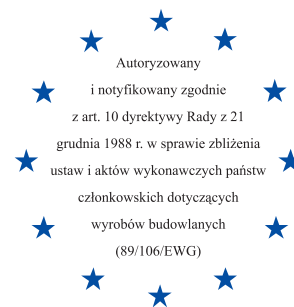




Instytut Techniki Budowlanej

Member of EOTA



European Technical Approval

ETA-07/0277

DMX[®] type WB, WBZ, KPL, KP and KL

Three-dimensional nailing plates

*Trójwymiarowe łączniki mechaniczne
do konstrukcji drewnianych*



Europejska Organizacja ds. Aprobatach Technicznych
European Organisation for Technical Approvals

Europejska aprobatą techniczną została opracowana
w Zakładzie Aprobát Technicznych
przez dr inż. Agnieszkę FLESZAR

Projekt okładki: Ewa Kossakowska

GW II

Kopiowanie aprobaty technicznej
jest dozwolone jedynie w całości

Wykonano z oryginałów bez opracowania wydawniczego

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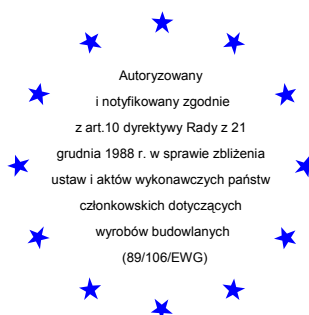
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Członek EOTA

European Technical Approval

ETA-07/0277

English translation – the original version is in Polish language

Nazwa handlowa

Trade name

DMX[®] typów WB, WBZ, KPL, KP i KL

DMX[®] type WB, WBZ, KPL, KP and KL

Właściciel aprobaty

Holder of approval

DOMAX Sp. z o.o.

Al. Parku Krajobrazowego 109

PL 84-207 Koleczkowo, Łężyce

Rodzaj i przeznaczenie wyrobu

*Generic type and use
of construction products*

**Trójwymiarowe łączniki mechaniczne do
konstrukcji drewnianych**

Three-dimensional nailing plates

Termin ważności

Valid

od

from

14.11.2012

do

to

14.11.2017

Zakład produkcyjny

Manufacturing plant

DOMAX Sp. z o.o.

Al. Parku Krajobrazowego 109

PL 84-207 Koleczkowo, Łężyce

Niniejsza Europejska

Aprobata Techniczna zawiera

*This European Technical
Approval contains*

25 stron, w tym 12 Załączników

25 pages including 12 Annexes

Niniejsza Europejska

Aprobata Techniczna zastępuje

*This European Technical
Approval replaces*

ETA-07/0277 ważną od 24.11.2009 do 13.12.2012

ETA-07/0277 with validity from 24.11.2009 to 13.12.2012



Europejska Organizacja ds. Aprobatach Technicznych

European Organisation for Technical Approvals

I LEGAL BASES AND GENERAL CONDITIONS

1. This European Technical Approval is issued by Instytut Techniki Budowlanej in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by the Council Directive 93/68/EEC² and Regulation (EC) no. 1882/2003 of the European Parliament and of the Council³;
 - ustawa z dnia 16 kwietnia 2004 r. o wyrobach budowlanych (law on construction products of 16 April 2004)⁴;
 - rozporządzenie Ministra Infrastruktury z dnia 14 października 2004 r. w sprawie europejskich aprobat technicznych oraz polskich jednostek organizacyjnych upoważnionych do ich wydawania (ordinance of Ministry of Infrastructure of 14 October 2004 on the European Technical Approvals and Polish bodies entitled to issue them)⁵;
 - Common Procedural Rules for Requesting, Preparing and the Granting of European Technical Approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European Technical Approval of “*Three-dimensional nailing plates*” ETAG 015, edition September 2002.
2. Instytut Techniki Budowlanej is authorized to check whether the provisions of this European Technical Approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European Technical Approval and for their fitness for the intended use remains with the holder of the European Technical Approval.
3. This European Technical Approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1; or manufacturing plants other than those laid down in the context of this European Technical Approval.
4. This European Technical Approval may be withdrawn by Instytut Techniki Budowlanej, in particular pursuant to information by the Commission according to Article 5 (1) of Council Directive 89/106/EEC.
5. Reproduction of this European Technical Approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Instytut Techniki Budowlanej. In this case, partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European Technical Approval.
6. The European Technical Approval is issued by the approval body in its official language. This version corresponds to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities no. L 40, 11.2.1989, p. 12

² Official Journal of the European Communities no. L 220, 30.8.1993, p. 1

³ Official Journal of the European Union no. L 284, 31.10.2003, p. 1

⁴ Official Journal of the Polish Republic no. 92/2004, pos. 881

⁵ Official Journal of the Polish Republic no. 237/2004, pos. 2375

⁶ Official Journal of the European Communities no. L 17, 20.1.1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of product and intended use

1.1 Definition of 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 10327. The range of the DMX[®] three-dimensional nailing plates are shown in Annex 1. The dimensions of the particular types of the three-dimensional nailing plates, spacing, number and dimension of the nail holes are shown in Annexes 2 to 7.

1.2 Intended use

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 Essential Requirement 1 of Council Directive 89/106/EEC shall be fulfilled.

Ring shank nails Anchor (Gunnebo Ankarspik) with the diameter of 4 mm and the length not less than 50 mm (Annex 8) 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 1995-1-1:2004 (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 Approval are based on an assumed working life of the product of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or approval 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.

2 Characteristics of product and methods of verification

2.1 Characteristics of product

The three-dimensional nailing plates DMX[®] type WB, WBZ, KPL, KP and KL correspond to the drawings and descriptions given in Annexes 1 to 7. The characteristic material values, dimensions and tolerances of the three-dimensional nailing plates not indicated in these Annexes shall correspond to the respective

values laid down in the technical documentation⁷ of this European Technical Approval. The dimension tolerances shall meet the requirements of EN 22768-1.

The DMX[®] three-dimensional nailing plates are made of the cold-formed steel sheet grade DX51D according to EN 10327, with the thickness of 2,0 mm (DMX[®] type WB, WBZ and KPL) or 2,5 mm (DMX[®] type KP and KL), with the zinc coating mass of 275 g/m².

2.2 Methods of verification

2.2.1 General

The assessment of the fitness of the DMX[®] three-dimensional nailing plates for the intended use has been made in compliance with the Guideline for European Technical Approval of “*Three-dimensional nailing plates*”, ETAG 015.

2.2.2 Essential Requirement 1 – Mechanical resistance and stability

2.2.2.1 Strength

The characteristic load-carrying capacities of joints made with the DMX[®] three-dimensional nailing plates, determined by the tests carried out according to ETAG 015, clause 5.1.3, are given in Annexes 9 to 12. 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).

2.2.2.2 Stiffness

No performance determined.

2.2.2.3 Ductility in cyclic testing

No performance determined.

2.2.3 Essential Requirement 2 – Safety in case of fire

2.2.3.1 Reaction to fire

The steel elements are classified as class A1 of reaction to fire (non-combustible products) according to European Commission Decision 96/603/EC amended by European Commission Decision 2000/605/EC and European Commission Decision 2003/424/EC.

2.2.3.2 Resistance to fire

Performances in relation to fire resistance would be determined for the complete structural element with any associated finishes, therefore there is no performance determined option used to this Essential Requirement.

2.2.4 Essential Requirement 3 – Hygiene, health and the environment

According to the manufacturer's declaration the DMX[®] three-dimensional nailing plates do not contain harmful or dangerous substances as defined in the EU database.

⁷ The technical documentation of this European Technical Approval is deposited at Instytut Techniki Budowlanej and, as far as relevant for the tasks of the notified body involved in the attestation of conformity procedure, may be handed over only to the notified body involved.

In addition to the specific clauses relating to dangerous substances contained in this ETA, there may be other requirements applicable to the products falling within their scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

2.2.5 Essential Requirement 4 – Safety in use

Not relevant

2.2.6 Essential Requirement 5 – Protection against noise

Not relevant

2.2.7 Essential Requirement 6 – Energy economy and heat retention

Not relevant

2.2.8 Aspects of durability, serviceability and identification

2.2.8.1 Durability and serviceability

The DMX[®] three-dimensional nailing plates have been assessed as having satisfactory durability and serviceability when used in conditions defined by service classes 1 and 2 according to EN 1995-1-1:2004 (Eurocode 5).

2.2.8.2 Identification

Each three-dimensional nailing plate is to be marked with the symbol and the product type according to the Annexes 2 to 7.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the decision 98/279/EC of the European Commission amended by 2001/596/EC the system 2+ of attestation of conformity applies.

The system 2+ of attestation of conformity is defined as follows:

Declaration of conformity of the product by the manufacturer on the basis of:

a) Tasks of the manufacturer:

- (1) initial type-testing of the product,
- (2) factory production control,
- (3) testing of samples taken at the factory in accordance with a prescribed test plan,

b) Tasks of the notified body:

- (4) certification of factory production control on the basis of:
 - initial inspection of factory and of factory production control,
 - continuous surveillance, assessment and approval of factory production control.

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall ensure that the products are in conformity with this European Technical Approval.

The manufacturer shall only use raw materials supplied with the relevant inspection documents as laid down in the control plan⁸. The incoming raw materials shall be subjected to controls and tests by the manufacturer before acceptance. Check of incoming materials shall include control of inspection documents presented by the manufacturers of those materials by verifying the steel grade and thickness (in case of steel sheet) and dimensions (in case of ring shank nails) and other material properties laid down in those documents (comparison with nominal values).

The manufactured three-dimensional nailing plates shall be subjected to the following tests:

- shape,
- dimensions,
- marking.

The results of factory production control are to be recorded and evaluated. The records shall include at least the following information:

- designation of the product and basic materials used in production,
- type of control or testing,
- date of manufacture and date of testing of the product and of the basic materials used in production,
- result of control and testing and, if appropriate, comparison with requirements,
- signature of person responsible for factory production control.

The records shall be presented to the notified body involved in continuous surveillance. On request they shall be presented to Instytut Techniki Budowlanej. Details of extent, nature and frequency of testing and controls to be performed within the factory production control shall correspond to the control plan which is part of the technical documentation of this European Technical Approval.

3.2.1.2 Initial type-testing

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

⁸ The control plan has been deposited at Instytut Techniki Budowlanej and may be handed over only to the approved body involved in the conformity attestation procedure.

3.2.2 Tasks of the notified body

3.2.2.1 Initial inspection of factory and of factory production control

The notified body shall ascertain that, in accordance with the control plan, the factory, in particular the staff and equipment, and the factory production control are suitable to ensure a continuous and orderly manufacturing of the hangers with the specifications mentioned in clause 2.1 as well as in the Annexes to this European Technical Approval.

3.2.2.2 Continuous surveillance

Continuous surveillance and assessment of factory production control have to be performed according to the control plan.

The notified body shall visit the factory at least twice a year for surveillance. It has to be verified that the system of factory production control and the manufacturing process are maintained taking account of the prescribed control plan.

The results of continuous surveillance shall be made available on demand by the notified body to Instytut Techniki Budowlanej.

3.3 CE marking

The CE-marking shall be affixed on each packaging of the three-dimensional nailing plates. The symbol „CE” shall be accompanied by the following information:

- identification number of the notified body,
- name or identifying mark of the manufacturer and manufacturing plant,
- the last two digits of the year in which the CE-marking was affixed,
- the number of EC certificate of the Factory Production Control,
- the number of the European Technical Approval,
- the number of the Guideline for European Technical Approval (ETAG 015).

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The DMX[®] three-dimensional nailing plates are manufactured in accordance with the provisions of the European Technical Approval using the manufacturing process as identified in the inspection of the plant by Instytut Techniki Budowlanej. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Instytut Techniki Budowlanej before the changes are introduced. Instytut Techniki Budowlanej will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

4.2 Installation

4.2.1 General

The design of the building work in which the DMX[®] three-dimensional nailing plates are to be used shall be made in accordance with EN 1995-1-1:2004 (Eurocode 5) or with the appropriate national rules concerning timber structures design.

4.2.2 Design of joints

The joints with the DMX[®] three-dimensional nailing plates shall be designed taking into account the following conditions:

- the characteristic load-carrying capacities of joints are to be taken from the Annexes 9 to 12 for the defined nailing pattern,
- connected elements shall be made of solid coniferous timber classified to at least C24 strength class according to EN 338.

4.2.3 Installation of three-dimensional nailing plates

The fitness for use of the DMX[®] three-dimensional nailing plates can only be assumed if the following conditions of installation are met:

- installation is carried out by appropriately qualified personnel under the supervision of the person qualified for this work,
- the original three-dimensional nailing plates only are used, supplied by the manufacturer together with the appropriate ring shank nails defined in clause 2.2.2,
- three-dimensional nailing plates installation is in accordance with the manufacturer's installation guide,
- before placing the three-dimensional nailing plates, the characteristics of timber members (type, class and moisture content) in which the nailing plates are to be placed are checked to ensure that they are identical or better than the characteristics of timber members used in testing in which the characteristic load-carrying capacities were determined,
- timber member placed in three-dimensional nailing plate does not contain the waness and the gap between the connected elements does not exceed 3 mm.

4.2.4 Responsibility of the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions defined in clause 2 and in Annexes is given to those who are concerned. This information shall be presented in manufacturer's installation guide which may include the reproduction of the respective parts of the European Technical Approval. All installation data shall be shown clearly on the packaging and/or on an enclosed instruction sheet, preferably using illustrations.

The minimum data required are:

- specification of the three-dimensional nailing plate,
- requirements of the timber members connected,
- identification of the manufacturing batch.

5 Recommendations for the manufacturer

5.1 Recommendations on packaging, transport and storage

The three-dimensional nailing plates shall be supplied in original packages. The one package shall contain the three-dimensional nailing plates of the same type and size.

Packaging of the three-dimensional nailing plates has to be such that the products are protected against weathering and damage during transport and storage.

5.2 Use, maintenance and repair

The assessment of the fitness for use is based on the assumption that the maintenance is not required during the assumed intended working live.

Should repair prove necessary, it is normal for the three-dimensional nailing plate to be replaced.

On behalf of Instytut Techniki Budowlanej



Marek Kaproń
Deputy Director of ITB

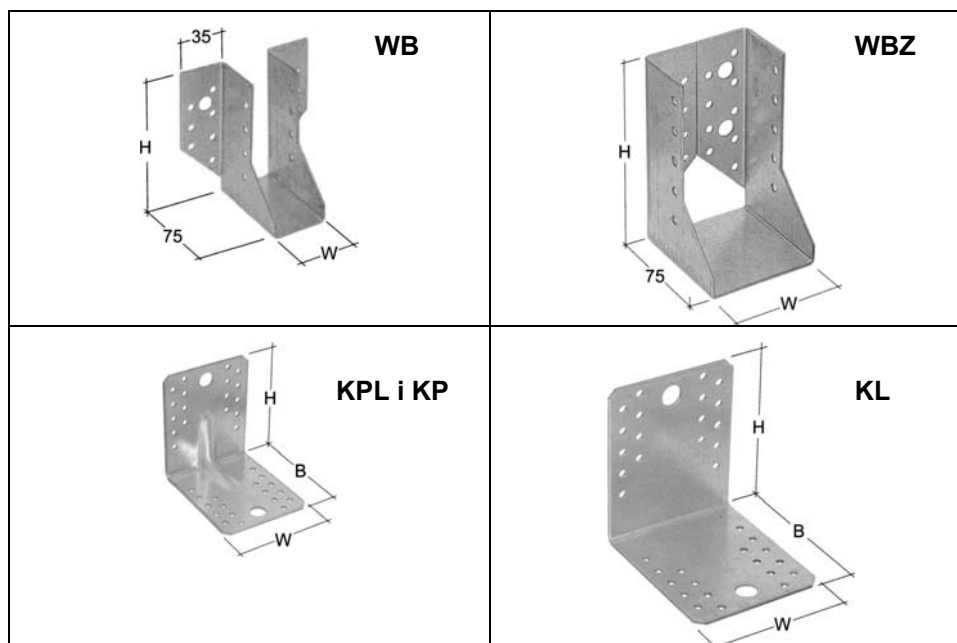


Table 1. DMX[®] three-dimensional nailing plate types and dimensions

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 10327	Zink coating mass, g/m ²
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

Types and materials

Annex 1
 of European
 Technical Approval
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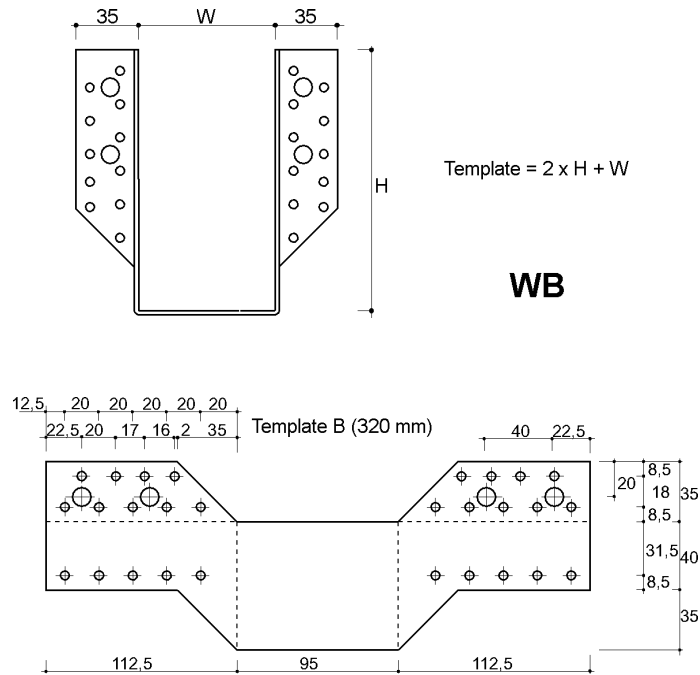


Table 3. DMX® type WB three-dimensional nailing plate symbols and dimensions

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

DMX® type WB, WBZ, KPL, KP and KL

Range and dimensions of DMX® type WB three-dimensional nailing plates

Annex 2
 of European
 Technical Approval
 ETA-07/0277

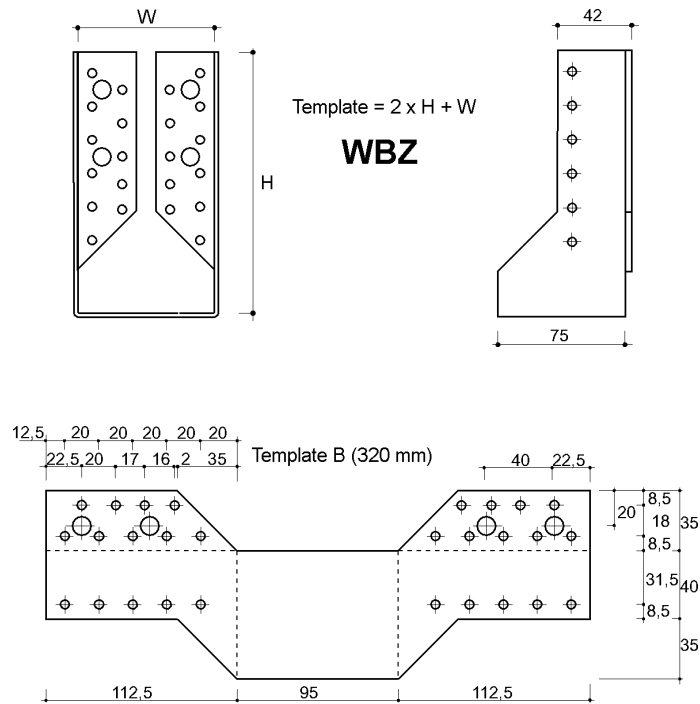


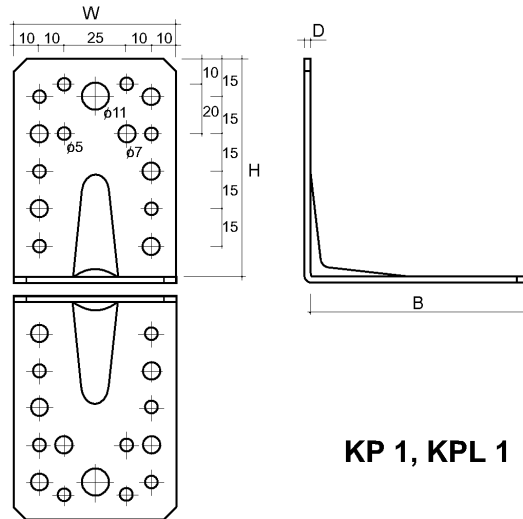
Table 4. DMX[®] type WBZ three-dimensional nailing plate symbols and dimensions

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

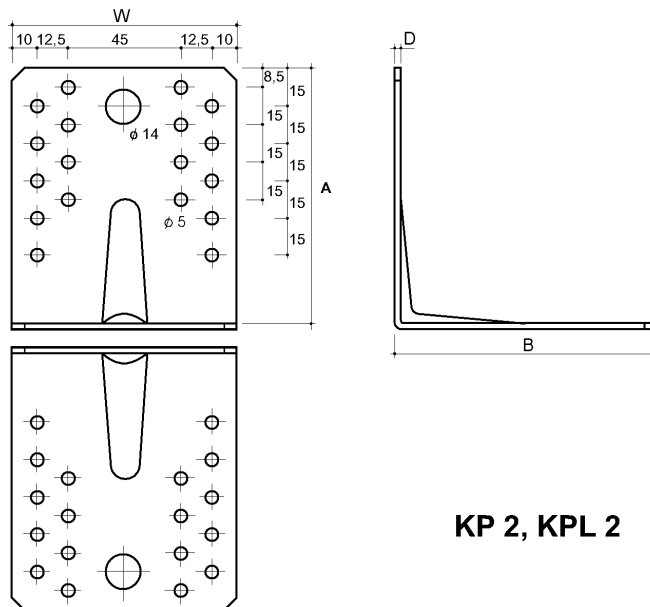
DMX[®] type WB, WBZ, KPL, KP and KL

Range and dimensions of DMX[®] type WBZ three-dimensional nailing plates

Annex 3
 of European
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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

Range and dimensions of DMX[®] type KP 1, KPL 1, KP 2 and KPL 2 three-dimensional nailing plates

Annex 4
 of European
 Technical Approval
 ETA-07/0277

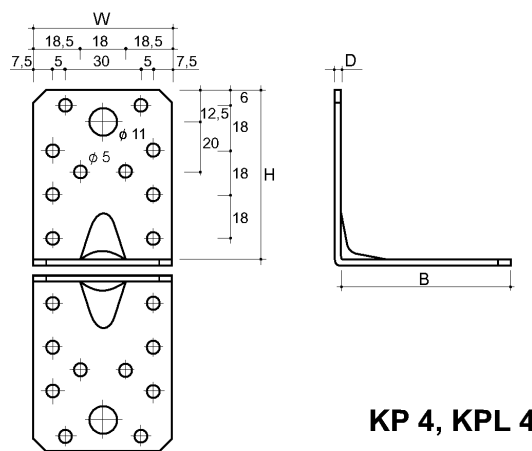
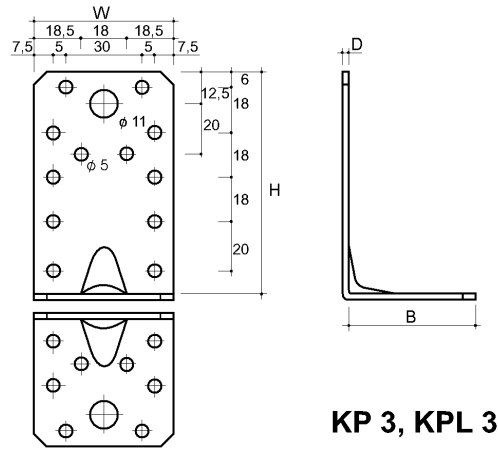


Table 6. DMX[®] type KP and KPL three-dimensional nailing plate symbols and dimensions

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	–

DMX[®] type WB, WBZ, KPL, KP and KL

Range and dimensions of DMX[®] type KP 3, KPL 3, KP 4 and KPL 4 three-dimensional nailing plates

Annex 5
 of European
 Technical Approval
 ETA-07/0277

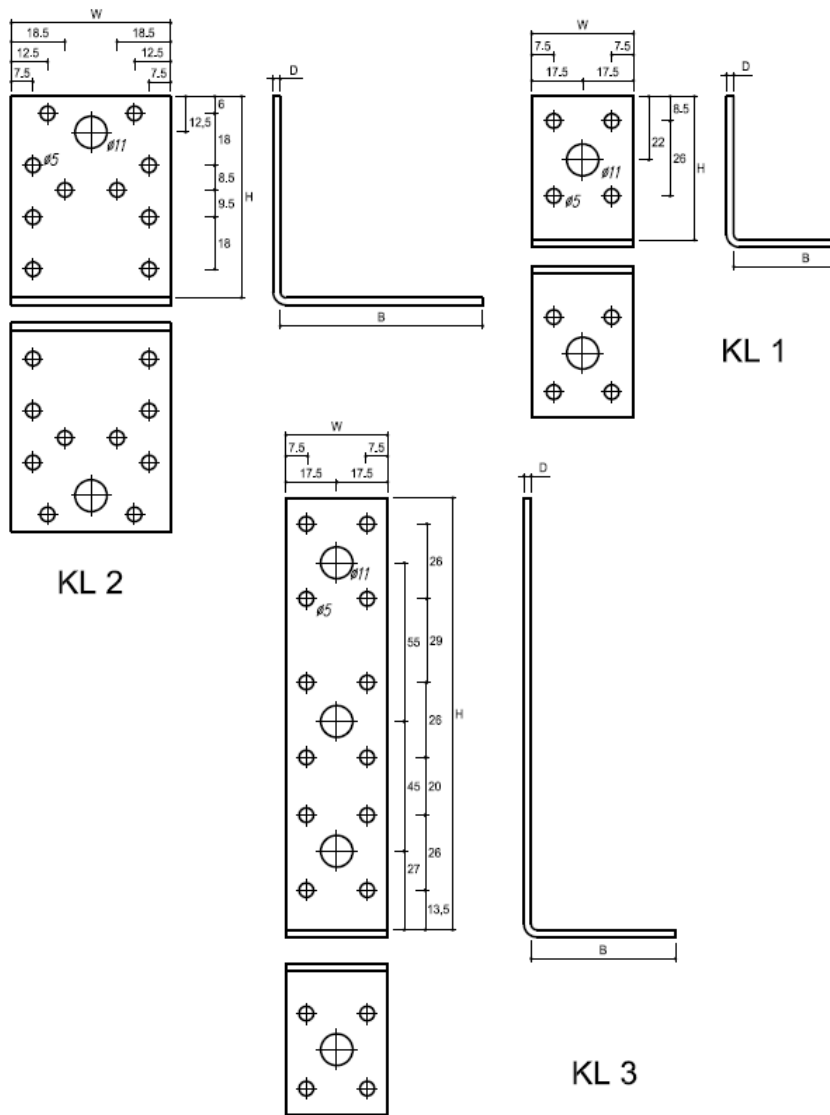


Table 7. DMX[®] type KL three-dimensional nailing plate symbols and dimensions

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

Range and dimensions of DMX[®] type KL 1, KL 2 and KL 3
 three-dimensional nailing plates

Annex 6
 of European
 Technical Approval
 ETA-07/0277

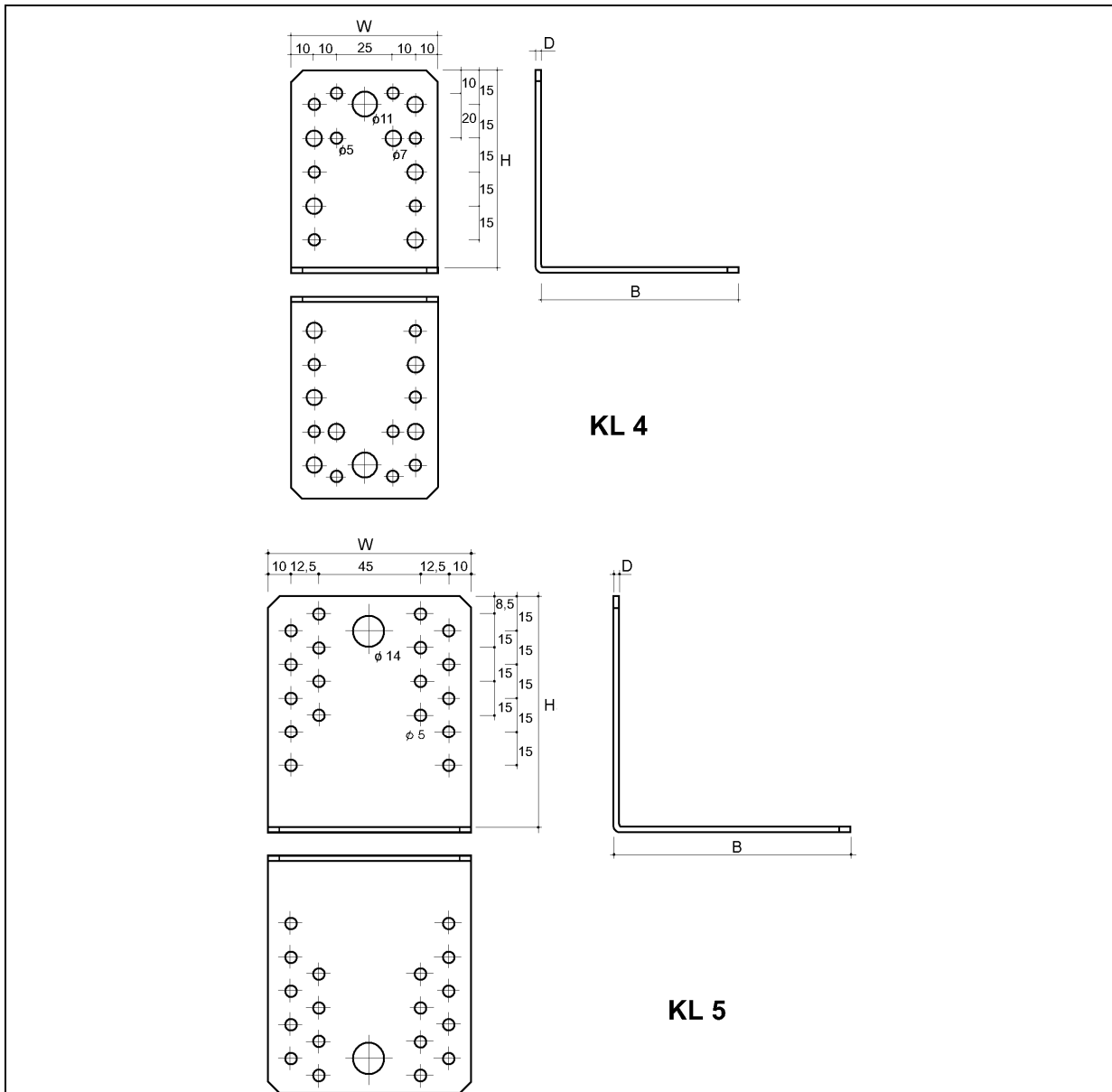


Table 8. DMX[®] type KL three-dimensional nailing plate symbols and dimensions

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 7 of European Technical Approval ETA-07/0277
Range and dimensions of DMX [®] type KL 4 and KL 5 three-dimensional nailing plates	

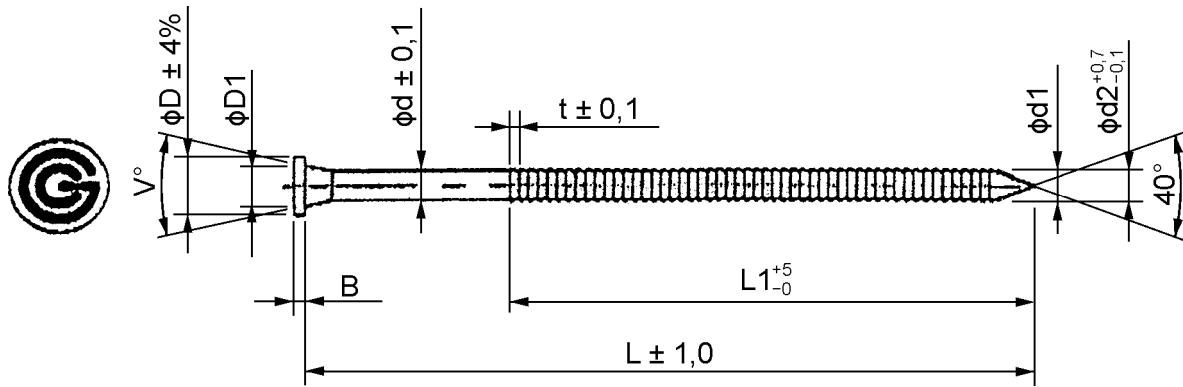


Table 9. ANCHOR (GUNNEBO ANKARSPIK) nail symbols and dimensions

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;
 $R_{m,min} = 600 \text{ N/mm}^2$.

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

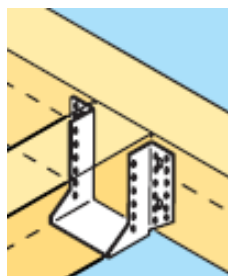
Steel sheet thickness, mm	Nail with the diameter d, mm	Depth of embedment, t_{pen}	Characteristic withdrawal capacity*, F_{ax}, R_k , kN
2,00	4,00	8d	1,55
2,50	4,00		

* Timber characteristic density $\rho_k \geq 350 \text{ kg/m}^3$

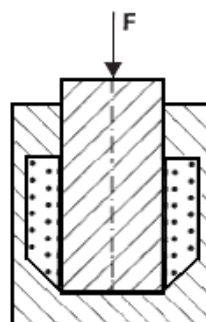
DMX® type WB, WBZ, KPL, KP and KL

ANCHOR (GUNNEBO ANKARSPIK) ring shank nails

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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 reference drawing*	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

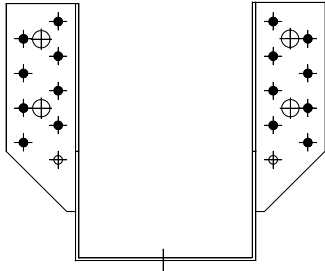
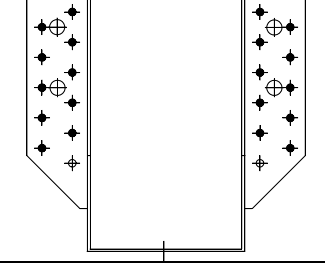
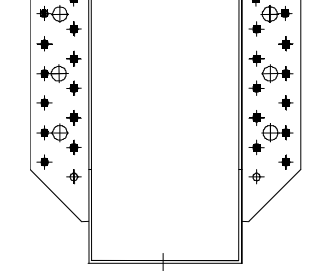
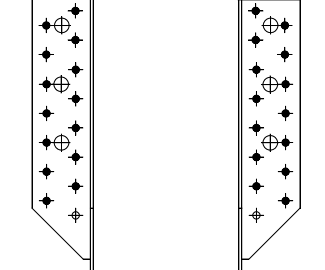
* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter $d \geq 4$ mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338.

DMX[®] type WB, WBZ, KPL, KP and KL

Characteristic load-carrying capacity of joints made with DMX[®] type WB three-dimensional nailing plates

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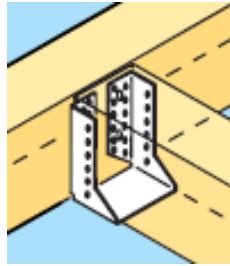
cont. Table 11

Template	DMX [®] symbol	Nailing reference drawing*	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 $d \geq 4$ mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338.			

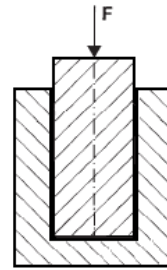
DMX[®] type WB, WBZ, KPL, KP and KL

Characteristic load-carrying capacity of joints made with DMX[®] type WB three-dimensional nailing plates

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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 reference drawing*	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 $d \geq 4$ mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338.			

DMX[®] type WB, WBZ, KPL, KP and KL

Characteristic load-carrying capacity of joints made with DMX[®] type WBZ three-dimensional nailing plates

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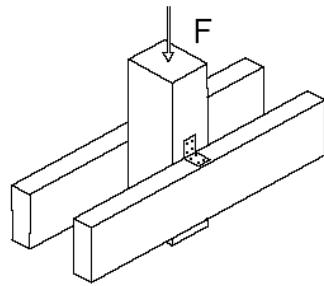
cont. Table 12

Template	DMX [®] symbol	Nailing reference drawing*	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.			

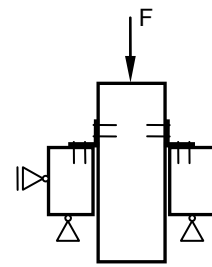
DMX[®] type WB, WBZ, KPL, KP and KL

Characteristic load-carrying capacity of joints made with DMX[®] type WBZ three-dimensional nailing plates

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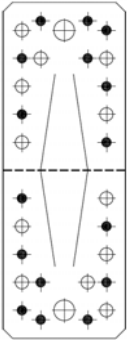
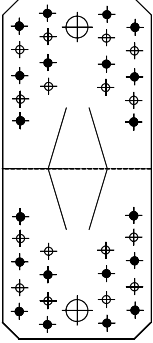


Reference joint diagram



Static diagram of load

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

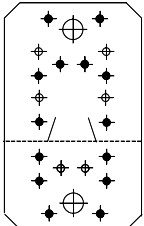
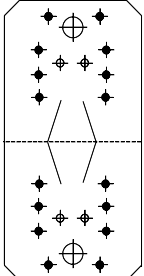
DMX [®] symbol	Nailing reference drawing*	Characteristic load-carrying capacity, R _k , kN
KP1 KPL1		17,80
KP2 KPL2		21,90
* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter $d \geq 4$ mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338.		

DMX[®] type WB, WBZ, KPL, KP and KL

Characteristic load-carrying capacity of joints made with DMX[®] type KP and KPL three-dimensional nailing plates

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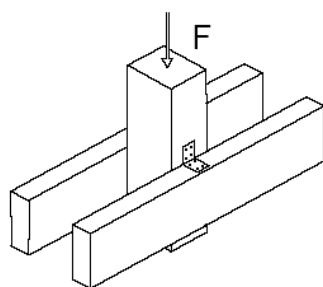
cont. Table 13

DMX [®] symbol	Nailing reference drawing*	Characteristic load-carrying capacity, R _k , kN
KP3 KPL3		14,35
KP4 KPL4		10,45
* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter $d \geq 4$ mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338.		

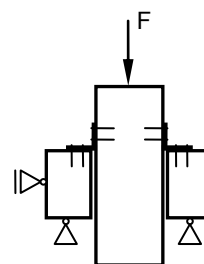
DMX[®] type WB, WBZ, KPL, KP and KL

Characteristic load-carrying capacity of joints made with DMX[®] type KP and KPL three-dimensional nailing plates

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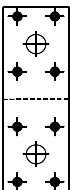
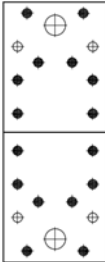


Reference joint diagram



Static diagram of load

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

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


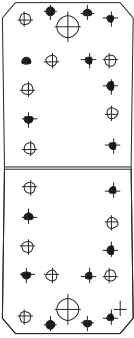
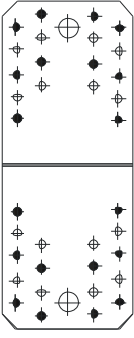
* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter $d \geq 4$ mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338.

DMX[®] type WB, WBZ, KPL, KP and KL

Characteristic load-carrying capacity of joints made with DMX[®] type KL three-dimensional nailing plates

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cont. Table 14

DMX [®] symbol	Nailing reference drawing*	Characteristic load-carrying capacity, R _k , kN
KL 3		14,90
KL4		17,80
KL5		21,90
<p>* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter $d \geq 4$ mm and the length ≥ 50 mm. Timber grade at least C24 according to EN 338.</p>		

DMX[®] type WB, WBZ, KPL, KP and KL

Characteristic load-carrying capacity of joints made with DMX[®] type KL three-dimensional nailing plates

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