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Member of



## European Technical Assessment

**ETA-07/0277  
of 13/11/2017**

### General Part

|   |  |
|---|--|
| <b>Technical Assessment Body issuing the European Technical Assessment</b>  | Instytut Techniki Budowlanej   |
| <b>Trade name of the construction product</b>   | DMX® type WB, WBZ, KPL, KP and KL  |
| <b>Product family to which the construction product belongs</b>   | Three-dimensional nailing plates   |
| <b>Manufacturer</b>   | DOMAX Sp. z o.o.<br>Al. Parku Krajobrazowego 109<br>PL 84-207 Koleczkowo, Łódź   |
| <b>Manufacturing plant</b>  | DOMAX Sp. z o.o.<br>Al. Parku Krajobrazowego 109<br>PL 84-207 Koleczkowo, Łódź   |
| <b>This European Technical Assessment contains</b>  | 21 pages including 2 Annexes which form an integral part of this Assessment  |
| <b>This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of</b> | Guideline for European Technical Approval ETAG 015, Edition November 2012 "Three-dimensional nailing plates", used as European Assessment Document (EAD) |
| <b>This version replaces</b>  | ETA-07/0277 issued on 14/11/2012   |

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## 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.

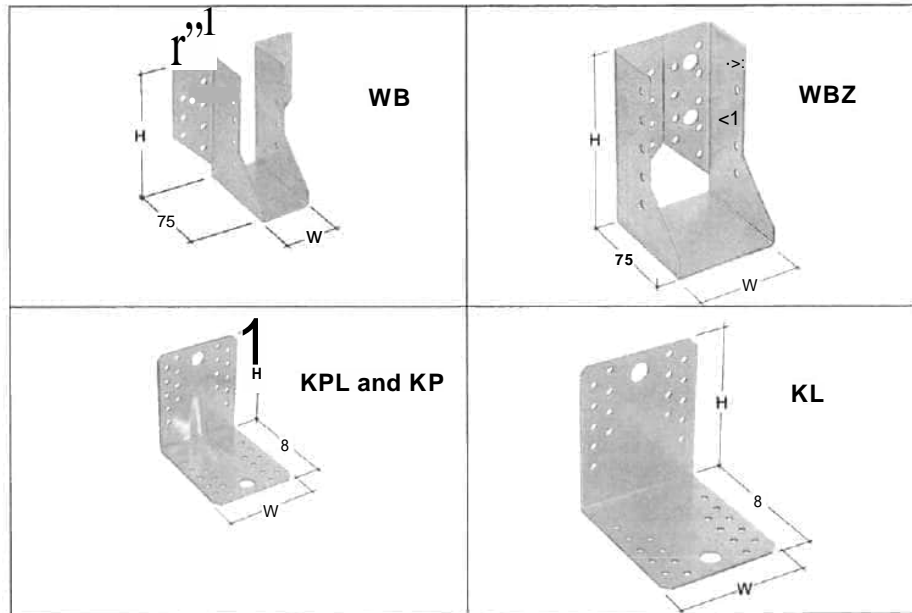
For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

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



Anna Panek, MSc

Deputy Director of ITB



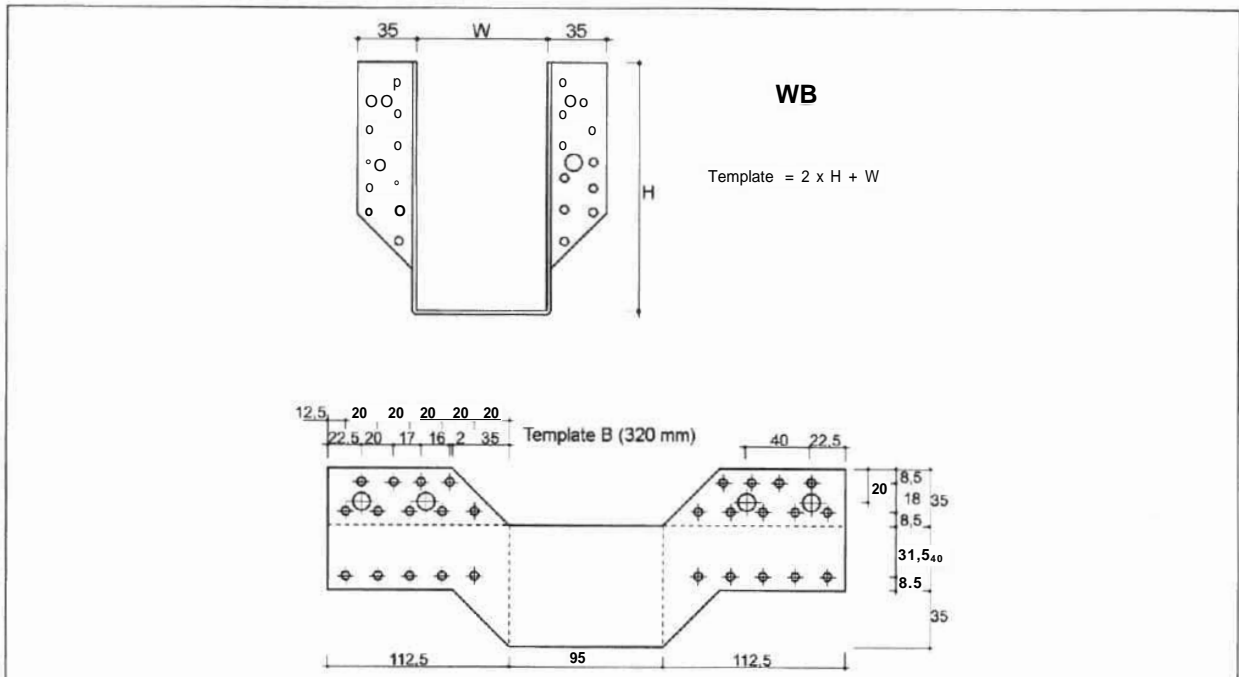
**Table 1. DMX® three-dimensional nailing plate types and dimensions**

| 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/m <sup>2</sup> |
|-----------|------------------|---------------|-----------------------------|-------------------------------------|
| 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           |                             |                                     |

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



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

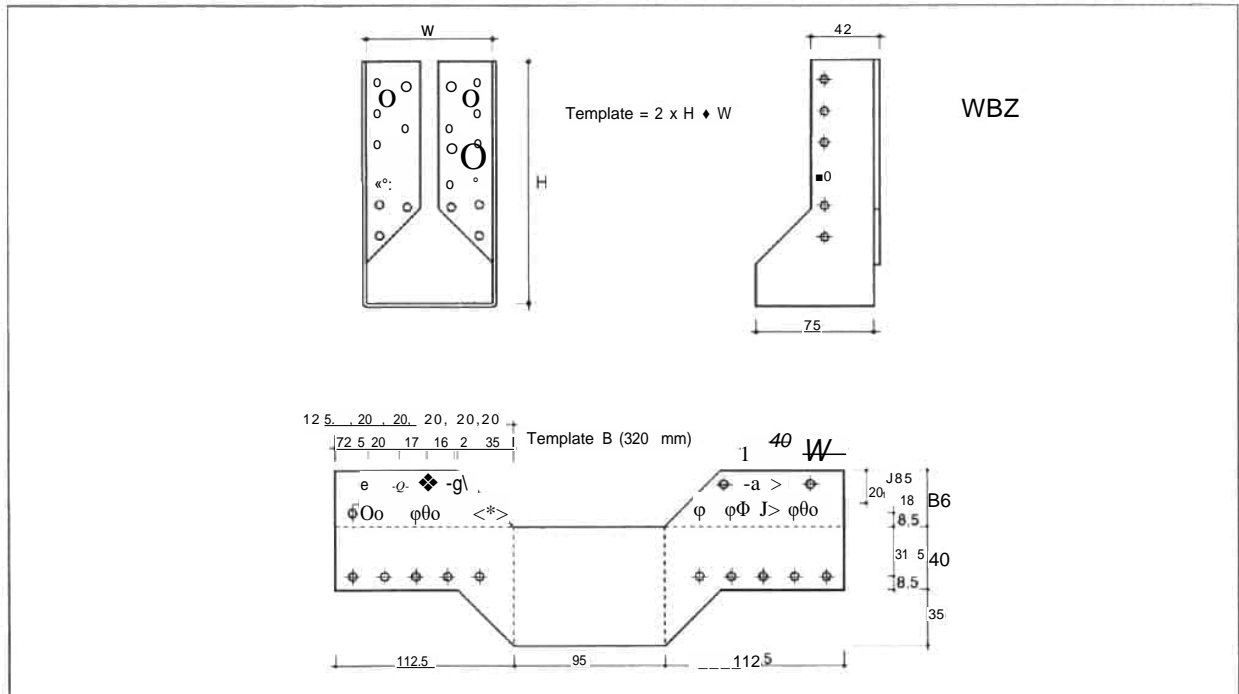
| DMX® Symbol | Dimensions, mm |     | Template | Number of holes |   | DMX® symbol | Dimensions, mm |     | Template | Number of holes |   |
|-------------|----------------|-----|----------|-----------------|---|-------------|----------------|-----|----------|-----------------|---|
|             | W              | H   |          | 0               | 5 |             | 0              | 11  |          | W               | H |
| WB 1        | 25             | 118 | A        | 22              | 2 | WB 20       | 64             | 128 | B        | 28              | 4 |
| WB2         | 38             | 111 | A        | 22              | 2 | WB21        | 70             | 125 | B        | 28              | 4 |
| WB3         | 38             | 141 | B        | 28              | 4 | WB22        | 70             | 155 | c        | 34              | 4 |
| WB4         | 38             | 171 | C        | 34              | 4 | WB23        | 76             | 122 | B        | 28              | 4 |
| WB5         | 41             | 110 | A        | 22              | 2 | WB 24       | 76             | 152 | C        | 34              | 4 |
| WB6         | 41             | 140 | B        | 28              | 4 | WB 25       | 76             | 182 | D        | 40              | 6 |
| WB7         | 41             | 170 | C        | 34              | 4 | WB 26       | 80             | 120 | B        | 28              | 4 |
| WB8         | 45             | 108 | A        | 22              | 2 | WB 27       | 80             | 150 | C        | 34              | 4 |
| WB9         | 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 | WB30        | 100            | 140 | C        | 34              | 4 |
| WB 12       | 51             | 165 | C        | 34              | 4 | WB31        | 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 | WB33        | 115            | 163 | D        | 40              | 6 |
| WB 15       | 60             | 130 | B        | 28              | 4 | WB34        | 115            | 193 | E        | 46              | 6 |
| WB 16       | 60             | 160 | C        | 34              | 4 | WB35        | 120            | 160 | □        | 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 | WB38        | 160            | 170 | E        | 46              | 6 |

**DMX® type WB, WBZ, KPL, KP and KL**

**Three-dimensional nailing plates DMX® WB**

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

| DMX* symbol | Dimensions, mm |     | Template | Number of holes |     |
|-------------|----------------|-----|----------|-----------------|-----|
|             | W              | H   |          | 05              | 011 |
| 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   |

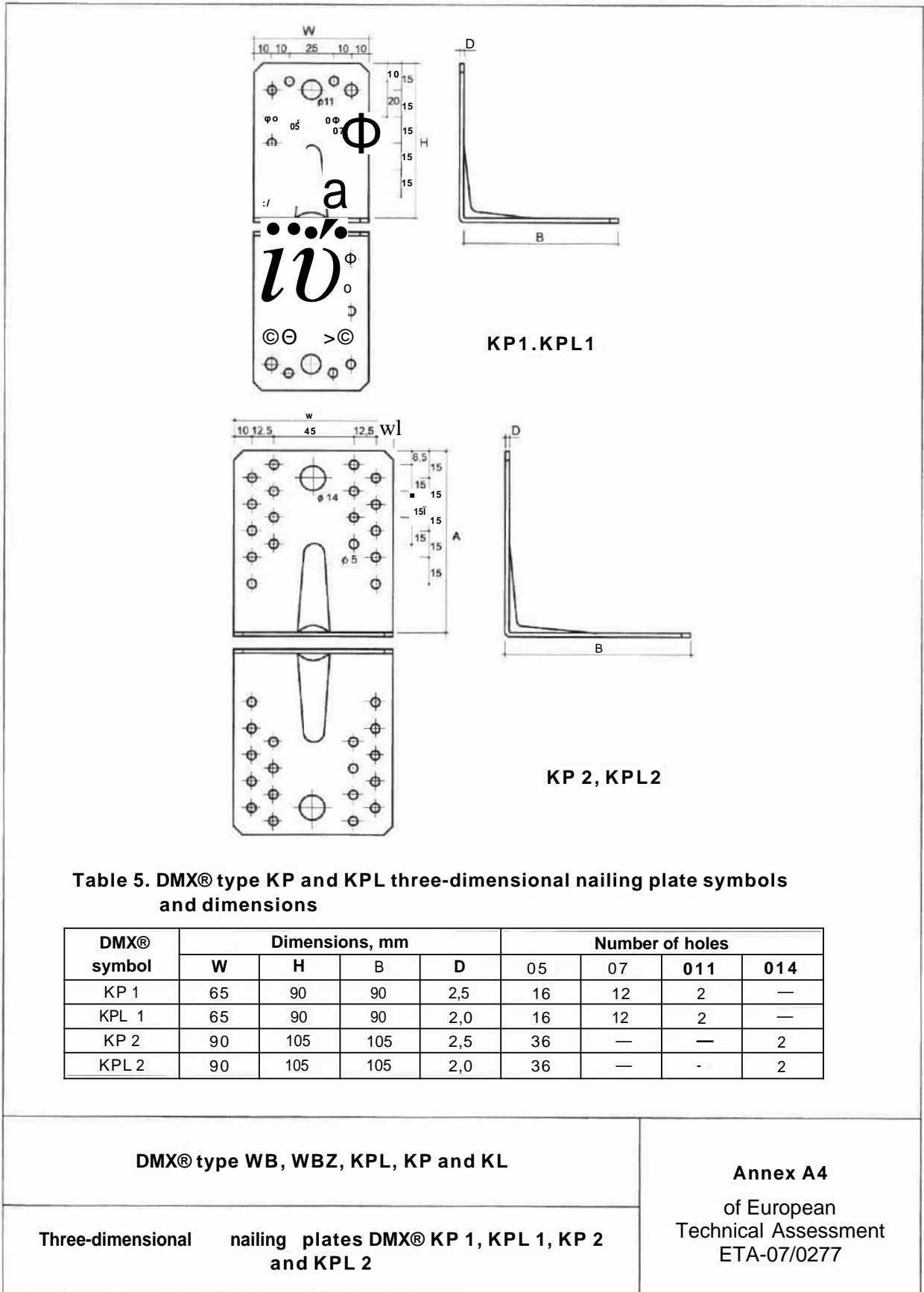
**DMX® type WB, WBZ, KPL, KP and KL**

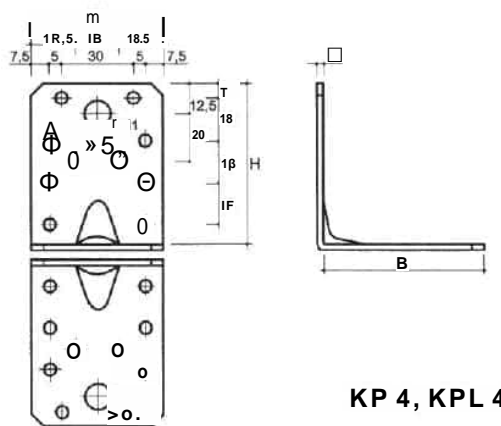
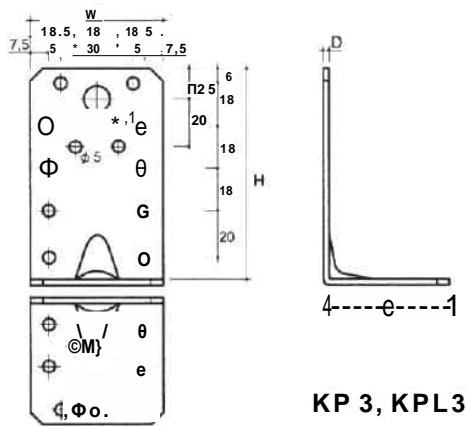
**Three-dimensional nailing plates DMX® WBZ**

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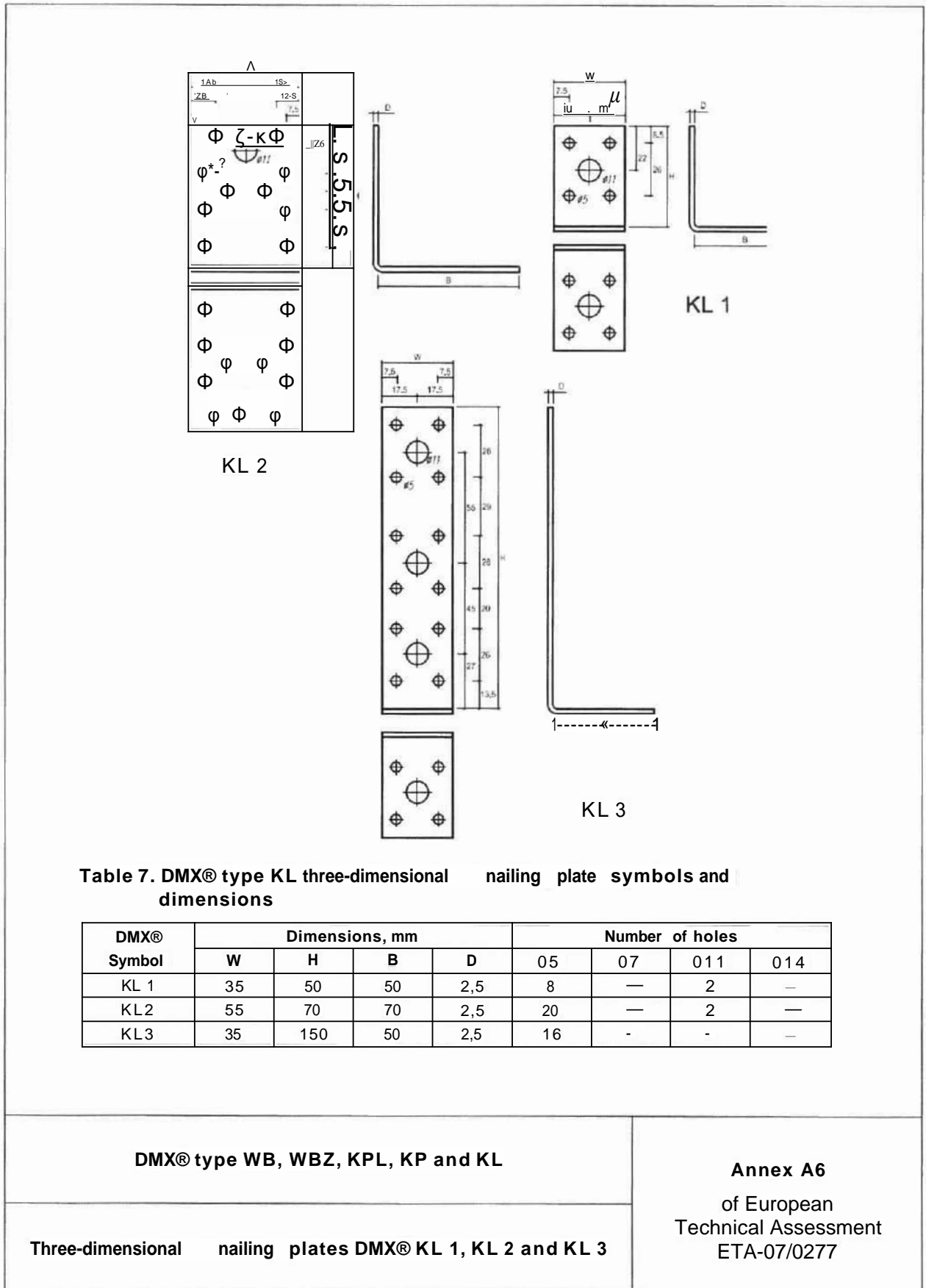
**Table 6. DMX® type KP and KPL three-dimensional nailing plate symbols and dimensions**

| DMX* symbol | Dimensions, mm |    |    |     | Number of holes |    |     |     |
|-------------|----------------|----|----|-----|-----------------|----|-----|-----|
|             | W              | H  | B  | D   | 05              | 07 | 011 | 014 |
| KP3         | 55             | 90 | 50 | 2,5 | 20              | —  | 2   | —   |
| KPL 3       | 55             | 90 | 50 | 2,0 | 20              | —  | 2   | —   |
| KP4         | 55             | 70 | 70 | 2,5 | 20              | -  | 2   | -   |
| KPL 4       | 55             | 70 | 70 | 2,0 | 20              | -  | 2   | —   |

**DMX® type WB, WBZ, KPL, KP and KL**

**Three-dimensional nailing plates DMX® KP 3, KPL 3, KP 4 and KPL 4**

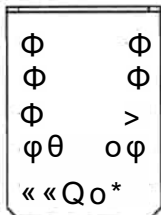
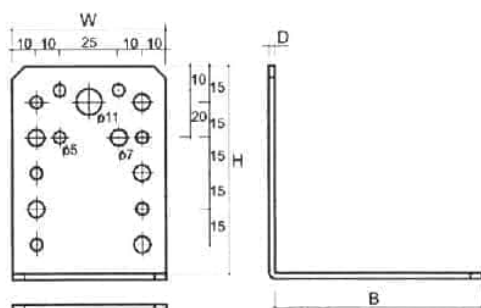
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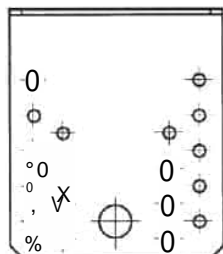
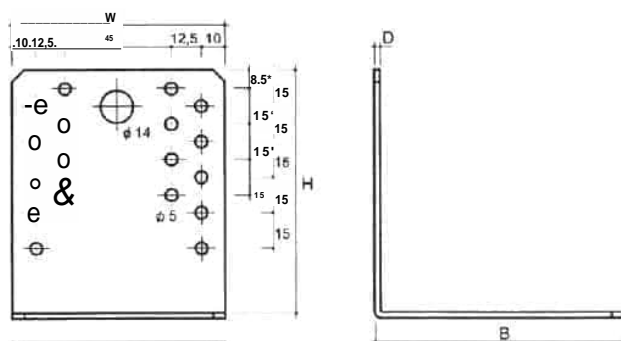
DMX® type WB, WBZ, KPL, KP and KL

Three-dimensional nailing plates DMX® KL 1, KL 2 and KL 3

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KL4



KL5

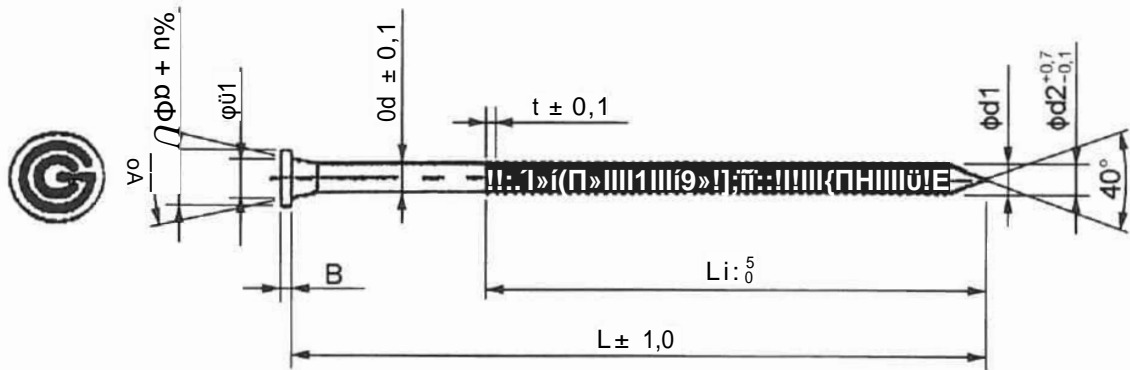
Table 8. DMX® type KL three-dimensional nailing plate symbols and dimensions

| DMX® symbol | Dimensions, mm |     |     |     | Number of holes |    |     |     |
|-------------|----------------|-----|-----|-----|-----------------|----|-----|-----|
|             | W              | H   | B   | D   | 05              | 07 | 011 | 014 |
| KL4         | 65             | 90  | 90  | 2,5 | 16              | 12 | 2   | —   |
| KL5         | 90             | 105 | 105 | 2,5 | 36              | -  | -   | 2   |

DMX® type WB, WBZ, KPL, KP and KL

Three-dimensional nailing plates DMX® KL 4 and KL 5

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

| Symbol,<br>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 1-5-4; Rm,mm- 600 N/mm<sup>2</sup>.

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

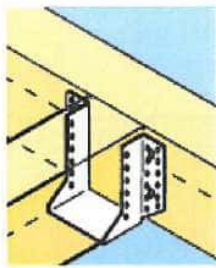
| Steel sheet thickness, mm | Nail with the diameter d, mm | Depth of embedment, tpen | Characteristic withdrawal capacity*, Fax,Rk, kN |
|---------------------------|------------------------------|--------------------------|---|
| 2,00                      | 4,00                         | 8d                       | 1,55  |
| 2,50                      | 4,00                         |                          |   |

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

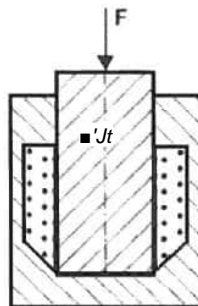
DMX® type WB, WBZ, KPL, KP and KL

**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* |                          | Characteristic load-carrying capacity, Rk.kN |
|----------|--|-----------------------|----------|--------------------------|--|
| A        | WB1<br>WB2<br>WB5<br>WB8<br>WB10<br>WB14<br>WB19 | 4Φ*<br>k *            |          | *Φ4<br>*<br>A<br>*:<br>Φ | 17,05  |
| A        | WB1<br>WB2<br>WB5<br>WB8<br>WB10<br>WB14<br>WB19 | ⊕<br>♦<br>♦<br>♦<br>♦ |          | ><br>4 ♦<br>4/ 4         | 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

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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**Table 11**

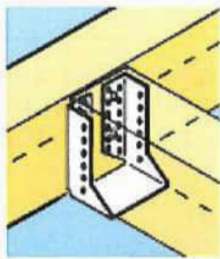
| Template  | DMX® symbol   | Nailing* |  | Characteristic load-carrying capacity, Rk.kN |
|---|---|----------|--|--|
| <b>B</b>  | WB3<br>WB6<br>WB9<br>WB11<br>WB15<br>WB20<br>WB21<br>WB23<br>WB26 |          |  | 20,30  |
| <b>C</b>  | WB4<br>WB7<br>WB12<br>WB16<br>WB22<br>WB24<br>WB27<br>WB30        |          |  | 25,45  |
| <b>D</b>  | WB13<br>WB17<br>WB25<br>WB28<br>WB31<br>WB33<br>WB35              |          |  | 27,75  |
| <b>E</b>  | WB18<br>WB29<br>WB32<br>WB34<br>WB36<br>WB37<br>WB38              |          |  | 32,30  |
| * Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter $d > 4$ mm and the length $l \geq 50$ mm. Timber grade at least C24 according to EN 338 |   |          |  |  |

**DMX® type WB, WBZ, KPL, KP and KL**

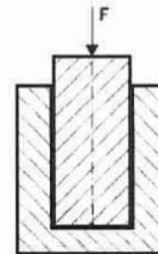
**Characteristic load-carrying capacity of joints made with DMX® type WB three-dimensional nailing plates**

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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* |                          |                           |   | Characteristic load-carrying capacity, Rk.kN |
|--|-------------------------------|----------|--------------------------|---------------------------|---|--|
| B                                      | WBZ21<br>WBZ23<br>WBZ26       |          | -4<br>◆<br>* ><br>4<br>" | ◆<br>ψ<br>· *<br>4 J<br>4 | 12,75   |  |
| B                                      | WBZ21<br>WBZ23<br>WBZ26       |          | ><br>◆<br>-φ<br>4 4-     | ◆ <<br>* *<br>-φ-<br>◆    | 17,15   |  |
| <sup>ft</sup> Ring shank<br>the length | nails ANCH<br>> 50 mm. Timber | R (GUR)  | NEBO<br>e at least       | NARSPI<br>t C<br>4 acco   | ) with the diameter d > 4 mm and<br>ing 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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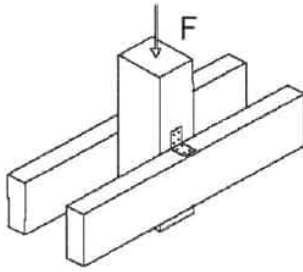
**Table 12**

| Template   | DMX® symbol                               | Nailing* | Characteristic load-carrying capacity, R <sub>k</sub> , kN |
|--|---|----------|--|
| C  | WBZ22<br>WBZ24<br>WBZ27<br>WBZ30          |          | 22,35  |
| C  | WBZ22<br>WBZ24<br>WBZ27<br>WBZ30          |          | 23,65  |
| D  | WBZ25<br>WBZ28<br>WBZ31<br>WBZ33<br>WBZ35 |          | 30,95  |
| E  | WBZ29<br>WBZ32<br>WBZ34<br>WBZ36<br>WBZ37 |          | 28,65  |
| * Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter d i 4 mm and the length > 50 mm. Timber grade at least C24 according to EN 338 |   |          |  |

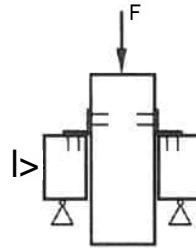
DMX® type WB, WBZ, KPL, KP and KL

**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**


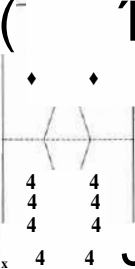
| DMX* symbol  | Nailing* | Characteristic load-carrying capacity, Rk.kN |
|--|----------|--|
| KP1<br>KPL1  |          | 17,80  |
| KP2<br>KPL2  |          | 21,90  |
| * Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter $d > 4$ mm and the length $> 50$ mm. Timber grade at least C24 according to EN 338 |          |  |

**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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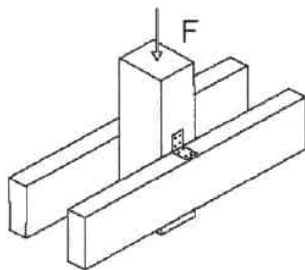
**Table 13**

| DMX® symbol  | Nailing*   | Characteristic load-carrying capacity, R <sub>k</sub> ,kN |
|--|--|---|
| KP3<br>KPL3  |   | 14,35   |
| KP4<br>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 |  |   |

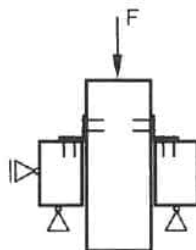
**DMX® type WB, WBZ, KPL, KP and KL**

**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* | Characteristic load-carrying capacity, Rk.kN |
|---|----------|--|
| KL1   |          | 6,85   |
| KL2   |          | 10,95  |
| <p>* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter <math>d &gt; 4</math> mm and the length <math>&gt; 50</math> 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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**Table 14**

| DMX® symbol   | Nailing* | Characteristic load-carrying capacity, Rk, kN |
|---|----------|---|
| KL3   |          | 14,90   |
| KL4   |          | 17,80   |
| KL5   |          | 21,90   |
| <p>* Ring shank nails ANCHOR (GUNNEBO ANKARSPIK) with the diameter <math>d &gt; 4</math> mm and the length <math>&gt; 50</math> 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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