

Leistungserklärung / Declaration of Performance

2009100351_007CPR2022-11-041_2023

- **Eindeutiger Kenncode des Produkttyps / Unique identification code of the product type**
HV2710, HV2760, HV2770, HVG2730, HVG2770

- **Verwendungszweck(e) / Usage(s)**
Winkel für Verbindungen von Holz auf Holz, Holz auf Stahl oder Holz auf Beton /
Angle bracket for timber to timber, timber to steel or timber to concrete connections

- **Hersteller / Manufacturer**
Conmetall Meister GmbH
Hafenstraße 26
29223 Celle Germany

- **System(e) zur Bewertung und Überprüfung der Leistungsbeständigkeit /
System(s) for evaluating and verifying constancy of performance**
System 2+

- **Europäisch Technische Bewertung / European Technical Assessment**
Europäisches Bewertungsdokument / *European evaluation document:*
EAD 130186-00-0603 01.07.2018
Europäisch technische Bewertung / *European technical evaluation:*
ETA 11/0017 31.10.2022
Technische Bewertungsstelle / *Technical Assessment Body:*
ETA Danmark A/S
Notifizierte Stelle / *Notified body:*
1336



■ **Wesentliche Merkmale und erklärte Leistung(en) /**
Essential features and stated performance(s)

Wesentliches Merkmal <i>Essential features</i>	Leistung <i>Performance</i>	Harmonisierte technische Spezifikation <i>Harmonized technical specification</i>
Verbindungsfestigkeit – Charakteristische Tragfähigkeit <i>Joint Strength - Characteristic load-carrying capacity</i>	Annex B	ETA-11/0017; 3.1
Steifigkeit der Verbindung <i>Joint Stiffness</i>	Annex B	ETA-11/0017; 3.1
Duktilität der Verbindung <i>Joint ductility</i>	NPD	ETA-11/0017; 3.1
Widerstandsfähigkeit gegen seismische Einflüsse <i>Resistance to seismic actions</i>	NPD	ETA-11/0017; 3.1
Widerstandsfähigkeit gegen Korrosion und Beschädigung <i>Resistance to corrosion and deterioration</i>	Nutzungsklasse 1 und 2 <i>Service class 1 and 2</i> DX 51 D / Z 275.	ETA-11/0017; 3.1, 3.6 EAD 130186-00-0603 EN 10346
Brandverhalten <i>Reaction to fire</i>	Stahl klassifiziert als Euroklasse A1 <i>Steel classified as Euroclass A1</i>	ETA-11/0017; 3.2 EN 13501-1
Allgemeine Aspekte im Zusammenhang mit der Leistung des Produkts <i>General aspects related to the performance of the product</i>	Nutzungsklasse 1 und 2 bei Holzkonstruktionen unter Verwendung von Holzarten gem. Eurocode 5 <i>Service class 1 and 2 for timber constructions using timber species according to Eurocode 5</i>	ETA-11/0017; 3.3

Tab.1 Wesentliche Merkmale / essential features

Kenncode <i>Identification code</i>	Winkel-Typ <i>Angle bracket type</i>	Spezifikation von Stahl und Beschichtung <i>Steel and coating specification</i>
HV2710	60 x 60 x 40 x 2,5	DX51D + Z275
HV2760	80 x 80 x 60 x 2,5	DX51D + Z275
HV2770 / HVG2770	80 x 80 x 80 x 2,5	DX51D + Z275
HVG2730	60 x 60 x 60 x 2,5	DX51D + Z275

Tab.2 Produkt Details / Product details

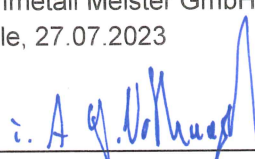
Die Leistung des vorstehenden Produkts entspricht der erklärten Leistung / den erklärten Leistungen.
Für die Erstellung der Leistungserklärung im Einklang mit der Verordnung (EU) Nr. 305/2011 ist allein
der obengenannte Hersteller verantwortlich.

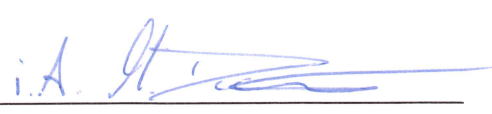
Unterzeichnet für den Hersteller und im Namen des Herstellers von:

*The performance of the above product is the declared performance. The above manufacturer is solely
responsible for drawing up the declaration of performance in accordance with Regulation (EU) No
305/2011.*

Signed for the manufacturer and on behalf of the manufacturer of:

Conmetall Meister GmbH
Celle, 27.07.2023


i. A. Yannik Nothnagel
Leitung Einkauf Eisenwaren
Head of purchasing ironmongery


i. A. Marcel Dartscht
Standortverantwortlicher Qualitätsmanagement Celle
Site Manager Quality Management Celle

Erstellt von: QM_CM Celle

Leistungserklärung nach Anhang III
Bauproduktenverordnung 305/2011 EG

Änderungsindex: 1
Gültig für: Bauprodukte



Annex B

Characteristic load-carrying capacities

Table 1: Force F_1 Column, 2 angle brackets / connection

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (column)	
			Timber	Steel
50 x 50 x 35 x 2,5	-	-	-	-
60 x 60 x 40 x 2,5	-	-	-	-
60 x 60 x 50 x 2,5	-	-	-	-
60 x 60 x 60 x 2,5	-	-	-	-
70 x 70 x 55 x 2,5	1,2,3	12,13,14,15,16,20,21,22	3,05	1,81
70 x 70 x 55 x 2,5 with rib	1,2,3	11,12,13,14,18,19,20	2,04	2,40
80 x 80 x 60 x 2,5	1,2,3	13,14,15,16,17,18,19,20,21,22, 23,24	3,82	4,08
80 x 80 x 80 x 2,5	1,2,3	15,16,17,18,19,20,21,22,23,24, 25,26,27,28	3,68	4,71
90 x 90 x 40 x 3,0	1,2	11,12,14,15,19,20	2,35	2,37
90 x 90 x 65 x 2,5	1,2	12,13,16,17,21,22	2,37	3,02
90 x 90 x 65 x 2,5 with rib	1,2	12,13,16,17,21,22	2,37	9,76
100 x 100 x 80 x 2,5	1,2,3,4,5,6,7	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35	3,85	4,91
100 x 100 x 100 x 2,5	1,2,3,4,5,7,8,9,10	26,27,28,29,30,31,32,33,34,36, 37,38,39, 40,41,42,43,44,46,47,48,49	5,29	7,63

Table 2: Force F_1 Column, 1 angle bracket / connection

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (column)	
			Timber	Steel
50 x 50 x 35 x 2,5	-	-	-	-
60 x 60 x 40 x 2,5	-	-	-	-
60 x 60 x 50 x 2,5	-	-	-	-
60 x 60 x 60 x 2,5	-	-	-	-
70 x 70 x 55 x 2,5	1,2,3	12,13,14,15,16,20,21,22	1,53	0,91
70 x 70 x 55 x 2,5 with rib	1,2,3	11,12,13,14,18,19,20	1,02	1,20
80 x 80 x 60 x 2,5	1,2,3	13,14,15,16,17,18,19,20,21,22, 23,24	1,91	2,04
80 x 80 x 80 x 2,5	1,2,3	15,16,17,18,19,20,21,22,23,24, 25,26,27,28	1,84	2,36
90 x 90 x 40 x 3,0	1,2	11,12,14,15,19,20	1,18	1,19
90 x 90 x 65 x 2,5	1,2	12,13,16,17,21,22	1,18	1,51
90 x 90 x 65 x 2,5 with rib	1,2	12,13,16,17,21,22	1,18	4,88
100 x 100 x 80 x 2,5	1,2,3,4,5,6,7	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35	1,93	2,45
100 x 100 x 100 x 2,5	1,2,3,4,5,7,8,9,10	26,27,28,29,30,31,32,33,34,36, 37,38,39, 40,41,42,43,44,46,47,48,49	2,64	3,82



Table 3: Force F_1 Purlin, 2 angle brackets / connection

Bracket type	Nail number n_v	Nail number n_H	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
50 x 50 x 35 x 2,5	1,2	6,7,8	1,87	1,46
60 x 60 x 40 x 2,5	1,2,3,4	7,8,9,10,11,12	2,35	2,47
60 x 60 x 50 x 2,5	1,2,3,5,6	10,11,12,13,14,16,17	2,41	3,63
60 x 60 x 60 x 2,5	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	3,61	4,08
70 x 70 x 55 x 2,5	1,2,3,7,8	12,13,14,15,16,20,21,22	3,05	1,81
70 x 70 x 55 x 2,5 with rib	1,2,3,7,8	11,12,13,18,15,19,20	2,04	2,40
80 x 80 x 60 x 2,5	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20,21,22, 23,24	3,82	4,08
80 x 80 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22,23,24, 25,26,27,28	3,68	4,71
90 x 90 x 40 x 3,0	1,2,4,5,6,7	11,12,14,15,19,20	2,35	2,37
90 x 90 x 65 x 2,5	1,2,4,5,6,7	12,13,16,17,21,22	2,37	3,02
90 x 90 x 65 x 2,5 with rib	1,2,4,5,6,7	12,13,16,17,21,22	2,37	9,76
100 x 100 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10, 11,12,13,14	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35	3,85	4,91
100 x 100 x 100 x 2,5	1,2,3,4,5,7,8,9,10, 11,12,13,14,15,17, 18,19,20	26,27,28,29,30,31,32,33,34,36, 37,38,39, 40,41,42,43,44,46,47,48,49	5,29	7,63

Table 4: Force F_1 Purlin, 1 angle bracket / connection

Bracket type	Nail number n_v	Nail number n_H	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
50 x 50 x 35 x 2,5	1,2	6,7,8	0,93	0,73
60 x 60 x 40 x 2,5	1,2,3,4	7,8,9,10,11,12	1,18	1,24
60 x 60 x 50 x 2,5	1,2,3,5,6	10,11,12,13,14,16,17	1,20	1,81
60 x 60 x 60 x 2,5	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	1,80	2,04
70 x 70 x 55 x 2,5	1,2,3,7,8	12,13,14,15,16,20,21,22	1,53	0,91
70 x 70 x 55 x 2,5 with rib	1,2,3,7,8	11,12,13,18,15,19,20	1,02	1,20
80 x 80 x 60 x 2,5	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20,21, 22,23,24	1,91	2,04
80 x 80 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22,23, 24,25,26,27,28	1,84	2,36
90 x 90 x 40 x 3,0	1,2,4,5,6,7	11,12,14,15,19,20	1,18	1,19
90 x 90 x 65 x 2,5	1,2,4,5,6,7	12,13,16,17,21,22	1,18	1,51
90 x 90 x 65 x 2,5 with rib	1,2,4,5,6,7	12,13,16,17,21,22	1,18	4,88
100 x 100 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10,11, 12,13,14	19,20,21,22,23,24,25,26,27, 28,29,30,31,32,33,34,35	1,93	2,45
100 x 100 x 100 x 2,5	1,2,3,4,5,7,8,9,10, 11,12,13,14,15,17, 18,19,20	26,27,28,29,30,31,32,33,34, 36,37,38,39, 40,41,42,43,44,46,47,48,49	2,64	3,82



Table 5: Forces $F_{2,3}$, 2 angle brackets / connection

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
50 x 50 x 35 x 2,5	1,2	6,7,8	2,07
60 x 60 x 40 x 2,5	1,2,3,4	7,8,9,10,11,12	4,24
60 x 60 x 50 x 2,5	1,2,3,5,6	10,11,12,13,14,16,17	5,33
60 x 60 x 60 x 2,5	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	7,58
70 x 70 x 55 x 2,5	1,2,3,7,8	12,13,14,15,16,20,21,22	5,71
70 x 70 x 55 x 2,5 with rib	1,2,3,7,8	11,12,13,18,15,19,20	5,56
80 x 80 x 60 x 2,5	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20,21,22, 23,24	9,66
80 x 80 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22,23,24, 25,26,27,28	11,4
90 x 90 x 40 x 3,0	1,2,4,5,6,7	11,12,14,15,19,20	5,06
90 x 90 x 65 x 2,5	1,2,4,5,6,7	12,13,16,17,21,22	5,89
90 x 90 x 65 x 2,5 with rib	1,2,4,5,6,7	12,13,16,17,21,22	5,89
100 x 100 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10,1 1,12,13,14	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35	13,9
100 x 100 x 100 x 2,5	1,2,3,4,5,7,8,9,10, 11,12,13,14,15,17, 18,19,20	26,27,28,29,30,31,32,33,34,36, 37,38,39, 40,41,42,43,44,46,47,48,49	20,3

Table 6: Forces $F_{2,3}$, 1 angle bracket / connection

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
50 x 50 x 35 x 2,5	1,2	6,7,8	2,07
60 x 60 x 40 x 2,5	1,2,3,4	7,8,9,10,11,12	4,24
60 x 60 x 50 x 2,5	1,2,3,5,6	10,11,12,13,14,16,17	5,33
60 x 60 x 60 x 2,5	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	7,58
70 x 70 x 55 x 2,5	1,2,3,7,8	12,13,14,15,16,20,21,22	5,71
70 x 70 x 55 x 2,5 with rib	1,2,3,7,8	11,12,13,18,15,19,20	5,56
80 x 80 x 60 x 2,5	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20,21, 22,23,24	9,66
80 x 80 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22,23, 24,25,26,27,28	11,4
90 x 90 x 40 x 3,0	1,2,4,5,6,7	11,12,14,15,19,20	5,06
90 x 90 x 65 x 2,5	1,2,4,5,6,7	12,13,16,17,21,22	5,89
90 x 90 x 65 x 2,5 with rib	1,2,4,5,6,7	12,13,16,17,21,22	5,89
100 x 100 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10,1 1,12,13,14	19,20,21,22,23,24,25,26,27, 28,29,30,31,32,33,34,35	13,9
100 x 100 x 100 x 2,5	1,2,3,4,5,7,8,9,10, 11,12,13,14,15,17, 18,19,20	26,27,28,29,30,31,32,33,34,36, 37,38,39, 40,41,42,43,44,46,47,48,49	10,1



Table 7: Basic Forces $F_{4,5}$, 2 angle brackets / connection

Bracket type	Nail number n_v	Nail number n_H	$F_{4,5,Rk}$ [kN]	
			Timber	Steel
50 x 50 x 35 x 2,5	1,2	6,7,8	5,38	2,24
60 x 60 x 40 x 2,5	1,2,3,4	7,8,9,10,11,12	5,08	2,81
60 x 60 x 50 x 2,5	1,2,3,5,6	10,11,12,13,14,16,17	5,56	3,62
60 x 60 x 60 x 2,5	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	7,40	4,11
70 x 70 x 55 x 2,5	1,2,3,7,8	12,13,14,15,16,20,21,22	5,92	4,27
70 x 70 x 55 x 2,5 with rib	1,2,3,7,8	11,12,13,18,15,19,20	5,85	5,43
80 x 80 x 60 x 2,5	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20,21,22, 23,24	8,14	4,34
80 x 80 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22,23,24, 25,26,27,28	9,81	6,01
90 x 90 x 40 x 3,0	1,2,4,5,6,7	11,12,14,15,19,20	5,44	2,99
90 x 90 x 65 x 2,5	1,2,4,5,6,7	12,13,16,17,21,22	8,52	4,45
90 x 90 x 65 x 2,5 with rib	1,2,4,5,6,7	12,13,16,17,21,22	8,55	7,96
100 x 100 x 80 x 2,5	1,2,3,4,5,6,7,8,9,10,11, 12,13,14	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35	10,7	5,88
100 x 100 x 100 x 2,5	1,2,3,4,5,7,8,9,10, 11,12,13,14,15,17, 18,19,20	26,27,28,29,30,31,32,33,34,36, 37,38,39, 40,41,42,43,44,46,47,48,49	12,5	7,33

Table 8: Basic Forces F_4 , 1 angle bracket / connection

Bracket type	Nail number n_v	Nail number n_H	$F_{4,Rk}$ [kN]	
			Timber	Steel
70 x 70 x 55 x 2,5 with rib	1,2,3,7,8	11,12,13,18,15,19,20	5,85	4,24
90 x 90 x 65 x 2,5 with rib	1,2,4,5,6,7	12,13,16,17,21,22	8,55	6,38

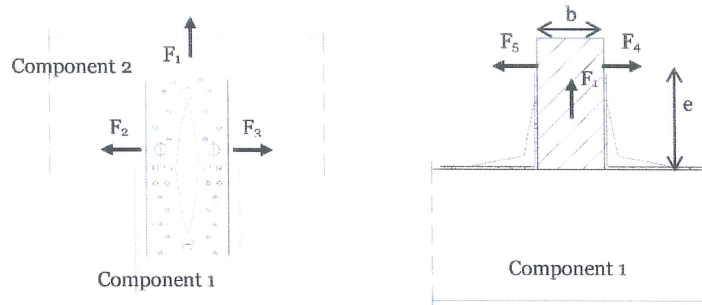
Table 9: Basic Forces F_5 , 1 angle bracket / connection

Bracket type	Nail number n_v	Nail number n_H	$F_{5,Rk}$ [kN]	
			Timber	Steel
70 x 70 x 55 x 2,5 with rib	1,2,3,7,8	11,12,13,18,15,19,20	1,28	1,40
90 x 90 x 65 x 2,5 with rib	1,2,4,5,6,7	12,13,16,17,21,22	1,70	1,73



Definitions of forces, their directions and eccentricity

Forces - Beam to beam connection



Fastener specification

Holes are marked with numbers referring to the nailing pattern in Annex A.

Double angle brackets per connection

The angle brackets must be placed at each side opposite to each other, symmetrically to the component axis.

Acting forces

- F_1 Lifting force acting along the central axis of the joint.
- F_2 and F_3 Lateral force acting in the joint between the component 2 and component 1 in the component 2 direction
- F_4 and F_5 Lateral force acting in the component 1 direction along the central axis of the joint. If the load is applied with an eccentricity e , a design for combined loading is required.

Single angle bracket per connection

Acting forces

- F_1 Lifting force acting in the central axis of the angle bracket. The component 2 shall be prevented from rotation. If the component 2 is prevented from rotation the load-carrying capacity will be half of a connection with double angle brackets.
- F_2 and F_3 Lateral force acting in the joint between the component 2 and the component 1 in the component 2 direction. The component 2 shall be prevented from rotation. If the component 2 is prevented from rotation the load-carrying capacity will be half of a connection with double angle brackets.
- F_4 and F_5 Lateral force acting in the component 1 direction in the height of the top edge of component 2. F_4 is the lateral force towards the angle bracket; F_5 is the lateral force away from the angle bracket. Only the characteristic load-carrying capacities for angle brackets with ribs are given.

Wane

Wane is not allowed, the timber has to be sharp-edged in the area of the angle brackets.

Timber splitting

For the lifting force F_1 it must be checked in accordance with Eurocode 5 or a similar national Timber Code that splitting will not occur.

Combined forces

If the forces F_1 and F_2/F_3 or F_4/F_5 act at the same time, the following inequality shall be fulfilled:

$$\left(\frac{F_{1,d}}{F_{Rd,1}} \right)^2 + \left(\frac{F_{2,d}}{F_{Rd,2}} \right)^2 + \left(\frac{F_{3,d}}{F_{Rd,3}} \right)^2 + \left(\frac{F_{4,d}}{F_{Rd,4}} \right)^2 + \left(\frac{F_{5,d}}{F_{Rd,5}} \right)^2 \leq 1$$

The forces F_2 and F_3 or F_4 and F_5 are forces with opposite direction. Therefore only one force F_2 or F_3 , and F_4 or F_5 , respectively, is able to act simultaneously with F_1 , while the other shall be set to zero.

If the load F_4/F_5 is applied with an eccentricity e , a design for combined loading **for connections with double angle brackets** is required. Here, an additional force ΔF_1 has to be added to the existing force F_1 .

$$\Delta F_{1,d} = F_{4,d} / F_{5,d} \cdot \frac{e}{B}$$

B is the width of component 2.

