INSTYTUT TECHNIKI BUDOWLANEJ
PL 00-611 WARSZAWA
ul. Filtrowa 1
tel.: (+48 22) 825-04-71
(+48 22) 825-76-55
fax: (+48 22) 825-52-86
www.itb.pl

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

Member of EOTA
www.eota.eu

European Technical Assessment

ETA-12/0523 of 28/09/2018

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	KOELNER
Product family to which the construction product belongs	Three-dimensional nailing plates
Manufacturer	RAWLPLUG S.A. ul. Kwidzyńska 6 51-416 Wrocław, Poland
Manufacturing plant	Manufacturing Plant no. 19
This European Technical Assessment contains	39 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-12/0523 issued on 20/12/2017

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 KOELNER are one-piece, non-welded elements (except D-TC nailing plate), made of galvanized steel sheet grade DX51D+Z275 according to EN 10346.

The range of the KOELNER 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 KOELNER three-dimensional nailing plates are intended to be used for connecting the mutually perpendicular, load-bearing, solid timber elements, in side-grain to side grain 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 according to EN 14592 with the diameter of 4 mm and characteristic tensile capacity $F_{ax,Rk}$ not less than 1,77 kN shall be used for connections made with the KOELNER three-dimensional nailing plates.

In respect of the requirements concerning corrosion resistance, KOELNER 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 KOELNER 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 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

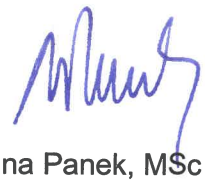
According to the Decision 97/638/EC of the European Commission the system 2+ of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) applies.

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 28/09/2018 by Instytut Techniki Budowlanej



Anna Panek, MSc

Deputy Director of ITB

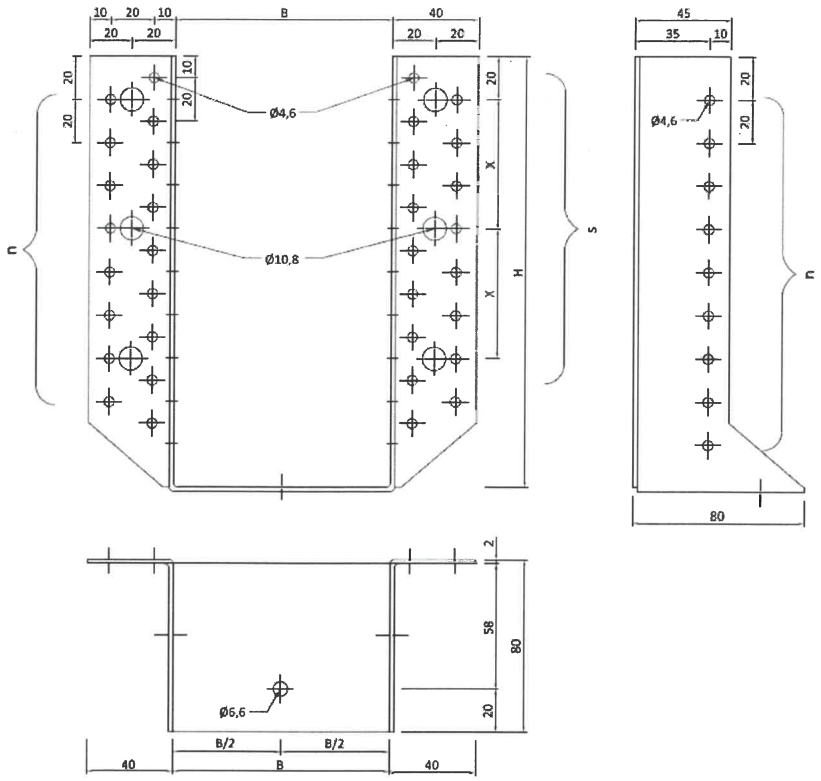


Table 1. KOELNER D-WB three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions		Thickness, mm	Number of holes in row n	Number of holes ϕ 4,6	Dimension X, mm	Number of holes ϕ 10,8 s
	B, mm	H, mm					
D-WB-411	40	110	2,0	4	2 × 7 + 2 × 4	—	2 × 1
D-WB-510	50	105		4	2 × 7 + 2 × 4	—	2 × 1
D-WB-516	50	165		7	2 × 13 + 2 × 7	2 × 50	2 × 3
D-WB-610	60	100		4	2 × 7 + 2 × 4	—	2 × 1
D-WB-613	60	130		5	2 × 9 + 2 × 5	1 × 50	2 × 2
D-WB-712	70	125		5	2 × 9 + 2 × 5	1 × 50	2 × 2
D-WB-812	80	120		5	2 × 9 + 2 × 5	1 × 50	2 × 2
D-WB-815	80	150		6	2 × 11 + 2 × 6	1 × 60	2 × 2
D-WB-818	80	180		8	2 × 15 + 2 × 8	2 × 60	2 × 3
D-WB-914	90	145		6	2 × 11 + 2 × 6	2 × 60	2 × 2
D-WB-1014	100	140		6	2 × 11 + 2 × 5	1 × 60	2 × 2
D-WB-1020	100	200		9	2 × 17 + 2 × 9	2 × 60	2 × 3

KOELNER	**Annex A1** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-WB	

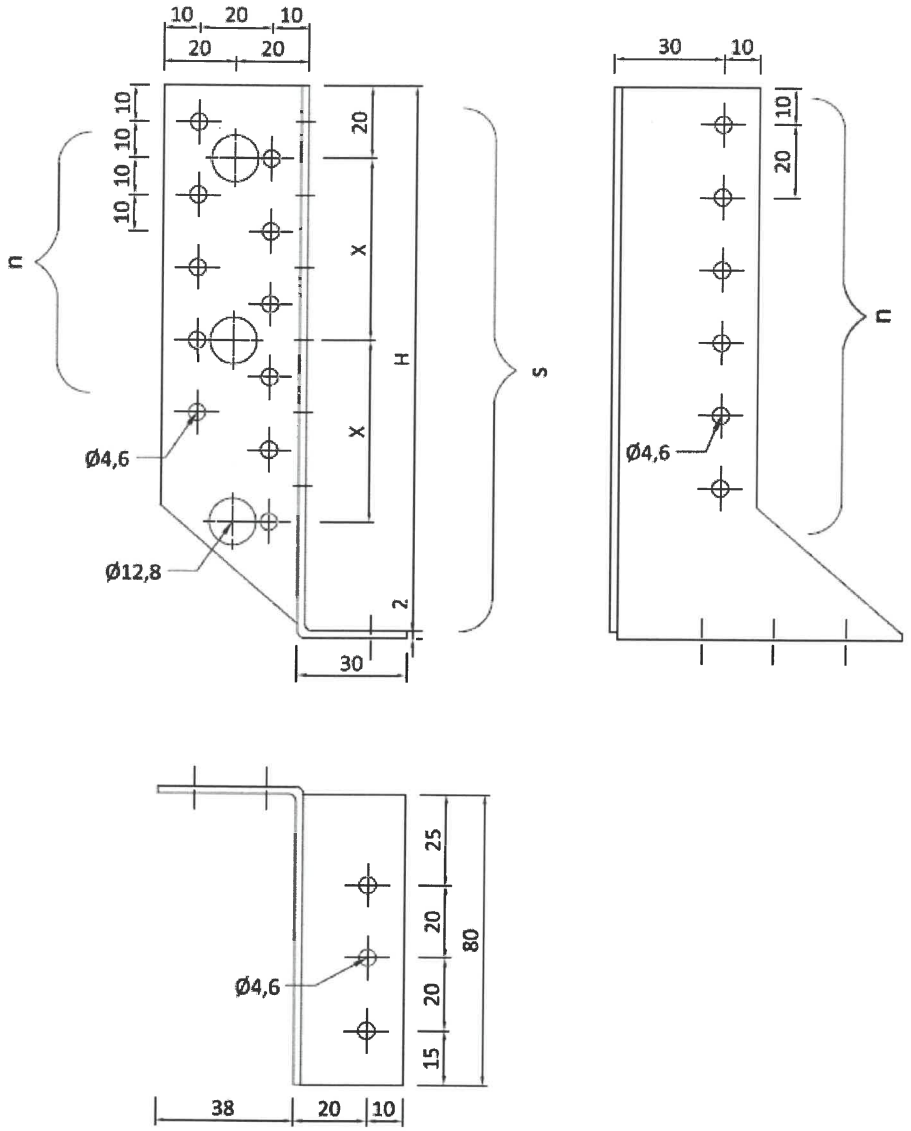


Table 2. KOELNER D-WD three-dimensional nailing plate symbols and dimensions

Symbol	Dimension H mm	Thickness, mm	Number of holes ϕ 4,6 n	Dimension X mm	Number of holes ϕ 12,8 s
D-WD-310	100	2,0	7 + 4	—	1
D-WD-312	120		9 + 5	1 × 50	2
D-WD-315	105		11 + 6	2 × 60	3

KOELNER	**Annex A2** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-WD	

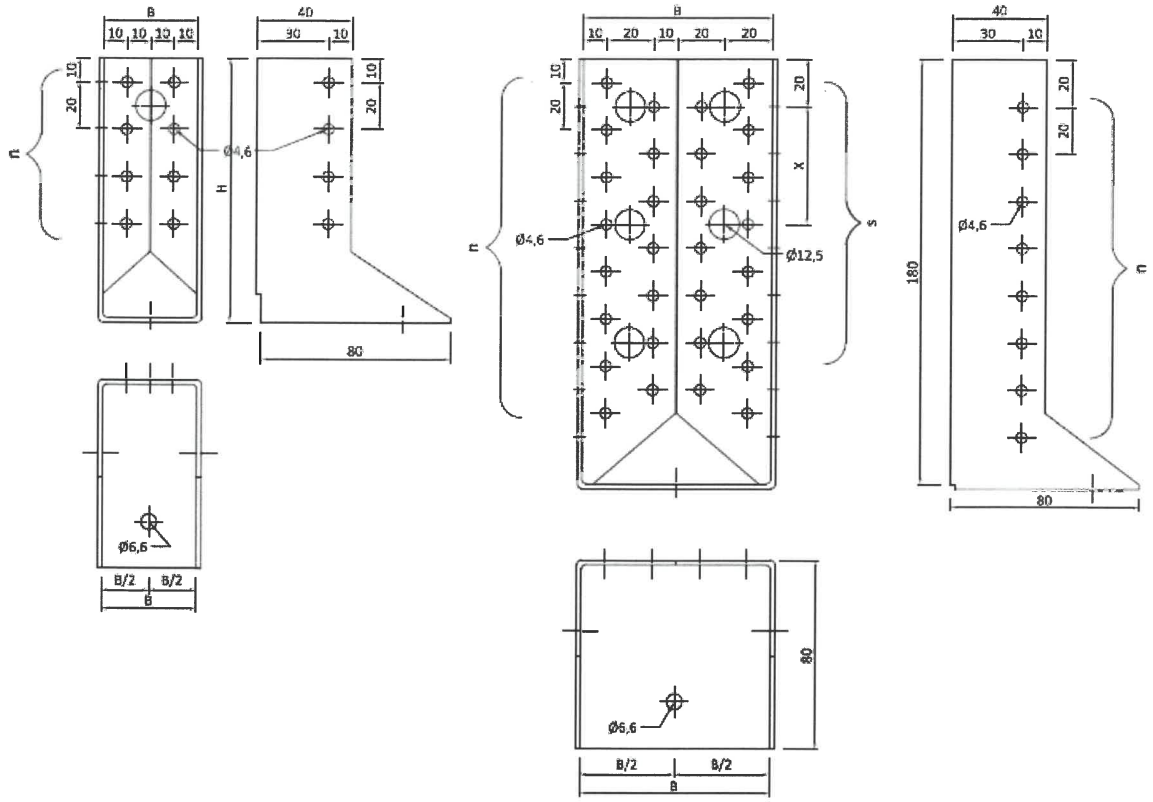


Table 3. KOELNER D-WC three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions		Thickness, mm	Number of holes ϕ 4,6 n	Dimension X mm	Number of holes ϕ 12,8 s
	B, mm	H, mm				
D-WC-411	40	110	2,0	2 × 4 + 2 × 4	—	—
D-WC-510	50	105		2 × 4 + 2 × 4	—	—
D-WC-610	60	100		2 × 4 + 2 × 4	—	—
D-WC-712	70	125		2 × 5 + 2 × 5	—	—
D-WC-812	80	120		2 × 9 + 2 × 5	1 × 50	2 × 2
D-WC-815	80	150		2 × 11 + 2 × 6	1 × 60	2 × 2
D-WC-818	80	180		2 × 15 + 2 × 8	2 × 50	2 × 3
D-WC-914	90	145		2 × 11 + 2 × 6	1 × 60	2 × 2
D-WC-1014	100	140		2 × 11 + 2 × 5	1 × 60	2 × 2

KOELNER	**Annex A3** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-WC	

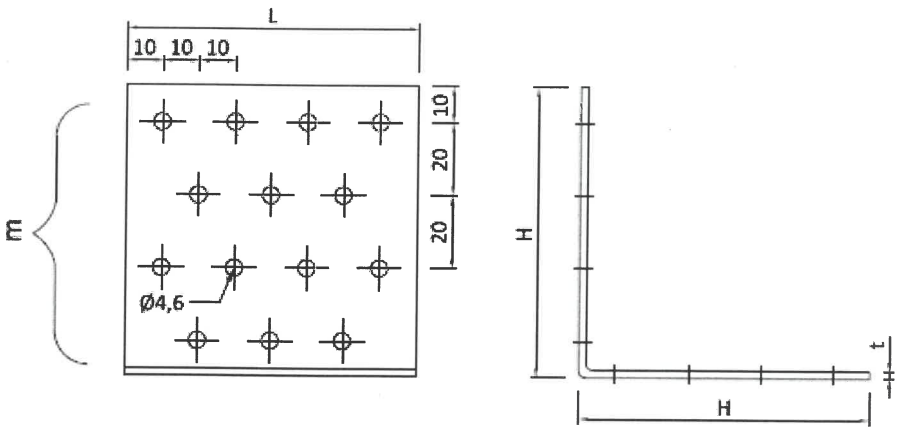


Table 4. KOELNER D-KF and D-KP three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions H × H, mm	Dimensions L, mm	Thickness t, mm	Number of row, m	Number of holes ϕ 4,6 n
D-KF-444	40 × 40	40	2,0	2	2 × 3
D-KF-446	40 × 40	60		2	2 × 5
D-KF-448	40 × 40	80		2	2 × 7
D-KF-4410	40 × 40	100		2	2 × 9
D-KF-4415	40 × 40	150		2	2 × 15
D-KF-664	60 × 60	40		3	2 × 5
D-KF-665	60 × 60	50		3	2 × 8
D-KF-666	60 × 60	60		3	2 × 8
D-KF-668	60 × 60	80		3	2 × 11
D-KF-884	80 × 80	40		4	2 × 6
D-KF-886	80 × 80	60		4	2 × 10
D-KF-888	80 × 80	80		4	2 × 14
D-KF-114	100 × 100	40		5	2 × 8
D-KF-116	100 × 100	60		5	2 × 13
D-KF-118	100 × 100	80		5	2 × 18
D-KF-1110	100 × 100	100		5	2 × 23
D-KF-1112	100 × 100	120		5	2 × 28
D-KF-1114	100 × 100	140		5	2 × 33
D-KP-444	40 × 40	40	2,5	2	2 × 3
D-KP-446	40 × 40	60		2	2 × 5
D-KP-448	40 × 40	80		2	2 × 7
D-KP-4410	40 × 40	100		2	2 × 9
D-KP-4415	40 × 40	150		2	2 × 15
D-KP-664	60 × 60	40		3	2 × 5
D-KP-665	60 × 60	50		3	2 × 8
D-KP-666	60 × 60	60		3	2 × 8
D-KP-668	60 × 60	80		3	2 × 11
D-KP-6610	60 × 60	100		3	2 × 14
D-KP-884	80 × 80	40		4	2 × 6
D-KP-886	80 × 80	60		4	2 × 10
D-KP-888	80 × 80	80		4	2 × 14
D-KP-8810	80 × 80	100		4	2 × 18
D-KP-8812	80 × 80	120		4	2 × 22
D-KP-114	100 × 100	40		5	2 × 8
D-KP-116	100 × 100	60		5	2 × 13
D-KP-118	100 × 100	80		5	2 × 18
D-KP-1110	100 × 100	100		5	2 × 23
D-KP-1112	100 × 100	120		5	2 × 28
D-KP-1114	100 × 100	140		5	2 × 33

KOELNER	**Annex A4** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-KF and D-KP	

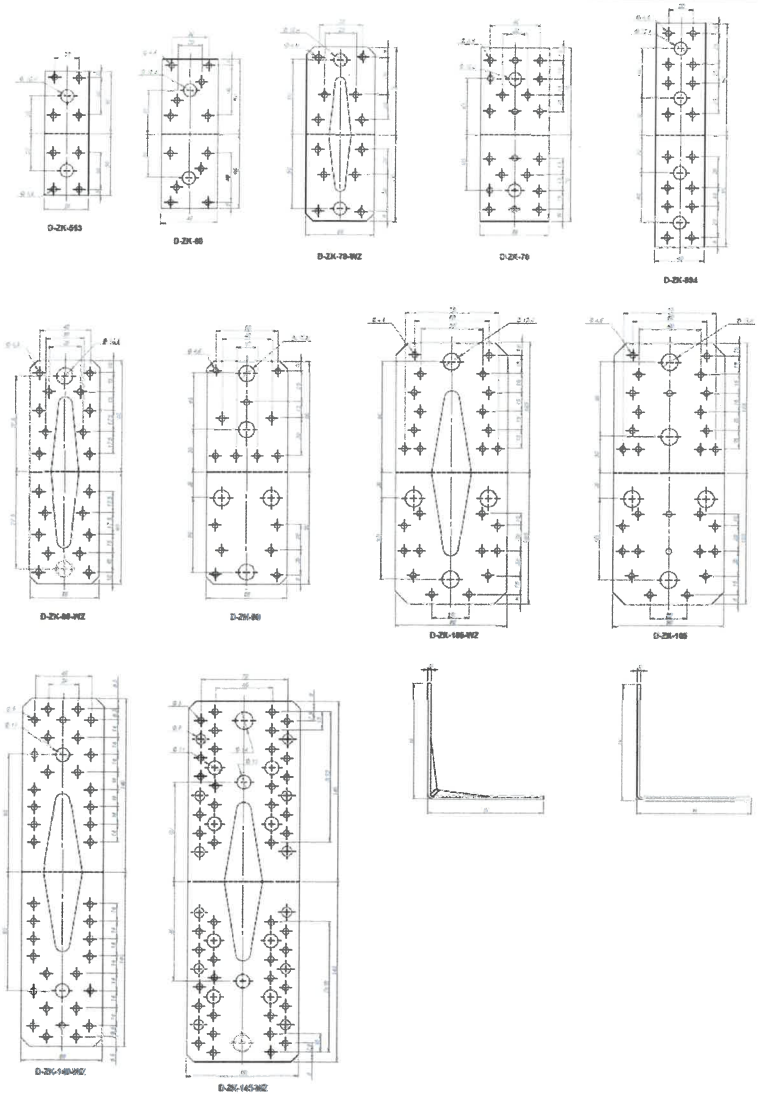
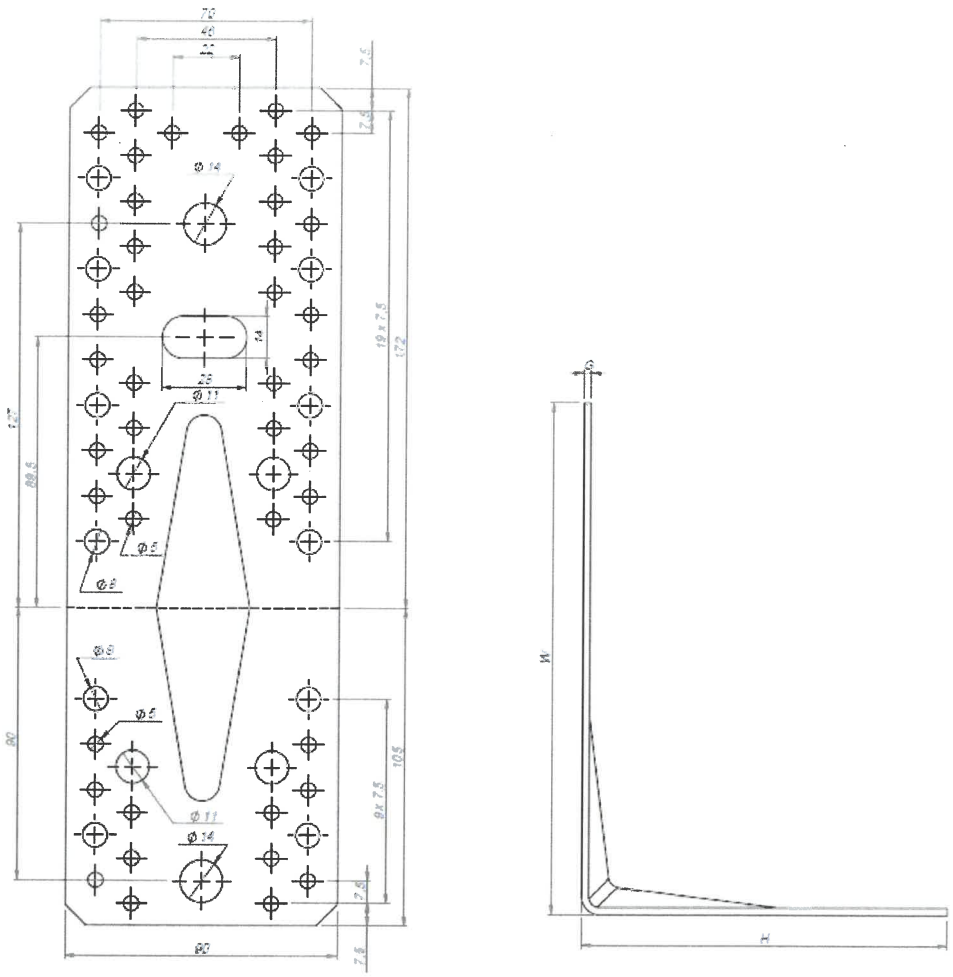


Table 5. KOELNER D-ZK three-dimensional nailing plate symbols and dimensions

Symbol	H x H, mm	G, mm	Number of holes							
			Ø4,6	Ø5	Ø8	Ø10,4	Ø11	Ø12,8	Ø13,4	Ø14
D-ZK-553	50 x 50	2,5	4+4	-		1+1	-	-	-	-
D-ZK-70	70 x 70		10+10	-		1+1	-	-	-	-
D-ZK-90	90 x 90		9+6	-		-	-	2+3	-	-
D-ZK-60	60 x 60		6+6	-		1+1	-	-	-	-
D-ZK-994	90 x 90		8+8	-		2+2	-	-	-	-
D-ZK-105	105 x 105		15+14	-		-	-	-	2+3	-
D-ZK-70-WZ	70 x 70		6+6	-		1+1	-	-	-	-
D-ZK-90-WZ	90 x 90		10+10	-		-	1+1	1+1	-	-
D-ZK-140-WZ	140 x 140		-	19 + 19		-	-	-	-	-
D-ZK-145-WZ	145 x 145		-	22 + 22	6 + 6	-	-	-	-	1+1
D-ZK-105-WZ	105 x 105		14+12	-		-	-	-	1+3	-

KOELNER	**Annex A5** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-ZK	



D-ZK-1719-WZ

Table 6. KOELNER D-ZK three-dimensional nailing plate symbols and dimensions

Symbol	H x H, mm	G, mm	Number of holes			
			Ø5	Ø8	Ø11	Ø14
D-ZK-1719-WZ	105 x 172	3,0	28 + 12	8 + 4	2+2	1+1

KOELNER	**Annex A6** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-ZK	

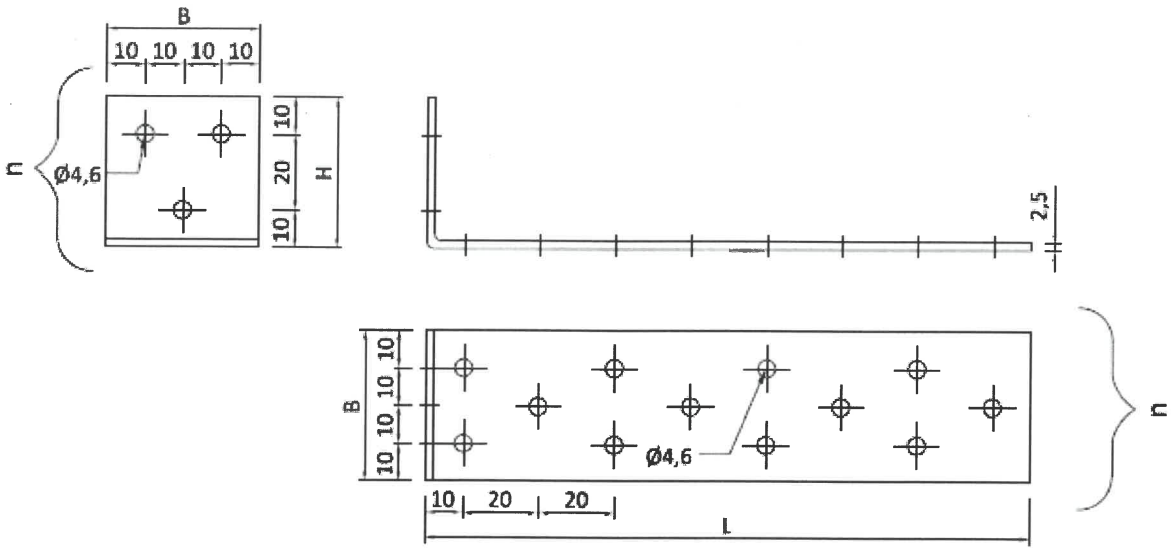


Table 7. KOELNER D-ZN three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions			Thickness, mm	Number of holes, ϕ 4,6
	H, mm	L, mm	B, mm		
D-ZN-4164	40	160	40	2,5	3 + 12
D-ZN-4124	40	120	40		3 + 9
D-ZN-4904	40	90	40		3 + 9
D-ZN-5905	50	90	50		5 + 10
D-ZN-6356	60	35	60		8 + 8
D-ZN-6906	60	90	60		8 + 12
D-ZN-8604	80	60	40		6 + 5
D-ZN-9124	90	120	40		8 + 9

KOELNER	**Annex A7** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-ZN	

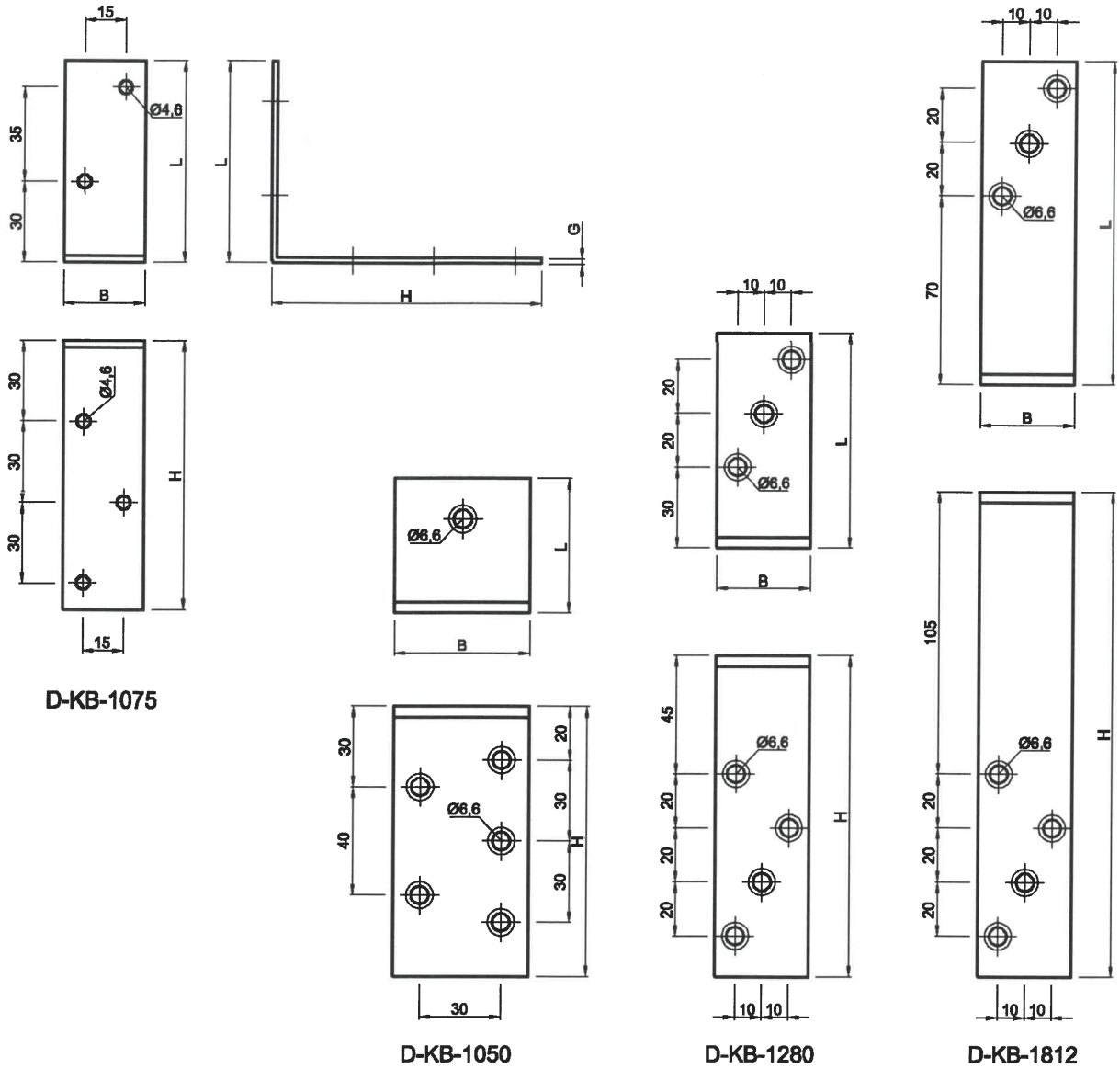
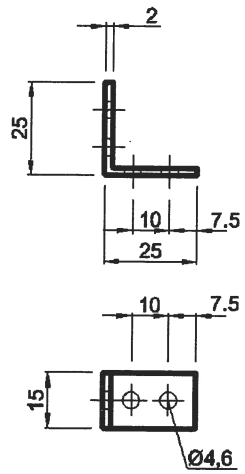


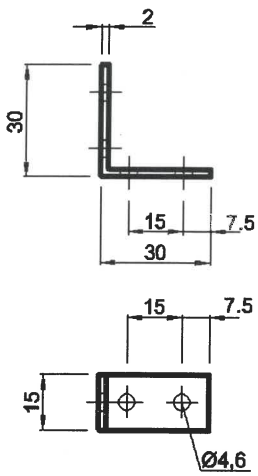
Table 8. KOELNER D-KB three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions H × B × L, mm	Thickness, mm	Number of holes ϕ 4,6	Number of holes ϕ 6,6
D-KB-1075	100 × 75 × 30	2,5	3 + 2	—
D-KB-1050	100 × 50 × 50	4,0	—	5 + 1
D-KB-1280	120 × 80 × 35		—	4 + 3
D-KB-1812	180 × 120 × 40	5,0	—	4 + 3

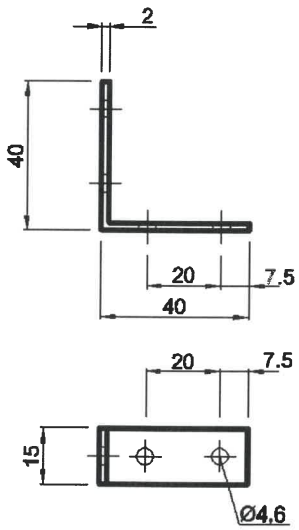
KOELNER	Annex A8 of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-KB	



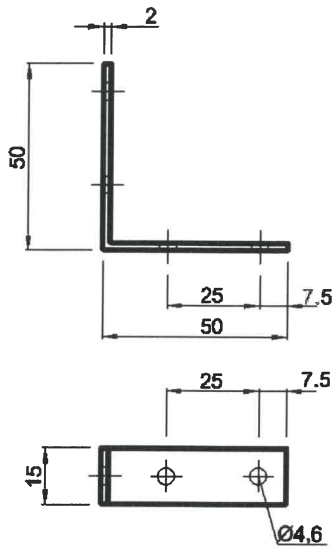
D-MI-2215



D-MI-3315



D-MI-4415



D-MI-5515

Table 9. KOELNER D-MI three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions		Thickness, mm	Number of holes ϕ 4,6
	H × H, mm	L, mm		
D-MI-2215	25 × 25	15	2,0	2 × 2
D-MI-3315	30 × 30			
D-MI-4415	40 × 40			
D-MI-5515	50 × 50			

KOELNER	**Annex A9** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-MI	

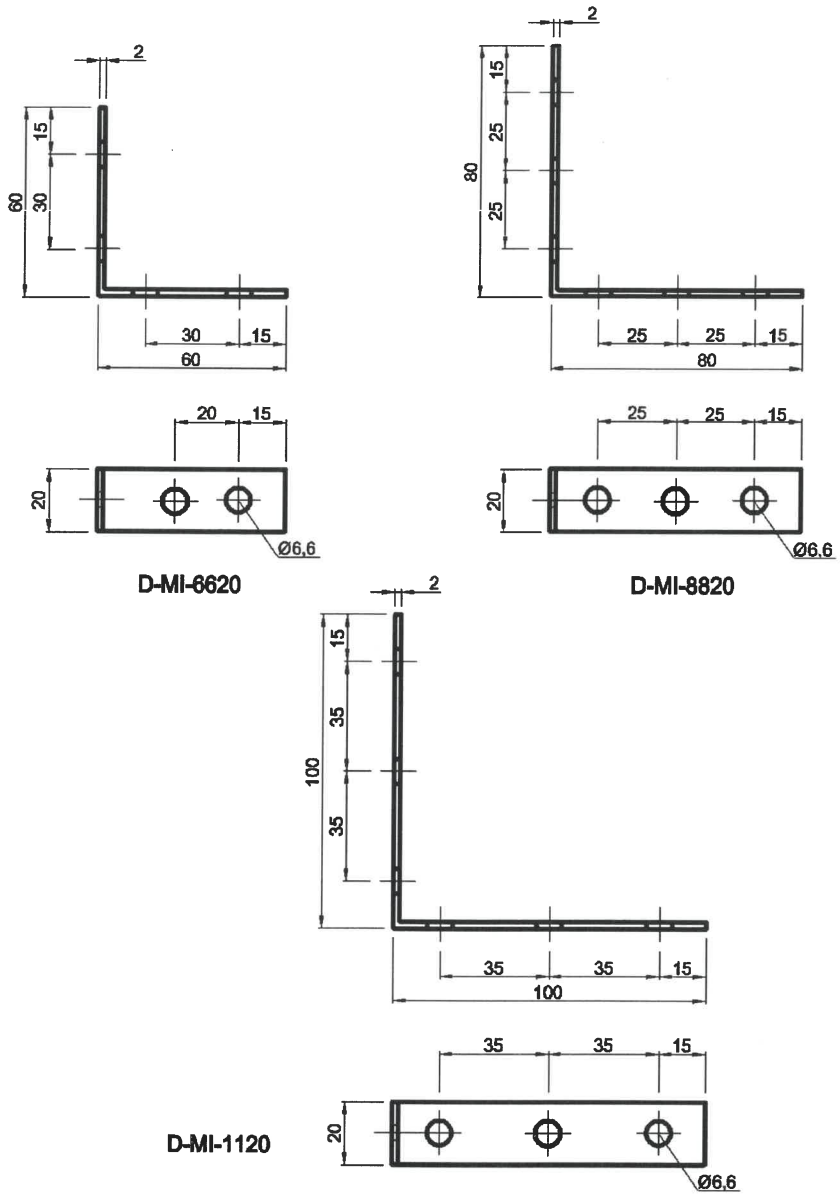


Table 10. KOELNER D-MI three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions		Thickness, mm	Number of holes ϕ 6,6
	H × H, mm	L, mm		
D-MI-6620	60 × 60	20	2,0	2 × 2
D-MI-8820	80 × 80			2 × 3
D-MI-1120	100 × 1000			

KOELNER	**Annex A10** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-MI	

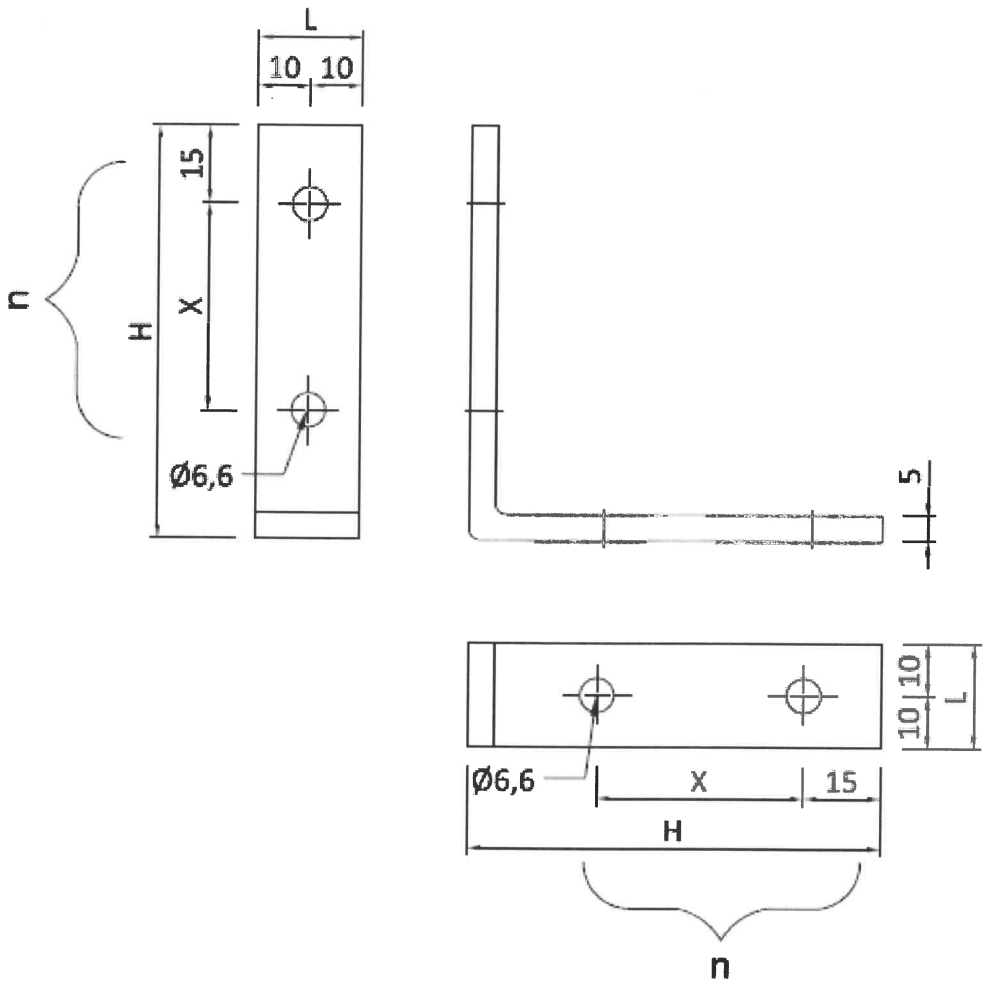


Table 11. KOELNER D-MK three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions		Thickness, mm	Number of holes ϕ 6,6 n	Dimension X, mm
	H × H, mm	L, mm			
D-MK-085	80 × 80	20	5,0	2 × 2	1 × 40
D-MK-105	100 × 100				1 × 50
D-MK-125	120 × 120				1 × 70
D-MK-145	140 × 140			2 × 3	2 × 50
D-MK165	160 × 160				2 × 60
D-MK-185	180 × 180				2 × 65

KOELNER	**Annex A11** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-MK	

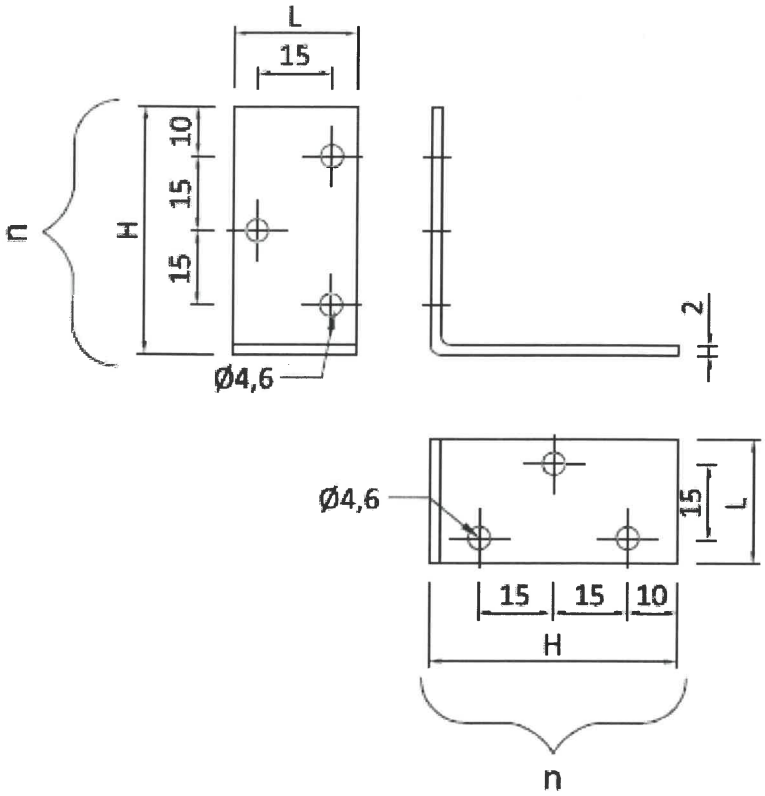


Table 12. KOELNER D-ZU three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions		Thickness, mm	Number of holes ϕ 4,6 n
	H × H, mm	L, mm		
D-ZU-3325	30 × 30	25	2,0	2 + 2
D-ZU-4425	40 × 40			
D-ZU-5525	50 × 50			3 + 3
D-ZU-6625	60 × 60			
D-ZU-5530	50 × 50	30		
D-ZU-5730	50 × 70			3 + 4

KOELNER	**Annex A12** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-ZU	

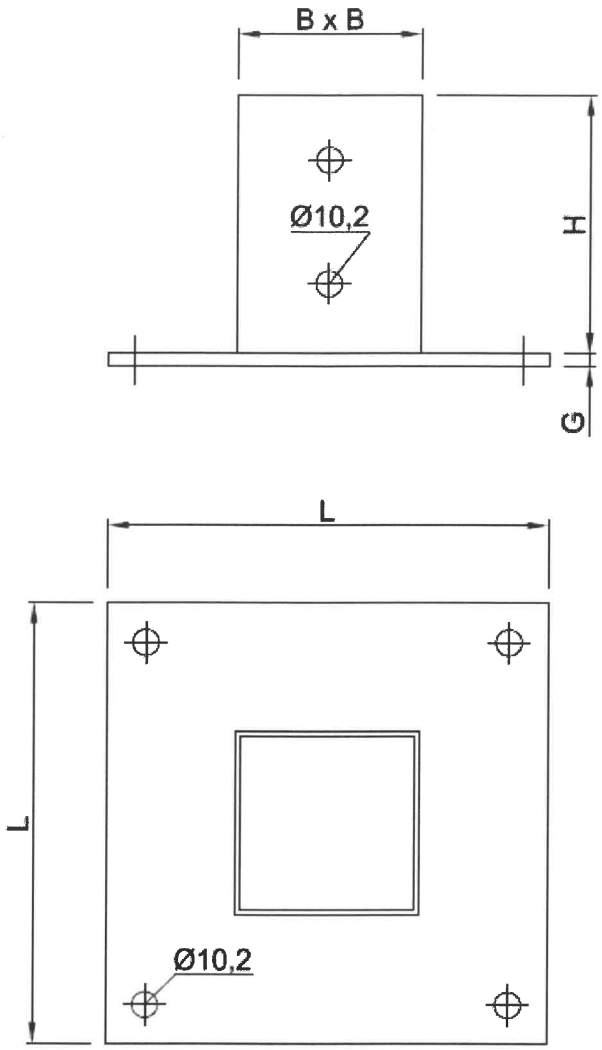


Table 13. KOELNER D-TB three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions		
	B x B x H, mm	L x L, mm	G, mm
D-TB-71	71 x 71 x 150	150 x 150	2
D-TB-81	81 x 81 x 150	150 x 150	2
D-TB-91	91 x 91 x 150	150 x 150	2
D-TB-101	101 x 101 x 170	150 x 150	2
D-TB-121	121 x 121 x 170	150 x 150	2

KOELNER	**Annex A13** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-TB	

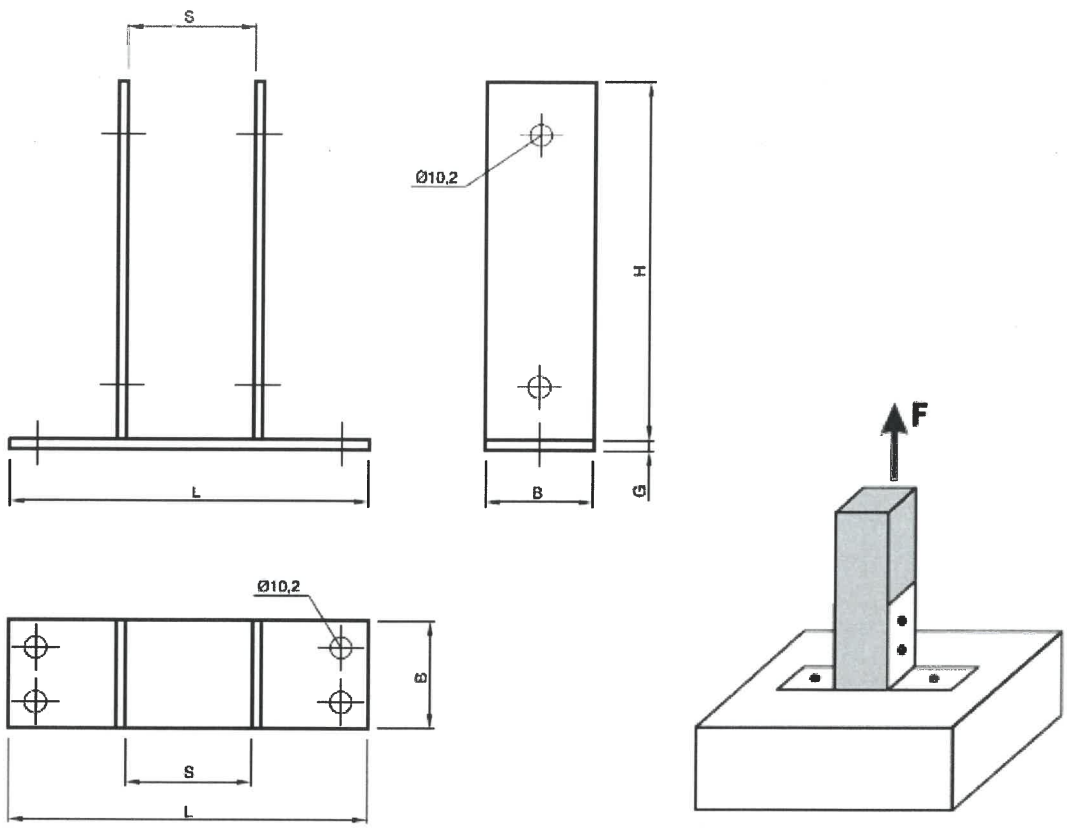


Table 14. KOELNER D-TG three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions	
	L x B x H, mm	S, mm
D-TG-716	200 x 60 x 200	71
D-TG-816	200 x 60 x 200	81
D-TG-916	200 x 60 x 200	91
D-TG-1016	200 x 60 x 200	101
D-TG-1116	200 x 60 x 200	111
D-TG-1216	200 x 60 x 200	121

KOELNER	**Annex A14** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-TG	

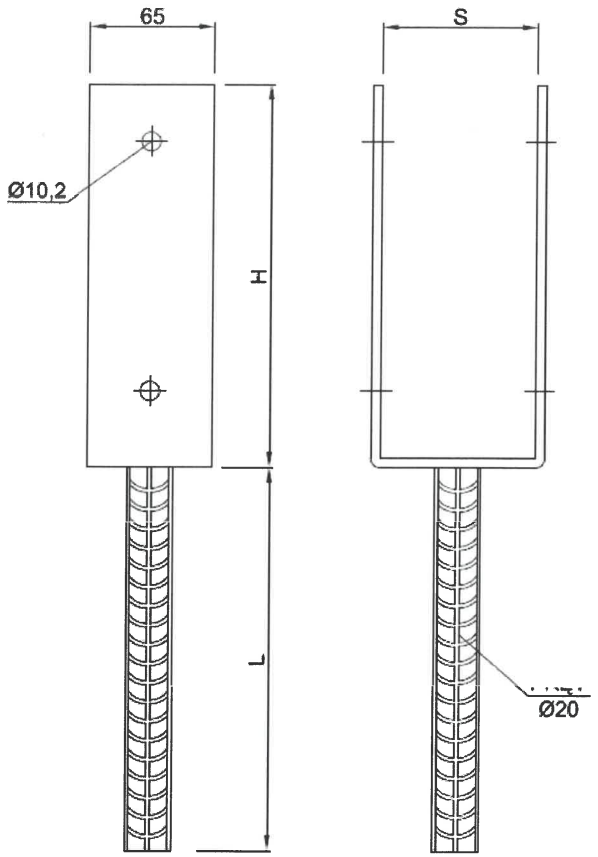


Table 15. KOELNER D-TC three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions		
	H, mm	L, mm	S, mm
D-TC-716	100	200	71
D-TC-816			81
D-TC-916			91
D-TC-1016			101
D-TC-1116			111
D-TC-1216			121
D-TC-1416			141
D-TC-1616			161

KOELNER	**Annex A15** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-TC	

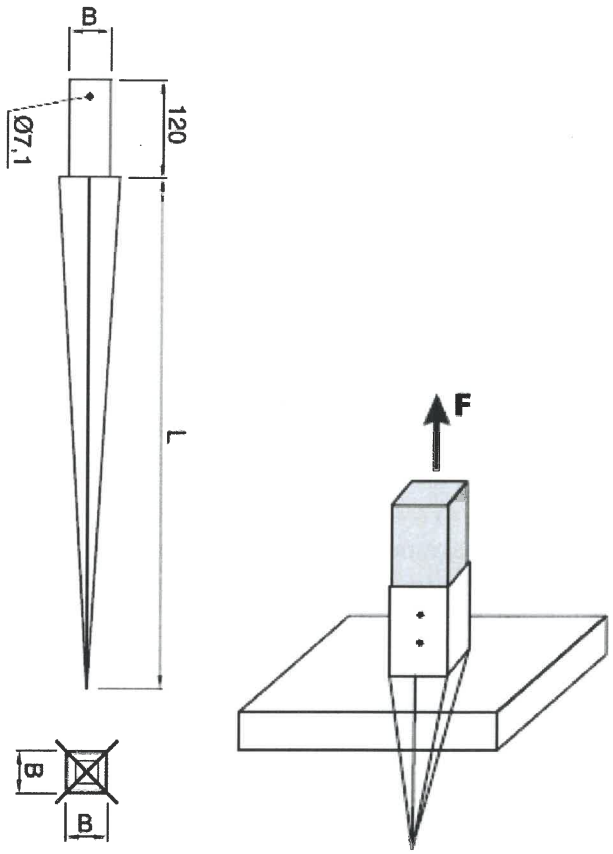


Table 16. KOELNER D-TD three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions
	B x B x L, mm
D-TD-5175	50 x 50 x 750
D-TD-7160	70 x 70 x 600
D-TD-7175	70 x 70 x 750
D-TD-7190	70 x 70 x 900
D-TD-9160	90 x 90 x 600
D-TD-9175	90 x 90 x 750
D-TD-9190	90 x 90 x 900
D-TD-1075	100 x 100 x 750
D-TD-1090	100 x 100 x 900
D-TD-1290	120 x 120 x 900

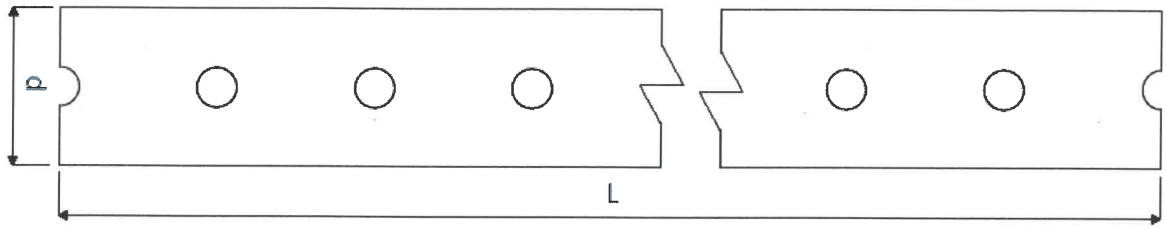


Table 17. KOELNER D-BP three-dimensional nailing plate symbols and dimensions

Symbol	Width, mm	Length, m
Thickness 0,8 mm		
D-BP-2010C	20	10
D-BP-2025C	20	25
Thickness1,5 mm		
D-BP-2010B	20	10
D-BP-2025B	20	25
Thickness 1,5 mm		
D-BP-2515A	25	25
D-BP-4010A	40	25
D-BP-4025A	40	25
D-BP-4050A	40	50
D-BP-6050A	60	50

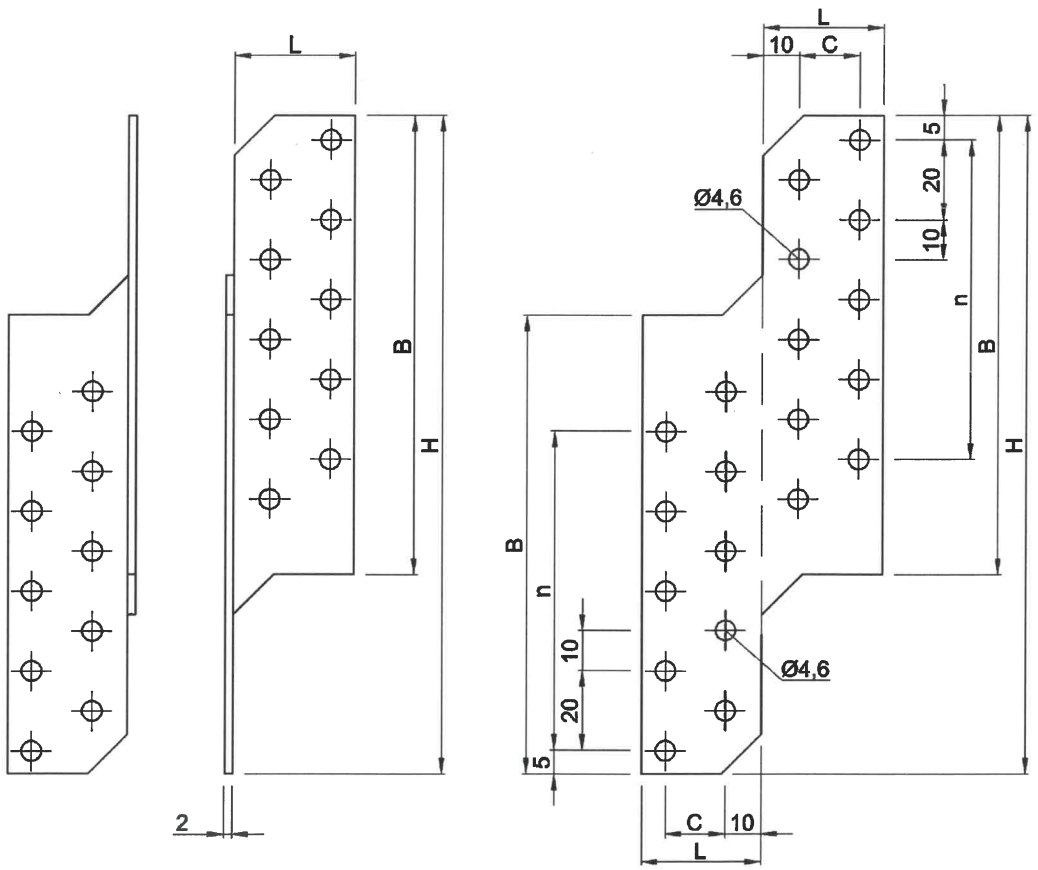


Table 18. KOELNER D-SP three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions				Thickness, mm	Number of holes in row, n	Number of holes, ϕ 4,6
	H, mm	L, mm	B, mm	C, mm			
Right							
D-SP-170P	170	30	115	15	2,0	5	2 × 10
D-SP-210P	210	30	155	15		7	2 × 14
D-SP-250P	250	30	180	15		9	2 × 18
D-SP-290P	290	30	220	15		11	2 × 22
D-SP-330P	330	40	260	20		13	2 × 26
D-SP-370P	370	40	300	20		15	2 × 30
Left							
D-SP-170L	170	30	115	15	2,0	5	2 × 10
D-SP-210L	210	30	155	15		7	2 × 14
D-SP-250L	250	30	180	15		9	2 × 18
D-SP-290L	290	30	220	15		11	2 × 22
D-SP-330L	330	40	260	20		13	2 × 26
D-SP-370L	370	40	300	20		15	2 × 30

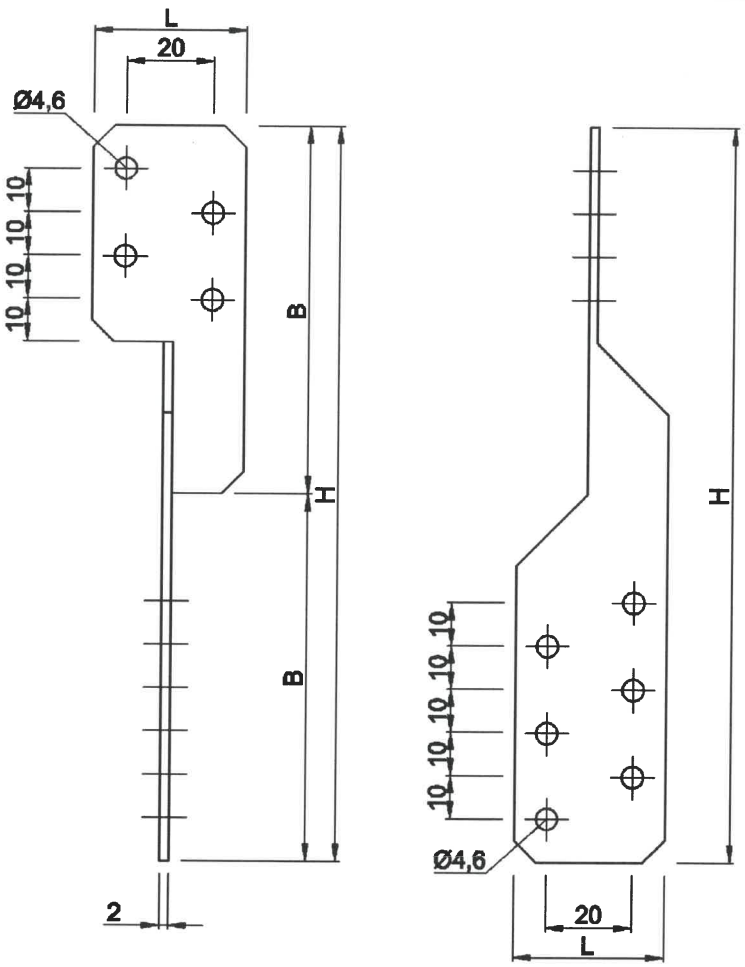
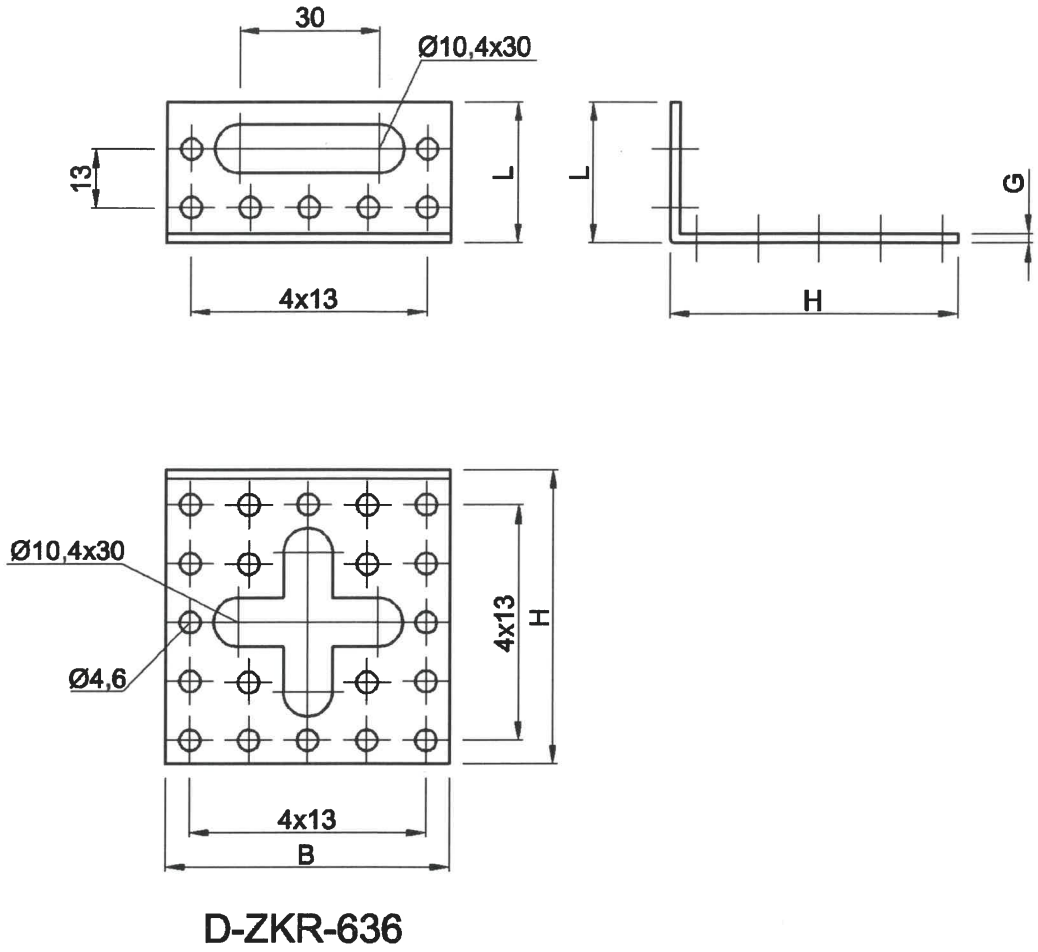


Table 19. KOELNER D-SP three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions			Thickness, mm	Number of holes, ϕ 4,6
	H, mm	L, mm	B, mm		
Right					
D-SP-170	170	35	85	2,0	4 × 6
D-SP-210	210		105		4 × 8
D-SP-250	250		125		4 × 10

KOELNER	**Annex A19** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-SP	



D-ZKR-636

Table 20. KOELNER D-ZKR three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions H × B × L, mm	Thickness, mm
D-ZKR-636	60 × 30 × 60	2,0

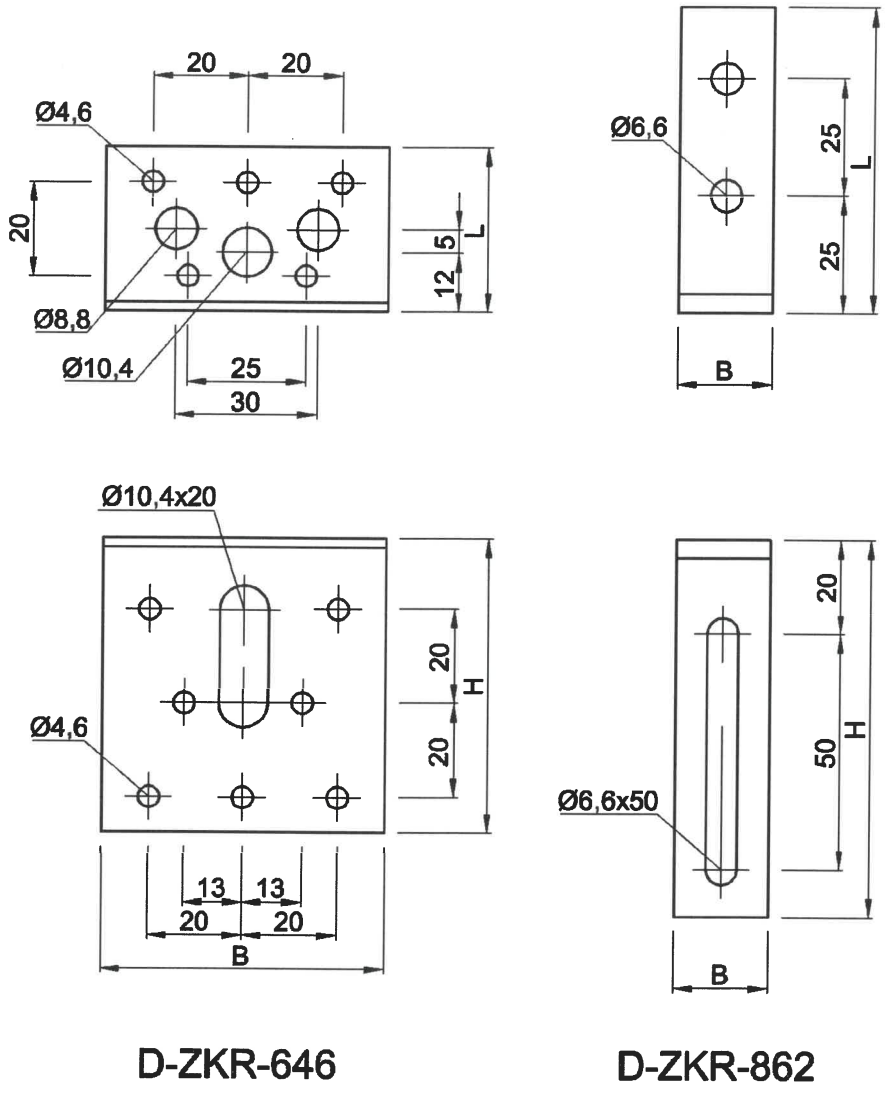


Table 21. KOELNER D-ZKR three-dimensional nailing plate symbols and dimensions

Symbol	Dimensions H × B × L, mm	Thickness, mm
D-ZKR-646	60 × 40 × 60	2,0
D-ZKR-862	80 × 65 × 20	

KOELNER	**Annex A21** of European Technical Assessment ETA-12/0523
Three-dimensional nailing plates KOELNER D-ZKR	

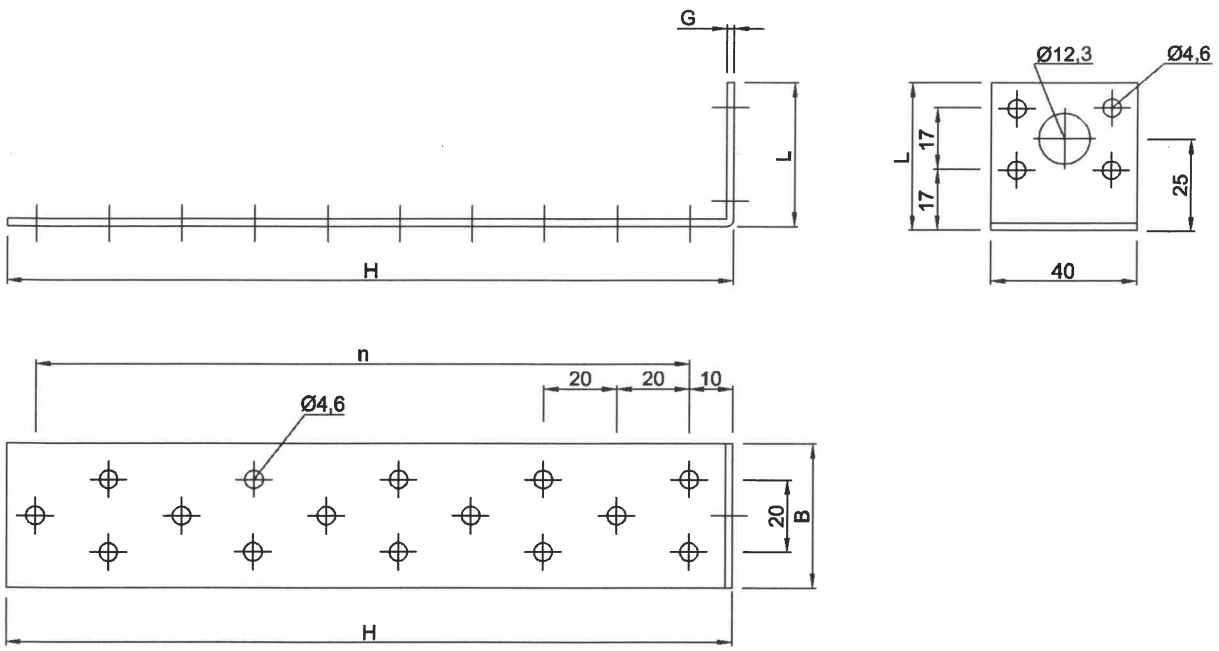
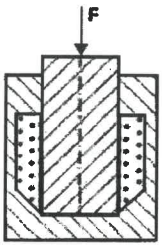
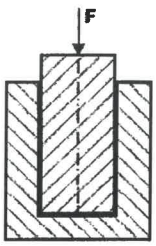


Table 22. KOELNER D-LA three-dimensional nailing plate symbols and dimensions

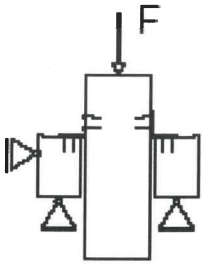
Symbol	Dimensions			Thickness, mm	Number of row, n	Number of holes, ϕ 4,6	Number of holes, ϕ 12,3
	H, mm	L, mm	B, mm				
D-LA-422	200	40	40	2,0	10	15 + 4	1
D-LA-432	300				15	23 + 4	1
D-LA-442	400				20	30 + 4	1
D-LA-452	500				25	38 + 4	1
D-LA-423	200			3,0	10	15 + 4	1
D-LA-433	300				15	23 + 4	1
D-LA-443	400				20	30 + 4	1
D-LA-453	500				25	38 + 4	1



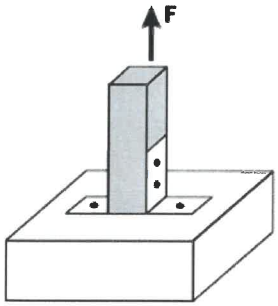
Static diagram No 1



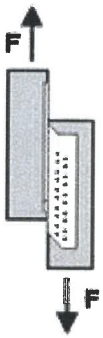
Static diagram No 2



Static diagram No 3

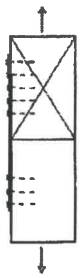


Static diagram No 4



Static diagram No 5

Static diagram No 6



Static diagram No 7

Table 23. Characteristic load-carrying capacity of joints made with KOELNER D-WB three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-WB 411 D-WB 510	full nailing	9,45
D-WB 516		17,20
D-WB 610		16,09
D-WB 613		12,78
D-WB 712 D-WB 812		17,56
D-WB 815		21,94
D-WB 818 D-WB 914		26,95
D-WB 1014 D-WB 1020		35,50

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 1

KOELNER	Annex B1 of European Technical Assessment ETA-12/0523
Characteristic load-carrying capacity of joints made with KOELNER D-WB three-dimensional nailing plates	

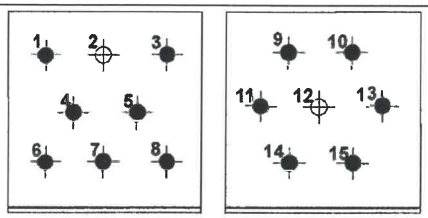
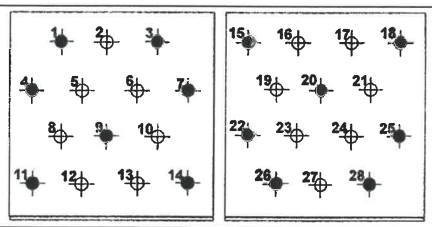
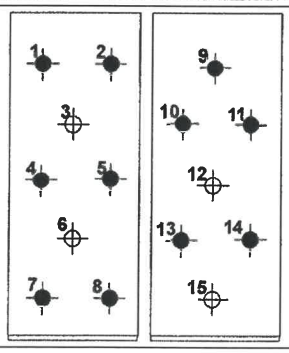
Table 24. Characteristic load-carrying capacity of joints made with KOELNER D-WD three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-WD 310	full nailing	17,50
D-WD 312		20,06
D-WD 315		
* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338 ** Loading according to static diagram No 1		

Table 25. Characteristic load-carrying capacity of joints made with KOELNER D-WC three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-WC 411 D-WC 510	full nailing	6,20
D-WC 610		12,38
D-WC 712 D-WC 812		13,66
D-WC 815		16,34
D-WC 818		33.23
D-WC 914		14,3
D-WC 1014		18,14
* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338 ** Loading according to static diagram No 2		

Table 26. Characteristic load-carrying capacity of joints made with KOELNER D-KF and D-KP three-dimensional nailing plates

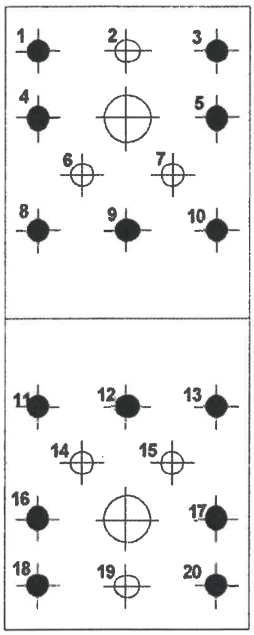
Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-KP 444 D-KF 446/D-KP 448 D-KF 448/D-KP 448 D-KF 4410/D-KP 4410 D-KF 4415/D-KP 4415	full nailing	3,58
D-KF 666/D-KP 666 D-KF 664/D-KP 664 D-KF 665/D-KP 665		3,49
D-KF 668/D-KP 668 D-KP 6610	full nailing	20,79
D-KF 888/D-KP 888 D-KF 884/ D-KP 884 D-KF 886/ D-KP 886 D-KP 8810 D-KP 8812		13,30
D-KF 114/ D-KP 114 D-KF 116/ D-KP 116 D-KF 118/ D-KP 118 D-KF 1110/ D-KP 1110 D-KF 1112/ D-KP 1112 D-KF 1114/ D-KP 1114		6,16

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 3

KOELNER	**Annex B3** of European Technical Assessment ETA-12/0523
Characteristic load-carrying capacity of joints made with KOELNER D-KF and D-KP three-dimensional nailing plates	

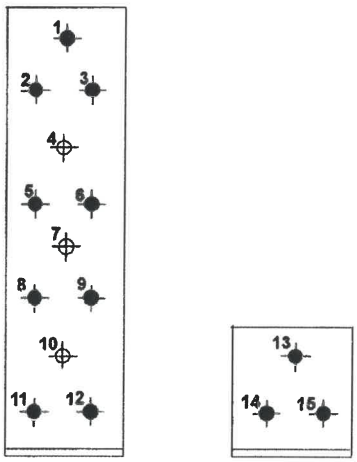
Table 27. Characteristic load-carrying capacity of joints made with KOELNER D-ZK three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-ZK 533	full nailing	9,68
D-ZK 60		
D-ZK 70 D-ZK 90 D-ZK 994 D-ZK 105 D-ZK 70 WZ D-ZK 90 WZ D-ZK 105 WZ D-ZK-140 WZ D-ZK-145 WZ D-ZK-1719 WZ		13,20

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 3

Table 28. Characteristic load-carrying capacity of joints made with KOELNER D-ZN three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-ZN 4164 D-ZN 4124		11,69
D-ZN 6356 D-ZN 4904 D-ZN 5905 D-ZN 6906 D-ZN 8604 D-ZN 9124	full nailing	3,44

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 3

Table 29. Characteristic load-carrying capacity of joints made with KOELNER D-KB three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-KB 1050	full nailing	19,89
D-KB 1075		6,43
D-KB 1280 D-KB 1812		17,22

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 3

Table 30. Characteristic load-carrying capacity of joints made with KOELNER D-MI three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-MI 6620 D-MI 2215 D-MI 3315 D-MI 4415 D-MI 5515	full nailing	2,01
D-MI 8820 D-MI 1120		4,06

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 3

Table 31. Characteristic load-carrying capacity of joints made with KOELNER D-MK three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-MK 125 D-MK 085 D-MK 105	full nailing	8,31
D-MK 145 D-MK 165 D-MK 185		3,94

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 3

Table 32. Characteristic load-carrying capacity of joints made with KOELNER D-ZU three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-ZU 3325 D-ZU 4425 D-ZU 5525 D-ZU 5530 D-ZU 6625 D-ZU 5730	full nailing	3,08

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 3

Table 33. Characteristic load-carrying capacity of joints made with KOELNER D-TB three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-TB 81 D-TB 71 D-TB 91 D-TB 101 D-TB 121 D-TD 5175 D-TD 7160 D-TD 7175 D-TD 7190 D-TD 9160 D-TD 9175 D-TD 9190 D-TD 1075 D-TD 1090 D-TD 1290	full nailing	5,14

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 4

Table 34. Characteristic load-carrying capacity of joints made with KOELNER D-TG three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-TG 916 D-TG 716 D-TG 816 D-TG 1016 D-TG 1116 D-TG 1216	full nailing	8,42

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 4

KOELNER	Annex B8 of European Technical Assessment ETA-12/0523
Characteristic load-carrying capacity of joints made with KOELNER D-TB and D-TG three-dimensional nailing plates	

Table 35. Characteristic load-carrying capacity of joints made with KOELNER D-TC three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-TC 1016 D-TC 716 D-TC 816 D-TC 916 D-TC 1116 D-TC 1216 D-TC 1416 D-TC 1616	full nailing	5,24

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 4

Table 36. Characteristic load-carrying capacity of joints made with KOELNER D-SP three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-SP 170L D-SP 170P D-SP 210L/D-SP 210 P D-SP 250L/D-SP 250P D-SP 290L/D-SP 290P D-SP 330L/D-SP 330P D-SP 370L/D-SP 370P	full nailing	20,85
* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338 ** Loading according to static diagram No 5		

Table 37. Characteristic load-carrying capacity of joints made with KOELNER D-SP three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-SP 170 D-SP 210 D-SP 250	full nailing	18,92
* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338 ** Loading according to static diagram No 6		

Table 38. Characteristic load-carrying capacity of joints made with KOELNER D-ZKR three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-ZKR 646 D-ZKR 636 D-ZKR 862	full nailing	3,24
* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338 ** Loading according to static diagram No 3		

Table 39. Characteristic load-carrying capacity of joints made with KOELNER D-LA three-dimensional nailing plates

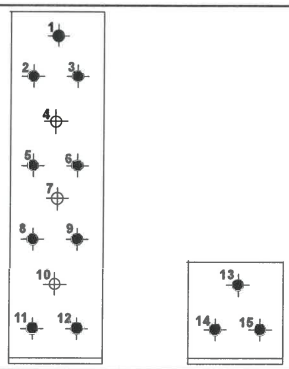
Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-LA 422 D-LA 432 D-LA 442 D-LA 452 D-LA 423 D-LA 433 D-LA 443 D-LA 453		13,97
* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338 ** Loading according to static diagram No 3		

Table 40. Characteristic load-carrying capacity of joints made with KOELNER D-BP three-dimensional nailing plates

Symbol	Nailing reference drawing*	Characteristic load-carrying capacity**, R_k, kN
D-BP 2010B D-BP 2025B D-BP 2515A D-BP 4010A D-BP 4025A D-BP 4050A D-BP 6050A	full nailing	3,00

* Ring shank nails with the diameter d ≥ 4 mm and the length ≥ 40 mm. Timber grade at least C24 according to EN 338

** Loading according to static diagram No 7