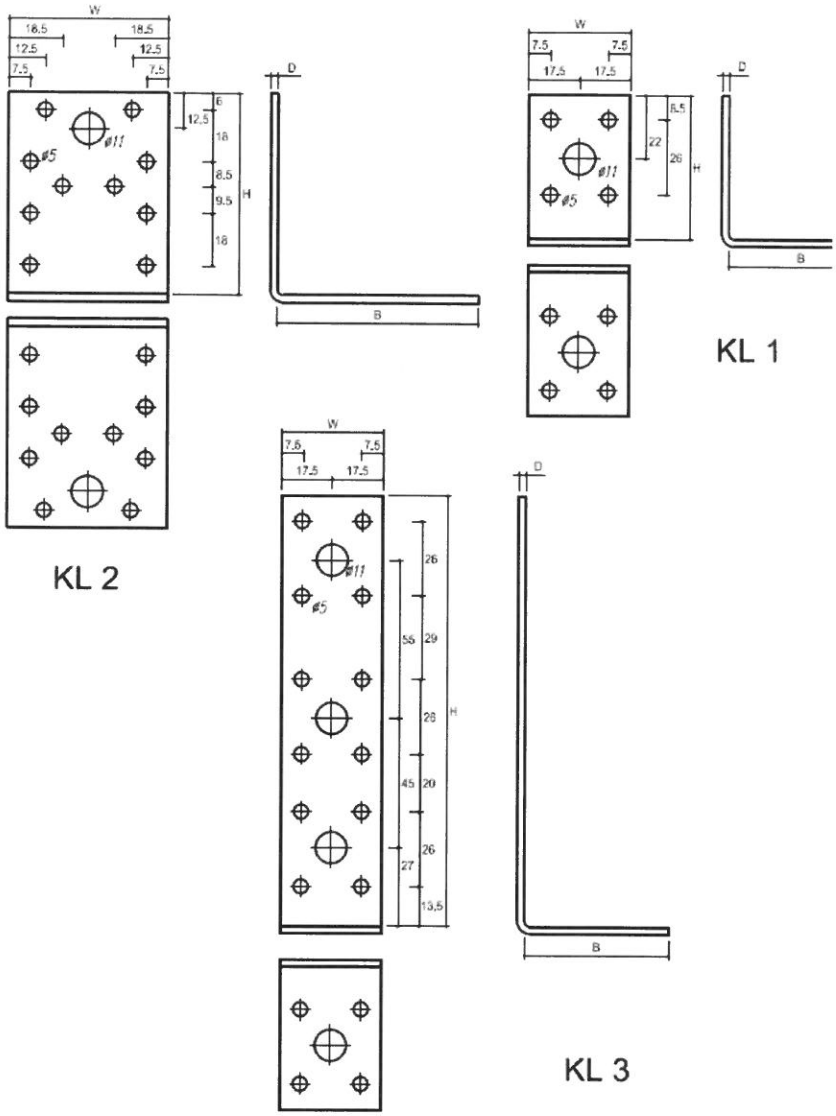
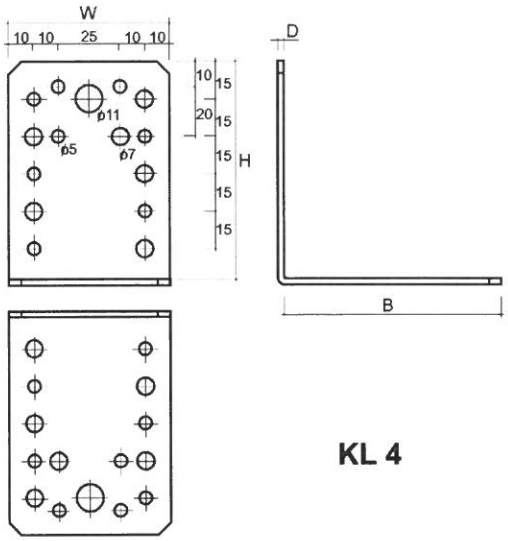


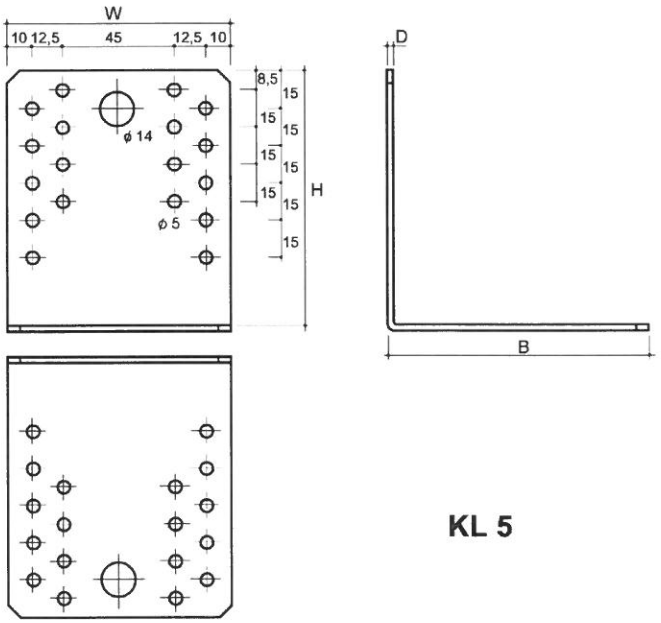
Table 7. DMX® type KL three-dimensional nailing plate symbols and dimensions

DMX® Symbol	Dimensions, mm				Number of holes			
	W	H	B	D	Ø 5	Ø 7	Ø 11	Ø 14
KL 1	35	50	50	2,5	8	–	2	–
KL 2	55	70	70	2,5	20	–	2	–
KL 3	35	150	50	2,5	16	–	–	–

DMX® type WB, WBZ, KPL, KP and KL	**Annex A6** of European Technical Assessment ETA-07/0277
Three-dimensional nailing plates DMX® KL 1, KL 2 and KL 3	



KL 4



KL 5

Table 8. DMX® type KL three-dimensional nailing plate symbols and dimensions

DMX® symbol	Dimensions, mm				Number of holes			
	W	H	B	D	Ø 5	Ø 7	Ø 11	Ø 14
KL 4	65	90	90	2,5	16	12	2	–
KL 5	90	105	105	2,5	36	–	–	2

DMX® type WB, WBZ, KPL, KP and KL	**Annex A7** of European Technical Assessment ETA-07/0277
Three-dimensional nailing plates DMX® KL 4 and KL 5	

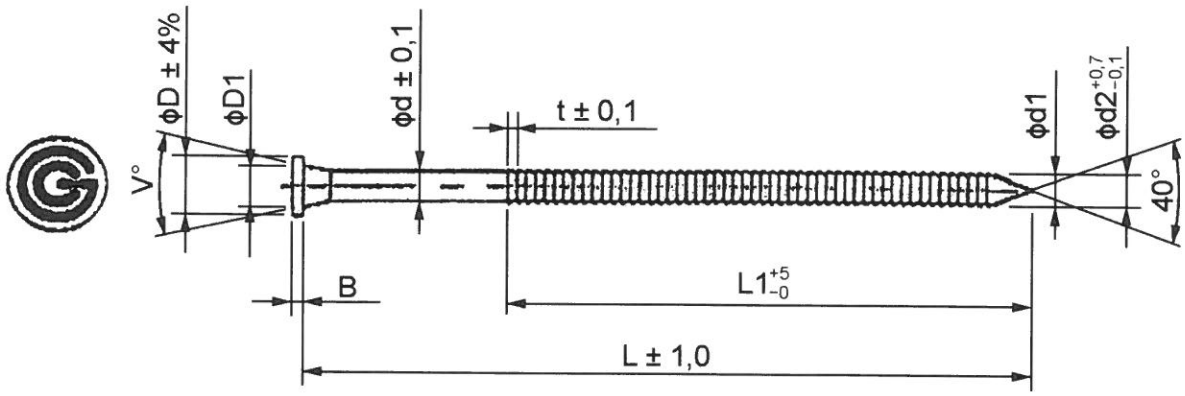


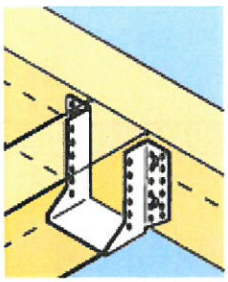
Table 9. ANCHOR (GUNNEBO ANKARSPIK) nail symbols and dimensions

Symbol, L-d	Dimensions, mm										
	L	L1	d	d1	d2	t	D	D1	B	d2-d1*	v°
125-4,0	123,5	70	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
100-4,0	98,5	70	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
75-4,0	73,5	65	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
60-4,0	58,5	50	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
50-4,0	48,5	40	4,0	3,6	4,4	1,25	8,0	5,6	1,5	0,6-1,0	25°
* Acceptable tolerances of difference in dimensions d2-d1 are -15% / +25%											

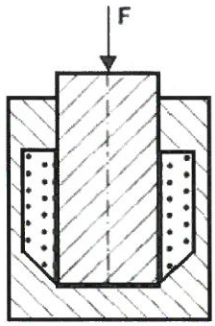
Nails are made of non-alloy steel rods for drawing according to EN 10016, Parts 1 ÷ 4; $R_{m.min}$ = 600 N/mm^2.

Table 10. Characteristic withdrawal capacity of the ANCHOR (GUNNEBO ANKARSPIK) nails with the overall length of 50 mm

Steel sheet thickness, mm	Nail with the diameter d, mm	Depth of embedment, t_{pen}	Characteristic withdrawal capacity*, F_{ax}, R_k, kN
2,00	4,00	8d	1,55
2,50	4,00		
* Timber characteristic density $\rho_k \geq 350$ kg/m^3			

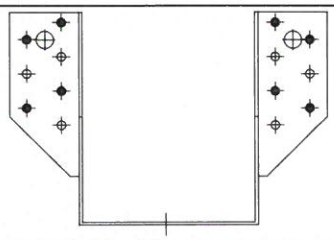
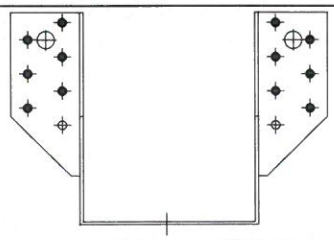


Reference joint diagram



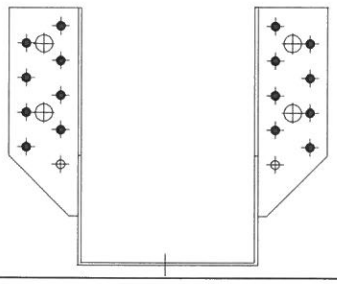
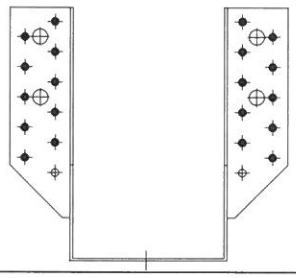
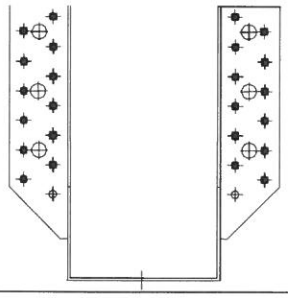
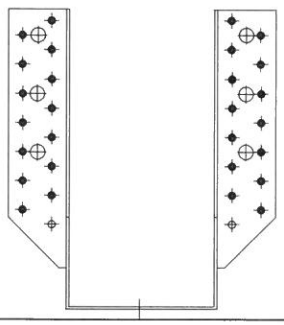
Static diagram of load

Table 11. Characteristic load-carrying capacity of joints made with DMX® type WB three-dimensional nailing plates

Template	DMX® symbol	Nailing*	Characteristic load-carrying capacity, R_k, kN
A	WB1 WB2 WB5 WB8 WB10 WB14 WB19		17,05
A	WB1 WB2 WB5 WB8 WB10 WB14 WB19		19,00

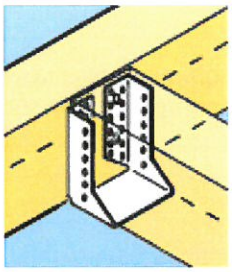
* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

Table 11

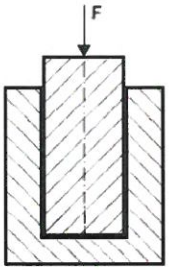
Template	DMX® symbol	Nailing*	Characteristic load-carrying capacity, R_k, kN
B	WB3 WB6 WB9 WB11 WB15 WB20 WB21 WB23 WB26		20,30
C	WB4 WB7 WB12 WB16 WB22 WB24 WB27 WB30		25,45
D	WB13 WB17 WB25 WB28 WB31 WB33 WB35		27,75
E	WB18 WB29 WB32 WB34 WB36 WB37 WB38		32,30

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

DMX® type WB, WBZ, KPL, KP and KL	**Annex B2** of European Technical Assessment ETA-07/0277
Characteristic load-carrying capacity of joints made with DMX® type WB three-dimensional nailing plates	

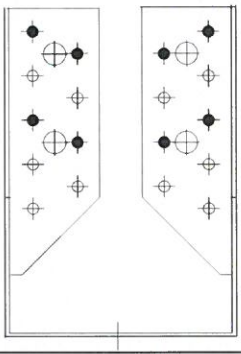
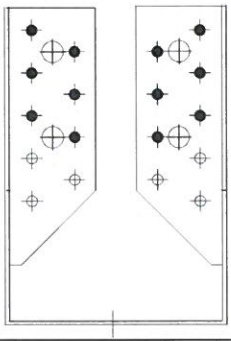


Reference joint diagram



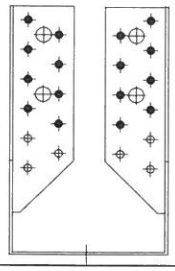
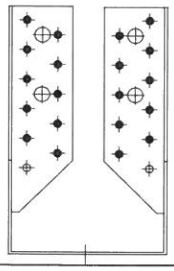
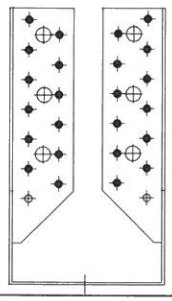
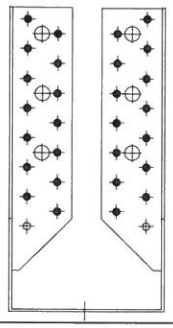
Static diagram of load

Table 12. Characteristic load-carrying capacity of joints made with DMX® type WBZ three-dimensional nailing plates

Template	DMX® symbol	Nailing*	Characteristic load-carrying capacity, R_k, kN
B	WBZ21 WBZ23 WBZ26		12,75
B	WBZ21 WBZ23 WBZ26		17,15

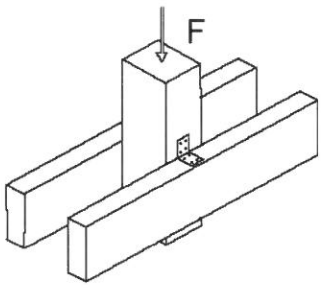
* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

Table 12

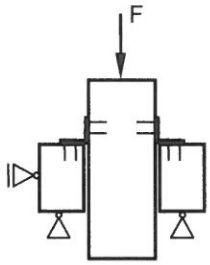
Template	DMX® symbol	Nailing*	Characteristic load-carrying capacity, R_k, kN
C	WBZ22 WBZ24 WBZ27 WBZ30		22,35
C	WBZ22 WBZ24 WBZ27 WBZ30		23,65
D	WBZ25 WBZ28 WBZ31 WBZ33 WBZ35		30,95
E	WBZ29 WBZ32 WBZ34 WBZ36 WBZ37		28,65

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

DMX® type WB, WBZ, KPL, KP and KL	**Annex B4** of European Technical Assessment ETA-07/0277
Characteristic load-carrying capacity of joints made with DMX® type WBZ three-dimensional nailing plates	

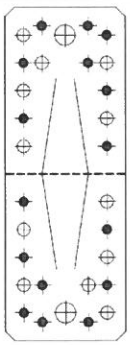
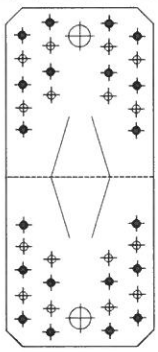


Reference joint diagram



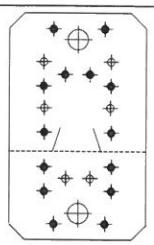
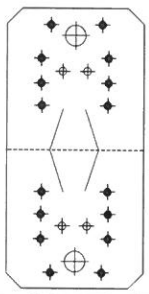
Static diagram of load

Table 13. Characteristic load-carrying capacity of joints made with DMX® type KP and KPL three-dimensional nailing plates

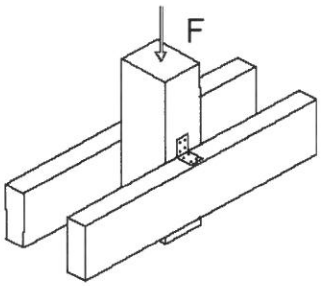
DMX® symbol	Nailing*	Characteristic load-carrying capacity, R_k, kN
KP1 KPL1		17,80
KP2 KPL2		21,90

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

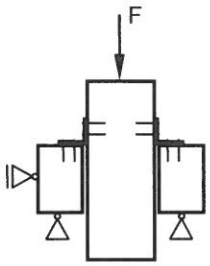
Table 13

DMX® symbol	Nailing*	Characteristic load-carrying capacity, R_k, kN
KP3 KPL3		14,35
KP4 KPL4		10,45

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

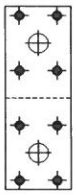
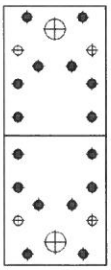


Reference joint diagram



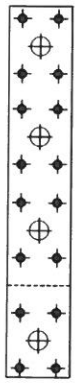
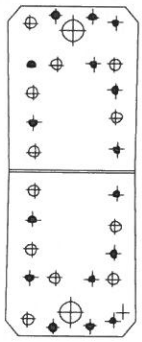
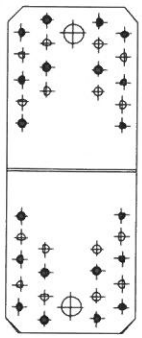
Static diagram of load

Table 14. Characteristic load-carrying capacity of joints made with DMX® type KL three-dimensional nailing plates

DMX® symbol	Nailing*	Characteristic load-carrying capacity, R_k, kN
KL1		6,85
KL 2		10,95

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338

Table 14

DMX® symbol	Nailing*	Characteristic load-carrying capacity, R_k, kN
KL 3		14,90
KL4		17,80
KL5		21,90

* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d ≥ 4 mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338