

Declaration of Performance



No **5 - 007 - 230168 - 2023/01**

- 1.) Unique identification code of the product-type:
Three-dimensional nailing plates / EJOT angle brackets
- 2.) Intended use:
Angle brackets for wood to wood connections
- 3.) Manufacturer:
EJOT Baubefestigungen GmbH, In der Stockwiese 35, 57334 Bad Laasphe - Germany
- 4.) System of AVCP:
System 2+
- 5.) European Assessment Document: **EAD 130186-00-0603**
 European Technical Assessment: **ETA-23/0168**
 Technical assessment body: **ETA-DANMARK A/S**
 Notified body: **1336 - Inspecta Estonia OÜ**

6.) Declared Performance:
 a) Mechanical resistance and stability (BWR 1) and safety and accessibility (BWR 4)

Essential characteristic	Performance
Characteristic load-carrying capacity	Annex B
Stiffness	NPD
Ductility in cyclic testing	NPD
Resistance to seismic actions	NPD
Resistance to corrosion and deterioration	The angle brackets have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service class 1 and 2. The angle brackets can also be used in outdoor timber structures, service class 3, when a corrosion protection in accordance with Eurocode 5 is applied, or when stainless steel with similar or better characteristic yield and ultimate strength is employed.

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b) Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	The angle brackets are made from steel classified to have reaction to fire class A1 according to EN 13501-1.
Resistance to fire	NPD

c) Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance

d) Protection against noise (BWR 5)

Essential characteristic	Performance

e) Energy economy and heat retention (BWR 6)

Essential characteristic	Performance

f) Sustainable use of natural resources (BWR 7)

Essential characteristic	Performance

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Dr. Jens Weber
(Name)

Bad Laasphe, 17/02/2023
(Place and date of issue)

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
angle bracket 60/75/2 SH LH	1,2,3	10,11,12,14,15,16	2,81	1,49
angle bracket 60/75/2,5 SH LH	1,2	8,10,11,12,13	1,87	2,02
angle bracket 60/75/2 SH 2LH	1,2,3	9,10,11,13,14,15	2,81	2,33
angle bracket 20/80/2	1,2	9,10,11,12,13,14,15,16	2,50	1,55
angle bracket 20/80/2,5	1,2	9,10,11,12,13,14,15,16	2,50	2,43
angle bracket 40/80/2	1,2	12,13,14,15,16,18,19,20,21,22	2,47	1,93
angle bracket 40/80/2,5	1,2	12,13,14,15,16,18,19,20,21,22	2,47	3,02
angle bracket 50/80/2 B	1,2,3	13,14,15,16,17,18,19,20,21,22, 23,24	3,82	2,61
angle bracket 50/80/2,5 B	1,2,3	15,16,17,18,19,20,21,22,23,24, 25,26,27,28	4,90	2,78
angle bracket 60/80/2	1,2,3,4	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36	6,13	3,48
angle bracket 80/80/2	1,2,3,4	20,21,22,23,24,25,26,27,28,30, 31,32,33,34,35,36,37,38	4,94	3,87
angle bracket 100/80/2	1,2,3,4	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36	6,13	5,44
angle bracket 100/80/2 B	1,2,3,4	20,21,22,23,24,25,26,27,28,30, 31,32,33,34,35,36,37,38	4,94	6,04
angle bracket 100/80/2,5	1,2,4,5	11,12	1,36	1,47
angle bracket 100/80/2,5 B	1,2,3,4,5,6	10,11,12,14,15,16	2,81	1,49
angle bracket 40/90/2,5	1,2,4,5,6	10,11,13,14,15	1,87	1,33
angle bracket LL	1,2,3,4,5,6	10,12,14,15,16	2,81	2,02
angle bracket LL	1,2,4,5,6	10,11,13,14,15	1,87	2,07
angle bracket LL	1,2,4	8,9,11,12,13	1,87	2,07
angle bracket LL	1,2,5,6	16,17,18,20,21,22,24,25,26,29,30	3,44	3,24
angle bracket LL	1,2,5,6	16,17,18,20,21,22,24,25,26,29,30	3,44	3,24
angle bracket 90 B	1,2,5,6	13,14,16,17,19,20,23,24	2,29	11,47
angle bracket 90 BL	1,2	14,15,16,17,18,21,22,25,26, 27,28	5,94	5,22
angle bracket 90/90 H	1,2	14,15,16,17,18,21,22,25,26, 27,28	5,94	5,22
angle bracket 90/90 R	1,2	13,14,15,16,19,20,23,24,25,26	4,75	13,9
angle bracket 90/90 RH	1,2	13,14,15,16,19,20,23,24,25,26	4,75	13,9
angle bracket 40/100/2	1,2,3,4	11,12,13,14,15,16,17,18,19,20	2,59	1,55
angle bracket 40/100/2,5	1,2,3,4	11,12,13,14,15,16,17,18,19,20	2,59	2,43
angle bracket 50/100/2	1,2,3,5,6	16,17,18,19,20,22,23,24,25, 26,28,29	2,55	1,86

Bracket type	Nail number n_v	Nail number n_H	$F_{1,Rk}$ [kN] (column)	
			Timber	Steel
angle bracket 50/100/2,5	1,2,3,5,6	16,17,18,19,20,22,23,24,25,26, 28,29	2,55	2,90
angle bracket 50/100/2,5 R	1,2,3,4,5	13,14,15,16,20,21,22,23,24	2,56	8,33
angle bracket 60/100/2	1,2,3,4,5,6	16,17,18,19,20,21,22,23,24,25, 26,27,28,29,30	3,95	2,61
angle bracket 60/100/2,5	1,2,3,4,5,6	16,17,18,19,20,21,22,23,24,25, 26,27,28,29,30	3,95	4,08
angle bracket 80/100/2	1,2,3,4,5,6,7	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36	5,11	2,78
angle bracket 100/100/2	1,2,3,4,5,6,7,8, 9	24,25,26,27,28,29,30,31,32,33, 34,35,36,37,38,39,40,41,42,43, 44,45,46	6,42	3,63
angle bracket 100/100/2 B	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	5,14	3,87
angle bracket 100/100/2,5	1,2,3,4,5,6,7,8, 9	24,25,26,27,28,29,30,31,32,33, 34,35,36,37,38,39,40,41,42,43, 44,45,46	6,42	5,66
angle bracket 105 R	1,2,4,5	16,17,18,19,22,23,26,29,31,32	4,57	10,3
angle bracket 105 B	1,2,4,5	17,18,19,20,21,24,25,28,31,33,34	5,71	3,52
angle bracket 105	1,2,4,5	17,18,19,20,21,24,25,28,31,33,34	6,15	5,22
angle bracket 105 H	1,2,4,5	17,18,19,20,21,24,25,28,31,33,34	6,15	5,22
angle bracket 105/3 R	1,2,4,5	16,17,18,19,22,23,26,29,31,32	4,92	14,1
angle bracket 105/3 RH	1,2,4,5	16,17,18,19,22,23,26,29,31,32	4,92	14,1
angle bracket 120	3,4,6,7	19,20,21,22,23,26,27,30,33,35, 36,38	6,31	5,22
angle bracket 120 H	3,4,6,7	19,20,21,22,23,26,27,30,33,35, 36,38	6,31	5,22
angle bracket 120 R	3,4,6,7	18,19,20,21,24,25,28,31,33,34,36	5,05	14,7
angle bracket 120 RH	3,4,6,7	18,19,20,21,24,25,28,31,33,34,36	5,05	14,7
angle bracket 65/130	1,2,4,5,8,9,11	17,18,19,21,22	2,01	4,15
angle bracket 140	1,2,3,6,7,9,10	22,23,24,25,26,29,30,33,36,38, 39,41,43,44	6,46	5,22
angle bracket 140 H	1,2,3,6,7,9,10	22,23,24,25,26,29,30,33,36,38, 39,41,43,44	6,46	5,22
angle bracket 140 R	1,2,3,6,7,9,10	21,22,23,24,27,28,31,34,36,37, 39,41,42	5,17	13,5
angle bracket 140 RH	1,2,3,6,7,9,10	21,22,23,24,27,28,31,34,36,37, 39,41,42	5,17	13,5

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
angle bracket 60/75/2 SH LH	1,2,3	10,11,12,14,15,16	1,40	0,75
angle bracket 60/75/2,5 SH LH	1,2	8,10,11,12,13	0,94	1,01
angle bracket 60/75/2 SH 2LH	1,2,3	9,10,11,13,14,15	1,40	1,17
angle bracket 20/80/2	1,2	9,10,11,12,13,14,15,16	1,25	0,78
angle bracket 20/80/2,5	1,2	9,10,11,12,13,14,15,16	1,25	1,21
angle bracket 40/80/2	1,2	12,13,14,15,16,18,19,20,21,22	1,23	0,97
angle bracket 40/80/2,5	1,2	12,13,14,15,16,18,19,20,21,22	1,23	1,51
angle bracket 50/80/2 B	1,2,3	13,14,15,16,17,18,19,20,21,22, 23,24	1,91	1,31
angle bracket 50/80/2,5 B	1,2,3	15,16,17,18,19,20,21,22,23,24, 25,26,27,28	2,45	1,39
angle bracket 60/80/2	1,2,3,4	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36	3,06	1,74
angle bracket 80/80/2	1,2,3,4	20,21,22,23,24,25,26,27,28,30, 31,32,33,34,35,36,37,38	2,47	1,93
angle bracket 100/80/2	1,2,3,4	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36	3,06	2,72
angle bracket 100/80/2 B	1,2,3,4	20,21,22,23,24,25,26,27,28,30, 31,32,33,34,35,36,37,38	2,47	3,02
angle bracket 100/80/2,5	1,2,4,5	11,12	0,68	0,73
angle bracket 100/80/2,5 B	1,2,3,4,5,6	10,11,12,14,15,16	1,40	0,75
angle bracket 40/90/2,5	1,2,4,5,6	10,11,13,14,15	0,94	0,66
angle bracket LL	1,2,3,4,5,6	10,12,14,15,16	1,40	1,01
angle bracket LL	1,2,4,5,6	10,11,13,14,15	0,94	1,04
angle bracket LL	1,2,4	8,9,11,12,13	0,94	1,04
angle bracket LL	1,2,5,6	16,17,18,20,21,22,24,25,26,29,30	1,72	1,62
angle bracket LL	1,2,5,6	16,17,18,20,21,22,24,25,26,29,30	1,72	1,62
angle bracket 90 B	1,2,5,6	13,14,16,17,19,20,23,24	1,15	5,73
angle bracket 90 BL	1,2	14,15,16,17,18,21,22,25,26,27,28	2,97	2,61
angle bracket 90/90 H	1,2	14,15,16,17,18,21,22,25,26,27,28	2,97	2,61
angle bracket 90/90 R	1,2	13,14,15,16,19,20,23,24,25,26	2,37	6,94
angle bracket 90/90 RH	1,2	13,14,15,16,19,20,23,24,25,26	2,37	6,94
angle bracket 40/100/2	1,2,3,4	11,12,13,14,15,16,17,18,19,20	1,30	0,78
angle bracket 40/100/2,5	1,2,3,4	11,12,13,14,15,16,17,18,19,20	1,30	1,21
angle bracket 50/100/2	1,2,3,5,6	16,17,18,19,20,22,23,24,25,26, 28,29	1,28	0,93
angle bracket 50/100/2,5	1,2,3,5,6	16,17,18,19,20,22,23,24,25,26, 28,29	1,28	1,45
angle bracket 50/100/2,5 R	1,2,3,4,5	13,14,15,16,20,21,22,23,24	1,28	4,16
angle bracket 60/100/2	1,2,3,4,5,6	16,17,18,19,20,21,22,23,24,25, 26,27,28,29,30	1,97	1,31
angle bracket 60/100/2,5	1,2,3,4,5,6	16,17,18,19,20,21,22,23,24,25, 26,27,28,29,30	1,97	2,04

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (column)	
			Timber	Steel
angle bracket 80/100/2	1,2,3,4,5,6,7	19,20,21,22,23,24,25,26,27,28, 29,30,31,32,33,34,35,36	2,55	1,39
angle bracket 100/100/2	1,2,3,4,5,6,7,8,9	24,25,26,27,28,29,30,31,32,33, 34,35,36,37,38,39,40,41,42, 43,44,45,46	3,21	1,81
angle bracket 100/100/2 B	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	2,57	1,93
angle bracket 100/100/2,5	1,2,3,4,5,6,7,8,9	24,25,26,27,28,29,30,31,32, 33,34,35,36,37,38,39,40,41, 42,43,44,45,46	3,21	2,83
angle bracket 105 R	1,2,4,5	16,17,18,19,22,23,26,29,31,32	2,28	5,14
angle bracket 105 B	1,2,4,5	17,18,19,20,21,24,25,28, 31,33,34	2,86	1,76
angle bracket 105	1,2,4,5	17,18,19,20,21,24,25,28,31, 33,34	3,07	2,61
angle bracket 105 H	1,2,4,5	17,18,19,20,21,24,25,28,31, 33,34	3,07	2,61
angle bracket 105/3 R	1,2,4,5	16,17,18,19,22,23,26,29,31,32	2,46	7,03
angle bracket 105/3 RH	1,2,4,5	16,17,18,19,22,23,26,29,31,32	2,46	7,03
angle bracket 120	3,4,6,7	19,20,21,22,23,26,27,30,33, 35,36,38	3,15	2,61
angle bracket 120 H	3,4,6,7	19,20,21,22,23,26,27,30,33, 35,36,38	3,15	2,61
angle bracket 120 R	3,4,6,7	18,19,20,21,24,25,28,31,33,34,36	2,52	7,37
angle bracket 120 RH	3,4,6,7	18,19,20,21,24,25,28,31,33,34,36	2,52	7,36
angle bracket 65/130	1,2,4,5,8,9,11	17,18,19,21,22	1,01	2,08
angle bracket 140	1,2,3,6,7,9,10	22,23,24,25,26,29,30,33,36, 38,39,41,43,44	3,23	2,61
angle bracket 140 H	1,2,3,6,7,9,10	22,23,24,25,26,29,30,33,36, 38,39,41,43,44	3,23	2,61
angle bracket 140 R	1,2,3,6,7,9,10	21,22,23,24,27,28,31,34,36, 37,39,41,42	2,58	6,74
angle bracket 140 RH	1,2,3,6,7,9,10	21,22,23,24,27,28,31,34,36, 37,39,41,42	2,58	6,74

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
angle bracket 40/40/2	1,2	5,6,7,8	2,00	1,55
angle bracket 40/40/2,5	1,2	5,6,7,8	2,00	2,43
angle bracket 50/40/2	1,2,3	6,7,8,9,10	3,15	2,03
angle bracket 50/40/2,5	1,2,3	6,7,8,9,10	3,15	3,17
angle bracket 60/40/2	1,2,3	7,8,9,10,11,12	3,15	2,61
angle bracket 60/40/2,5	1,2,3	7,8,9,10,11,12	3,15	4,08
angle bracket 80/40/2	1,2,3	8,9,10,11,12,13,14	3,83	2,90
angle bracket 80/40/2,5	1,2,3	8,9,10,11,12,13,14	3,78	4,35
angle bracket 100/40/2	1,2,3,4	10,11,12,13,14,15,16,17,18	4,83	3,63
angle bracket 100/40/2,5	1,2,3,4	10,11,12,13,14,15,16,17,18	4,83	5,66
angle bracket 50 R	1,2	6,7,9,10	1,96	3,24
angle bracket 60/35/2 SR LH	1,2,4,5	7,9	1,14	1,29
angle bracket 60/35/2,5 SR LH	1,2	4,5	1,17	0,78
angle bracket 60/35/2 SR 2LH	1,2	4,5	1,17	1,21
angle bracket 20/60/2	1,2,3	6,7,8,9,10	2,34	1,04
angle bracket 20/60/2,5	1,2,3	6,7,8,9,10	2,34	1,62
angle bracket 30/60/2	1,2,3,4	7,8,9,10,11,12	2,34	1,55
angle bracket 30/60/2,5	1,2,3,4,5	8,9,10,11,12,13,14,15	3,61	2,03
angle bracket 40/60/2	1,2,3,5,6	10,11,12,13,14,16,17	2,30	1,93
angle bracket 50/60/2	1,2,3,4,5	8,9,10,11,12,13,14,15	3,61	3,17
angle bracket 50/60/2 B	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	3,61	2,61
angle bracket 50/60/2,5	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19,20,21,2 2	4,60	2,90
angle bracket 60/60/2	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19,20, 21,22	4,59	4,53
angle bracket 80/60/2	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20,21, 22,23,24	4,60	3,38
angle bracket 80/60/2,5	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20,21, 22,23,24	4,60	5,29
angle bracket 90/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22,23, 24,25,26,27,28	5,75	3,63
angle bracket 90/60/2,5	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23,24, 26,27,28,29	4,60	3,87
angle bracket 100/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22,23, 24,25,26,27,28	5,75	5,66
angle bracket 100/60/2 B	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23,24, 26,27,28,29	4,60	6,04

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
angle bracket 100/60/2,5	1,2,3,4	8,9,11,12,13,14	2,06	3,92
angle bracket 100/60/2,5 B	1,2,3,4	8,9,13,14	2,21	3,24
angle bracket 60/3	1,2,3,4,5,6	10,11,12,14,15,16	2,81	1,49
angle bracket 60 R	1,2,4	8,10,11,12,13	1,87	2,02
angle bracket 60/75/2 SH LH	1,2,3,4,5	9,10,11,13,14,15	2,81	2,33
angle bracket 60/75/2,5 SH LH	1,2,3	5,6,7,8	1,25	0,78
angle bracket 60/75/2 SH 2LH	1,2,3	5,6,7,8	1,25	1,21
angle bracket 20/80/2	1,2,3,4,5,6	9,10,11,12,13,14,15,16	2,50	1,55
angle bracket 20/80/2,5	1,2,3,4,5,6	9,10,11,12,13,14,15,16	2,50	2,43
angle bracket 40/80/2	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20,21,22	2,47	1,93
angle bracket 40/80/2,5	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20,21,22	2,47	3,02
angle bracket 50/80/2 B	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20,21,22,23,24	3,82	2,61
angle bracket 50/80/2,5 B	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22,23,24,25,26,27,28	4,90	2,78
angle bracket 60/80/2	1,2,3,4,5,6,7,8,9,10,11,12,13	19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36	6,13	3,48
angle bracket 80/80/2	1,2,3,4,5,6,7,8,9,11,12,13,14	20,21,22,23,24,25,26,27,28,30,31,32,33,34,35,36,37,38	4,94	3,87
angle bracket 100/80/2	1,2,3,4,5,6,7,8,9,10,11,12,13	19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36	6,13	5,44
angle bracket 100/80/2 B	1,2,3,4,5,6,7,8,9,11,12,13,14	20,21,22,23,24,25,26,27,28,30,31,32,33,34,35,36,37,38	4,94	6,04
angle bracket 100/80/2,5	1,2,4,5,6,7	11,12	1,36	1,47
angle bracket 100/80/2,5 B	1,2,3,4,5,6,7,9	10,11,12,14,15,16	2,81	1,49
angle bracket 40/90/2,5	1,2,4,5,6,7,9	10,11,13,14,15	1,87	1,33
angle bracket LL	1,2,3,4,5,6,7,9	10,12,14,15,16	2,81	2,02
angle bracket LL	1,2,4,5,6,7,9	10,11,13,14,15	1,87	2,07
angle bracket LL	1,2,4,5,6	8,9,11,12,13	1,87	2,07
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24,25,26,29,30	3,44	3,24
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24,25,26,29,30	3,44	3,24
angle bracket 90 B	1,2,5,6,8,9	13,14,16,17,19,20,23,24	2,29	11,47
angle bracket 90 BL	1,2,5,6,8	14,15,16,17,18,21,22,25,26,27,28	5,94	5,22
angle bracket 90 R	1,2,5,6,8	14,15,16,17,18,21,22,25,26,27,28	5,94	5,22
angle bracket 90/90	1,2,5,6	13,14,15,16,19,20,23,24,25,26	4,75	13,9
angle bracket 90/90 H	1,2,5,6	13,14,15,16,19,20,23,24,25,26	4,75	13,9

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
angle bracket 90/90 R	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	2,59	1,55
angle bracket 90/90 RH	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	2,59	2,43
angle bracket 40/100/2	1,2,3,5,6,7,8,9,11,12	16,17,18,19,20,22,23,24,25, 26,28,29	2,55	1,86
angle bracket 40/100/2,5	1,2,3,5,6,7,8,9,11,12	16,17,18,19,20,22,23,24,25, 26,28,29	2,55	2,90
angle bracket 50/100/2	1,2,3,4,5,9,10	13,14,15,16,20,21,22,23,24	2,56	8,33
angle bracket 50/100/2,5	1,2,3,4,5,6,7,8,9, 10,11,12	16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30	3,95	2,61
angle bracket 50/100/2,5 R	1,2,3,4,5,6,7,8,9, 10,11,12	16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30	3,95	4,08
angle bracket 60/100/2	1,2,3,4,5,6,7,8,9, 10,11,12,13,14	19,20,21,22,23,24,25,26,27, 28,29,30,31,32,33,34,35,36	5,11	2,78
angle bracket 60/100/2,5	1,2,3,4,5,6,7,8,9,10,11, 12,13,14,15,16,17,18	24,25,26,27,28,29,30,31,32, 33,34,35,36,37,38,39,40,41, 42,43,44,45,46	6,42	3,63
angle bracket 80/100/2	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	5,14	3,87
angle bracket 100/100/2	1,2,3,4,5,6,7,8,9,10,11, 12,13,14,15,16,17,18	24,25,26,27,28,29,30,31,32, 33,34,35,36,37,38,39,40,41, 42,43,44,45,46	6,42	5,66
angle bracket 100/100/2 B	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	4,57	10,27
angle bracket 100/100/2,5	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28, 31,33,34	5,71	3,52
angle bracket 105 R	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,3 4	6,15	5,22
angle bracket 105 B	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31, 33,34	6,15	5,22
angle bracket 105	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	4,92	14,1
angle bracket 105 H	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	4,92	14,1
angle bracket 105/3 R	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30,33, 35,36,38	6,31	5,22
angle bracket 105/3 RH	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30,33, 35,36,38	6,31	5,22
angle bracket 120	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33, 34,36	5,05	14,7
angle bracket 120 H	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33, 34,36	5,05	14,7
angle bracket 120 R	1,2,4,5,8,9,12, 13,14,15	17,18,19,21,22	2,01	4,15
angle bracket 120 RH	1,2,3,6,7,9,10,13,14,16	22,23,24,25,26,29,30,33,36, 38,39,41,43,44	6,46	5,22

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
angle bracket 65/130	1,2,3,6,7,9,10,13,14,16	22,23,24,25,26,29,30,33,36, 38,39,41,43,44	6,46	5,22
angle bracket 140	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34,36, 37,39,41,42	5,17	13,5
angle bracket 140 H	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34,36, 37,39,41,42	5,17	13,5

Table 4: Force F_1 Purlin, 2 angle brackets / connection

Bracket type	Nail number n_V	k_t	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
angle bracket 60/35/2,5 SR LH	1,2,3,4,5	3,0	15,9	1,36
angle bracket 60/35/2 SR LH	1,2	3,0	6,41	0,87

Table 5: 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
angle bracket 40/40/2	1,2	5,6,7,8	1,00	0,78
angle bracket 40/40/2,5	1,2	5,6,7,8	1,00	1,21
angle bracket 50/40/2	1,2,3	6,7,8,9,10	1,58	1,02
angle bracket 50/40/2,5	1,2,3	6,7,8,9,10	1,58	1,59
angle bracket 60/40/2	1,2,3	7,8,9,10,11,12	1,58	1,31
angle bracket 60/40/2,5	1,2,3	7,8,9,10,11,12	1,58	2,04
angle bracket 80/40/2	1,2,3	8,9,10,11,12,13,14	1,92	1,45
angle bracket 80/40/2,5	1,2,3	8,9,10,11,12,13,14	1,89	2,18
angle bracket 100/40/2	1,2,3,4	10,11,12,13,14,15,16,17,18	2,42	1,81
angle bracket 100/40/2,5	1,2,3,4	10,11,12,13,14,15,16,17,18	2,42	2,83
angle bracket 50 R	1,2	6,7,9,10	0,98	1,62
angle bracket 60/35/2 SR LH	1,2,4,5	7,9	0,57	0,65
angle bracket 60/35/2,5 SR LH	1,2	4,5	0,59	0,39
angle bracket 60/35/2 SR 2LH	1,2	4,5	0,59	0,61
angle bracket 20/60/2	1,2,3	6,7,8,9,10	1,17	0,52
angle bracket 20/60/2,5	1,2,3	6,7,8,9,10	1,17	0,81
angle bracket 30/60/2	1,2,3,4	7,8,9,10,11,12	1,17	0,78
angle bracket 30/60/2,5	1,2,3,4,5	8,9,10,11,12,13,14,15	1,80	1,02
angle bracket 40/60/2	1,2,3,5,6	10,11,12,13,14,16,17	1,15	0,97
angle bracket 50/60/2	1,2,3,4,5	8,9,10,11,12,13,14,15	1,80	1,59
angle bracket 50/60/2 B	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	1,80	1,31
angle bracket 50/60/2,5	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19, 20,21,22	2,30	1,45
angle bracket 60/60/2	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19, 20,21,22	2,29	2,27
angle bracket 80/60/2	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20, 21,22,23,24	2,30	1,69
angle bracket 80/60/2,5	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20, 21,22,23,24	2,30	2,64
angle bracket 90/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22, 23,24,25,26,27,28	2,87	1,81
angle bracket 90/60/2,5	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23, 24,26,27,28,29	2,30	1,93
angle bracket 100/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22, 23,24,25,26,27,28	2,87	2,83
angle bracket 100/60/2 B	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23, 24,26,27,28,29	2,30	3,02

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
angle bracket 100/60/2,5	1,2,3,4	8,9,11,12,13,14	1,03	1,96
angle bracket 100/60/2,5 B	1,2,3,4	8,9,13,14	1,10	1,62
angle bracket 60/3	1,2,3,4,5,6	10,11,12,14,15,16	1,40	0,75
angle bracket 60 R	1,2,4	8,10,11,12,13	0,94	1,01
angle bracket 60/75/2 SH LH	1,2,3,4,5	9,10,11,13,14,15	1,40	1,17
angle bracket 60/75/2,5 SH LH	1,2,3	5,6,7,8	0,63	0,39
angle bracket 60/75/2 SH 2LH	1,2,3	5,6,7,8	0,63	0,61
angle bracket 20/80/2	1,2,3,4,5,6	9,10,11,12,13,14,15,16	1,25	0,78
angle bracket 20/80/2,5	1,2,3,4,5,6	9,10,11,12,13,14,15,16	1,25	1,21
angle bracket 40/80/2	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20, 21,22	1,23	0,97
angle bracket 40/80/2,5	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20, 21,22	1,23	1,51
angle bracket 50/80/2 B	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20, 21,22,23,24	1,91	1,31
angle bracket 50/80/2,5 B	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22, 23,24,25,26,27,28	2,45	1,39
angle bracket 60/80/2	1,2,3,4,5,6,7,8,9, 10,11,12,13	19,20,21,22,23,24,25,26,27, 28,29,30,31,32,33,34,35,36	3,06	1,74
angle bracket 80/80/2	1,2,3,4,5,6,7,8,9, 11,12,13,14	20,21,22,23,24,25,26,27,28, 30,31,32,33,34,35,36,37,38	2,47	1,93
angle bracket 100/80/2	1,2,3,4,5,6,7,8,9, 10,11,12,13	19,20,21,22,23,24,25,26,27, 28,29,30,31,32,33,34,35,36	3,06	2,72
angle bracket 100/80/2 B	1,2,3,4,5,6,7,8,9, 11,12,13,14	20,21,22,23,24,25,26,27,28, 30,31,32,33,34,35,36,37,38	2,47	3,02
angle bracket 100/80/2,5	1,2,4,5,6,7	11,12	0,68	0,73
angle bracket 100/80/2,5 B	1,2,3,4,5,6,7,9	10,11,12,14,15,16	1,40	0,75
angle bracket 40/90/2,5	1,2,4,5,6,7,9	10,11,13,14,15	0,94	0,66
angle bracket LL	1,2,3,4,5,6,7,9	10,12,14,15,16	1,40	1,01
angle bracket LL	1,2,4,5,6,7,9	10,11,13,14,15	0,94	1,04
angle bracket LL	1,2,4,5,6	8,9,11,12,13	0,94	1,04
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24, 25,26,29,30	1,72	1,62
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24, 25,26,29,30	1,72	1,62
angle bracket 90 B	1,2,5,6,8,9	13,14,16,17,19,20,23,24	1,15	5,73
angle bracket 90 BL	1,2,5,6,8	14,15,16,17,18,21,22,25, 26,27,28	2,97	2,61
angle bracket 90 R	1,2,5,6,8	14,15,16,17,18,21,22,25, 26,27,28	2,97	2,61
angle bracket 90/90	1,2,5,6	13,14,15,16,19,20,23,24,25,26	2,37	6,94
angle bracket 90/90 H	1,2,5,6	13,14,15,16,19,20,23,24,25,26	2,37	6,94

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
angle bracket 90/90 R	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	1,30	0,78
angle bracket 90/90 RH	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	1,30	1,21
angle bracket 40/100/2	1,2,3,5,6,7,8,9,11, 12	16,17,18,19,20,22,23,24, 25,26,28,29	1,28	0,93
angle bracket 40/100/2,5	1,2,3,5,6,7,8,9,11, 12	16,17,18,19,20,22,23,24,25,26,28,2 9	1,28	1,45
angle bracket 50/100/2	1,2,3,4,5,9,10	13,14,15,16,20,21,22,23,24	1,28	4,16
angle bracket 50/100/2,5	1,2,3,4,5,6,7,8,9,10, 11,12	16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30	1,97	1,31
angle bracket 50/100/2,5 R	1,2,3,4,5,6,7,8,9, 10,11,12	16,17,18,19,20,21,22,23,24, 25,26,27,28,29,30	1,97	2,04
angle bracket 60/100/2	1,2,3,4,5,6,7,8,9, 10,11,12,13,14	19,20,21,22,23,24,25,26,27, 28,29,30,31,32,33,34,35,36	2,55	1,39
angle bracket 60/100/2,5	1,2,3,4,5,6,7,8,9,10, 11,12,13,14,15,16, 17,18	24,25,26,27,28,29,30,31,32, 33,34,35,36,37,38,39,40,41, 42,43,44,45,46	3,21	1,81
angle bracket 80/100/2	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	2,57	1,93
angle bracket 100/100/2	1,2,3,4,5,6,7,8,9,10, 11,12,13,14,15,16, 17,18	24,25,26,27,28,29,30,31,32, 33,34,35,36,37,38,39,40, 41,42,43,44,45,46	3,21	2,83
angle bracket 100/100/2 B	1,2,4,5,8,9	16,17,18,19,22,23,26, 29,31,32	2,28	5,14
angle bracket 100/100/2,5	1,2,4,5,8,9,11	17,18,19,20,21,24,25, 28,31,33,34	2,86	1,76
angle bracket 105 R	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28, 31,33,34	3,07	2,61
angle bracket 105 B	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28, 31,33,34	3,07	2,61
angle bracket 105	1,2,4,5,8,9	16,17,18,19,22,23,26,29, 31,32	2,46	7,03
angle bracket 105 H	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	2,46	7,03
angle bracket 105/3 R	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30, 33,35,36,38	3,15	2,61
angle bracket 105/3 RH	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30, 33,35,36,38	3,15	2,61
angle bracket 120	3,4,6,7,10,11	18,19,20,21,24,25,28,31, 33,34,36	2,52	7,37
angle bracket 120 H	3,4,6,7,10,11	18,19,20,21,24,25,28,31, 33,34,36	2,52	7,36
angle bracket 120 R	1,2,4,5,8,9,12, 13,14,15	17,18,19,21,22	1,01	2,08
angle bracket 120 RH	1,2,3,6,7,9,10,13, 14,16	22,23,24,25,26,29,30,33, 36,38,39,41,43,44	3,23	2,61

Bracket type	Nail number n_V	Nail number n_H	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
angle bracket 65/130	1,2,3,6,7,9,10,13, 14,16	22,23,24,25,26,29,30,33, 36,38,39,41,43,44	3,23	2,61
angle bracket 140	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34, 36,37,39,41,42	2,58	6,74
angle bracket 140 H	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34, 36,37,39,41,42	2,58	6,74

Table 6: Force F_1 Purlin, 1 angle bracket / connection

Bracket type	Nail number n_V	k_t	$F_{1,Rk}$ [kN] (purlin)	
			Timber	Steel
angle bracket 60/35/2,5 SR LH	1,2,3,4,5	3,0	7,95	0,68
angle bracket 60/35/2 SR LH	1,2	3,0	3,21	0,44

Table 7: Forces $F_{2,3}$, 2 angle brackets / connection

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
angle bracket 40/40/2	1,2	5,6,7,8	3,36
angle bracket 40/40/2,5	1,2	5,6,7,8	3,40
angle bracket 50/40/2	1,2,3	6,7,8,9,10	5,52
angle bracket 50/40/2,5	1,2,3	6,7,8,9,10	5,49
angle bracket 60/40/2	1,2,3	7,8,9,10,11,12	6,53
angle bracket 60/40/2,5	1,2,3	7,8,9,10,11,12	6,50
angle bracket 80/40/2	1,2,3	8,9,10,11,12,13,14	7,71
angle bracket 80/40/2,5	1,2,3	8,9,10,11,12,13,14	7,58
angle bracket 100/40/2	1,2,3,4	10,11,12,13,14,15,16,17,18	11,6
angle bracket 100/40/2,5	1,2,3,4	10,11,12,13,14,15,16,17,18	11,5
angle bracket 50 R	1,2	6,7,9,10	4,21
angle bracket 60/35/2 SR LH	1,2,4,5	7,9	4,83
angle bracket 60/35/2,5 SR LH	1,2	4,5	1,65
angle bracket 60/35/2 SR 2LH	1,2	4,5	1,64
angle bracket 20/60/2	1,2,3	6,7,8,9,10	2,80
angle bracket 20/60/2,5	1,2,3	6,7,8,9,10	2,82
angle bracket 30/60/2	1,2,3,4	7,8,9,10,11,12	4,46
angle bracket 30/60/2,5	1,2,3,4,5	8,9,10,11,12,13,14,15	6,93
angle bracket 40/60/2	1,2,3,5,6	10,11,12,13,14,16,17	5,57
angle bracket 50/60/2	1,2,3,4,5	8,9,10,11,12,13,14,15	6,89

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
angle bracket 50/60/2 B	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	8,38
angle bracket 50/60/2,5	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19,20,21,22	11,3
angle bracket 60/60/2	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19,20,21,22	11,3
angle bracket 80/60/2	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20,21,22,23,24	13,4
angle bracket 80/60/2,5	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20,21,22,23,24	13,3
angle bracket 90/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22,23,24,25, 26,27,28	17,0
angle bracket 90/60/2,5	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23,24,26,27, 28,29	15,5
angle bracket 100/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22,23,24,25, 26,27,28	16,9
angle bracket 100/60/2 B	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23,24,26,27, 28,29	14,2
angle bracket 100/60/2,5	1,2,3,4	8,9,11,12,13,14	5,81
angle bracket 100/60/2,5 B	1,2,3,4	8,9,13,14	5,34
angle bracket 60/3	1,2,3,4,5,6	10,11,12,14,15,16	5,76
angle bracket 60 R	1,2,4	8,10,11,12,13	3,46
angle bracket 60/75/2 SH LH	1,2,3,4,5	9,10,11,13,14,15	5,27
angle bracket 60/75/2,5 SH LH	1,2,3	5,6,7,8	2,47
angle bracket 60/75/2 SH 2LH	1,2,3	5,6,7,8	2,45
angle bracket 20/80/2	1,2,3,4,5,6	9,10,11,12,13,14,15,16	5,96
angle bracket 20/80/2,5	1,2,3,4,5,6	9,10,11,12,13,14,15,16	5,92
angle bracket 40/80/2	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20,21,22	7,38
angle bracket 40/80/2,5	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20,21,22	7,33
angle bracket 50/80/2 B	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20,21,22,23,24	10,6
angle bracket 50/80/2,5 B	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22,23,24,25, 26,27,28	12,7
angle bracket 60/80/2	1,2,3,4,5,6,7,8,9,10,11, 12,13	19,20,21,22,23,24,25,26,27,28,29, 30,31,32,33,34,35,36	19,0
angle bracket 80/80/2	1,2,3,4,5,6,7,8,9,11,12, 13,14	20,21,22,23,24,25,26,27,28,30,31, 32,33,34,35,36,37,38	18,8
angle bracket 100/80/2	1,2,3,4,5,6,7,8,9,10,11, 12,13	19,20,21,22,23,24,25,26,27,28,29, 30,31,32,33,34,35,36	18,9
angle bracket 100/80/2 B	1,2,3,4,5,6,7,8,9,11,12, 13,14	20,21,22,23,24,25,26,27,28,30,31, 32,33,34,35,36,37,38	18,7
angle bracket 100/80/2,5	1,2,4,5,6,7	11,12	3,05
angle bracket 100/80/2,5 B	1,2,3,4,5,6,7,9	10,11,12,14,15,16	6,70
angle bracket 40/90/2,5	1,2,4,5,6,7,9	10,11,13,14,15	6,18
angle bracket LL	1,2,3,4,5,6,7,9	10,12,14,15,16	6,01
angle bracket LL	1,2,4,5,6,7,9	10,11,13,14,15	6,13
angle bracket LL	1,2,4,5,6	8,9,11,12,13	5,30

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24,25,26,29,30	7,51
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24,25,26,29,30	7,52
angle bracket 90 B	1,2,5,6,8,9	13,14,16,17,19,20,23,24	7,20
angle bracket 90 BL	1,2,5,6,8	14,15,16,17,18,21,22,25,26,27,28	8,68
angle bracket 90 R	1,2,5,6,8	14,15,16,17,18,21,22,25,26,27,28	8,68
angle bracket 90/90	1,2,5,6	13,14,15,16,19,20,23,24,25,26	7,60
angle bracket 90/90 H	1,2,5,6	13,14,15,16,19,20,23,24,25,26	7,60
angle bracket 90/90 R	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	7,37
angle bracket 90/90 RH	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	7,32
angle bracket 40/100/2	1,2,3,5,6,7,8,9,11,12	16,17,18,19,20,22,23,24,25,26,28,29	9,16
angle bracket 40/100/2,5	1,2,3,5,6,7,8,9,11,12	16,17,18,19,20,22,23,24,25,26,28,29	9,10
angle bracket 50/100/2	1,2,3,4,5,9,10	13,14,15,16,20,21,22,23,24	6,99
angle bracket 50/100/2,5	1,2,3,4,5,6,7,8,9,10,11,12	16,17,18,19,20,21,22,23,24,25,26,27,28,29,30	12,6
angle bracket 50/100/2,5 R	1,2,3,4,5,6,7,8,9,10,11,12	16,17,18,19,20,21,22,23,24,25,26,27,28,29,30	12,6
angle bracket 60/100/2	1,2,3,4,5,6,7,8,9,10,11,12,13,14	19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36	15,9
angle bracket 60/100/2,5	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46	23,1
angle bracket 80/100/2	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	21,9
angle bracket 100/100/2	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46	22,9
angle bracket 100/100/2 B	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	7,51
angle bracket 100/100/2,5	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	7,10
angle bracket 105 R	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	9,22
angle bracket 105 B	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	9,22
angle bracket 105	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	8,24
angle bracket 105 H	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	8,24
angle bracket 105/3 R	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30,33,35,36,38	9,36
angle bracket 105/3 RH	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30,33,35,36,38	9,36
angle bracket 120	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33,34,36	8,38
angle bracket 120 H	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33,34,36	8,38
angle bracket 120 R	1,2,4,5,8,9,12,13,14,15	17,18,19,21,22	7,59
angle bracket 120 RH	1,2,3,6,7,9,10,13,14,16	22,23,24,25,26,29,30,33,36,38,39,41,43,44	10,9
angle bracket 65/130	1,2,3,6,7,9,10,13,14,16	22,23,24,25,26,29,30,33,36,38,39,41,43,44	10,9
angle bracket 140	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34,36,37,39,41,42	9,86

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
angle bracket 140 H	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34,36,37,39, 41,42	9,86

Table 8: Forces $F_{2,3}$, 1 angle bracket / connection

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
angle bracket 40/40/2	1,2	5,6,7,8	1,68
angle bracket 40/40/2,5	1,2	5,6,7,8	1,70
angle bracket 50/40/2	1,2,3	6,7,8,9,10	2,76
angle bracket 50/40/2,5	1,2,3	6,7,8,9,10	2,74
angle bracket 60/40/2	1,2,3	7,8,9,10,11,12	3,27
angle bracket 60/40/2,5	1,2,3	7,8,9,10,11,12	3,25
angle bracket 80/40/2	1,2,3	8,9,10,11,12,13,14	3,85
angle bracket 80/40/2,5	1,2,3	8,9,10,11,12,13,14	3,79
angle bracket 100/40/2	1,2,3,4	10,11,12,13,14,15,16,17,18	5,79
angle bracket 100/40/2,5	1,2,3,4	10,11,12,13,14,15,16,17,18	5,76
angle bracket 50 R	1,2	6,7,9,10	2,10
angle bracket 60/35/2 SR LH	1,2,4,5	7,9	2,41
angle bracket 60/35/2,5 SR LH	1,2	4,5	0,83
angle bracket 60/35/2 SR 2LH	1,2	4,5	0,82
angle bracket 20/60/2	1,2,3	6,7,8,9,10	1,40
angle bracket 20/60/2,5	1,2,3	6,7,8,9,10	1,41
angle bracket 30/60/2	1,2,3,4	7,8,9,10,11,12	2,23
angle bracket 30/60/2,5	1,2,3,4,5	8,9,10,11,12,13,14,15	3,47
angle bracket 40/60/2	1,2,3,5,6	10,11,12,13,14,16,17	2,79
angle bracket 50/60/2	1,2,3,4,5	8,9,10,11,12,13,14,15	3,45
angle bracket 50/60/2 B	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	4,19
angle bracket 50/60/2,5	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19,20,21,22	5,67
angle bracket 60/60/2	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19,20,21,22	5,63
angle bracket 80/60/2	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20,21,22,23,24	6,70
angle bracket 80/60/2,5	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20,21,22,23,24	6,66
angle bracket 90/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22,23,24,25, 26,27,28	8,48
angle bracket 90/60/2,5	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23,24,26,27, 28,29	7,74
angle bracket 100/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22,23,24,25, 26,27,28	8,43
angle bracket 100/60/2 B	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23,24,26, 27,28,29	7,11
angle bracket 100/60/2,5	1,2,3,4	8,9,11,12,13,14	2,90
angle bracket 100/60/2,5 B	1,2,3,4	8,9,13,14	2,67
angle bracket 60/3	1,2,3,4,5,6	10,11,12,14,15,16	2,88

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
angle bracket 60 R	1,2,4	8,10,11,12,13	1,73
angle bracket 60/75/2 SH LH	1,2,3,4,5	9,10,11,13,14,15	2,63
angle bracket 60/75/2,5 SH LH	1,2,3	5,6,7,8	1,24
angle bracket 60/75/2 SH 2LH	1,2,3	5,6,7,8	1,23
angle bracket 20/80/2	1,2,3,4,5,6	9,10,11,12,13,14,15,16	2,98
angle bracket 20/80/2,5	1,2,3,4,5,6	9,10,11,12,13,14,15,16	2,96
angle bracket 40/80/2	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20,21,22	3,69
angle bracket 40/80/2,5	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20,21,22	3,67
angle bracket 50/80/2 B	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20,21,22,23,24	5,29
angle bracket 50/80/2,5 B	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22,23,24,25, 26,27,28	6,35
angle bracket 60/80/2	1,2,3,4,5,6,7,8,9,10,11, 12,13	19,20,21,22,23,24,25,26,27,28,29, 30,31,32,33,34,35,36	9,49
angle bracket 80/80/2	1,2,3,4,5,6,7,8,9,11,12, 13,14	20,21,22,23,24,25,26,27,28,30,31, 32,33,34,35,36,37,38	9,41
angle bracket 100/80/2	1,2,3,4,5,6,7,8,9,10,11, 12,13	19,20,21,22,23,24,25,26,27,28,29, 30,31,32,33,34,35,36	9,43
angle bracket 100/80/2 B	1,2,3,4,5,6,7,8,9,11,12, 13,14	20,21,22,23,24,25,26,27,28,30,31, 32,33,34,35,36,37,38	9,37
angle bracket 100/80/2,5	1,2,4,5,6,7	11,12	1,52
angle bracket 100/80/2,5 B	1,2,3,4,5,6,7,9	10,11,12,14,15,16	3,35
angle bracket 40/90/2,5	1,2,4,5,6,7,9	10,11,13,14,15	3,09
angle bracket LL	1,2,3,4,5,6,7,9	10,12,14,15,16	3,01
angle bracket LL	1,2,4,5,6,7,9	10,11,13,14,15	3,06
angle bracket LL	1,2,4,5,6	8,9,11,12,13	2,65
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24,25,26,29,30	3,75
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24,25,26,29,30	3,76
angle bracket 90 B	1,2,5,6,8,9	13,14,16,17,19,20,23,24	3,60
angle bracket 90 BL	1,2,5,6,8	14,15,16,17,18,21,22,25,26,27,28	4,34
angle bracket 90 R	1,2,5,6,8	14,15,16,17,18,21,22,25,26,27,28	4,34
angle bracket 90/90	1,2,5,6	13,14,15,16,19,20,23,24,25,26	3,80
angle bracket 90/90 H	1,2,5,6	13,14,15,16,19,20,23,24,25,26	3,80
angle bracket 90/90 R	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	3,68
angle bracket 90/90 RH	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	3,66
angle bracket 40/100/2	1,2,3,5,6,7,8,9,11,12	16,17,18,19,20,22,23,24,25,26,28,29	4,58
angle bracket 40/100/2,5	1,2,3,5,6,7,8,9,11,12	16,17,18,19,20,22,23,24,25,26,28,29	4,55
angle bracket 50/100/2	1,2,3,4,5,9,10	13,14,15,16,20,21,22,23,24	3,49

Bracket type	Nail number n_V	Nail number n_H	$F_{2,3,Rk}$ [kN]
			Timber
angle bracket 50/100/2,5	1,2,3,4,5,6,7,8,9,10,11,12	16,17,18,19,20,21,22,23,24,25,26,27,28,29,30	6,32
angle bracket 50/100/2,5 R	1,2,3,4,5,6,7,8,9,10,11,12	16,17,18,19,20,21,22,23,24,25,26,27,28,29,30	6,28
angle bracket 60/100/2	1,2,3,4,5,6,7,8,9,10,11,12,13,14	19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36	7,95
angle bracket 60/100/2,5	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46	11,6
angle bracket 80/100/2	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	10,9
angle bracket 100/100/2	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46	11,5
angle bracket 100/100/2 B	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	3,76
angle bracket 100/100/2,5	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	3,55
angle bracket 105 R	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	4,61
angle bracket 105 B	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	4,61
angle bracket 105	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	4,12
angle bracket 105 H	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	4,12
angle bracket 105/3 R	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30,33,35,36,38	4,68
angle bracket 105/3 RH	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30,33,35,36,38	4,68
angle bracket 120	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33,34,36	4,19
angle bracket 120 H	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33,34,36	4,19
angle bracket 120 R	1,2,4,5,8,9,12,13,14,15	17,18,19,21,22	3,80
angle bracket 120 RH	1,2,3,6,7,9,10,13,14,16	22,23,24,25,26,29,30,33,36,38,39,41,43,44	5,44
angle bracket 65/130	1,2,3,6,7,9,10,13,14,16	22,23,24,25,26,29,30,33,36,38,39,41,43,44	5,44
angle bracket 140	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34,36,37,39,41,42	4,93
angle bracket 140 H	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34,36,37,39,41,42	4,93

Table 9: 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
angle bracket 40/40/2	1,2	5,6,7,8	7,13	2,04
angle bracket 40/40/2,5	1,2	5,6,7,8	6,07	2,66
angle bracket 50/40/2	1,2,3	6,7,8,9,10	9,09	2,27
angle bracket 50/40/2,5	1,2,3	6,7,8,9,10	7,08	2,91
angle bracket 60/40/2	1,2,3	7,8,9,10,11,12	9,76	2,90
angle bracket 60/40/2,5	1,2,3	7,8,9,10,11,12	9,10	3,75
angle bracket 80/40/2	1,2,3	8,9,10,11,12,13,14	12,1	4,20
angle bracket 80/40/2,5	1,2,3	8,9,10,11,12,13,14	11,4	5,67
angle bracket 100/40/2	1,2,3,4	10,11,12,13,14,15,16,17,18	14,3	5,21
angle bracket 100/40/2,5	1,2,3,4	10,11,12,13,14,15,16,17,18	14,5	6,89
angle bracket 50 R	1,2	6,7,9,10	7,53	4,04
angle bracket 60/35/2 SR LH	1,2,4,5	7,9	4,15	3,99
angle bracket 60/35/2,5 SR LH	1,2	4,5	2,46	1,14
angle bracket 60/35/2 SR 2LH	1,2	4,5	2,41	1,42
angle bracket 20/60/2	1,2,3	6,7,8,9,10	3,34	1,49
angle bracket 20/60/2,5	1,2,3	6,7,8,9,10	3,32	1,84
angle bracket 30/60/2	1,2,3,4	7,8,9,10,11,12	5,29	2,24
angle bracket 30/60/2,5	1,2,3,4,5	8,9,10,11,12,13,14,15	7,14	2,58
angle bracket 40/60/2	1,2,3,5,6	10,11,12,13,14,16,17	6,04	2,75
angle bracket 50/60/2	1,2,3,4,5	8,9,10,11,12,13,14,15	6,83	3,22
angle bracket 50/60/2 B	1,2,3,4,5,6	10,11,12,13,14,15,16,17,18	7,72	3,29
angle bracket 50/60/2,5	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19,20,21,22	9,10	4,33
angle bracket 60/60/2	1,2,3,4,5,6,7	12,13,14,15,16,17,18,19,20,21,22	9,09	5,52
angle bracket 80/60/2	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20,21,22,23,24	11,2	5,00
angle bracket 80/60/2,5	1,2,3,4,5,6,7,8	13,14,15,16,17,18,19,20,21,22,23,24	11,1	6,58
angle bracket 90/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22,23,24,25,26,27,28	12,0	5,52
angle bracket 90/60/2,5	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23,24,26,27,28,29	11,9	5,54
angle bracket 100/60/2	1,2,3,4,5,6,7,8,9	15,16,17,18,19,20,21,22,23,24,25,26,27,28	11,6	7,10
angle bracket 100/60/2 B	1,2,3,4,5,7,8,9,10	16,17,18,19,20,21,22,23,24,26,27,28,29	11,6	7,32

Bracket type	Nail number n_V	Nail number n_H	$F_{4,5,Rk}$ [kN]	
			Timber	Steel
angle bracket 100/60/2,5	1,2,3,4	8,9,11,12,13,14	6,45	4,79
angle bracket 100/60/2,5 B	1,2,3,4	8,9,13,14	7,79	4,12
angle bracket 60/3	1,2,3,4,5,6	10,11,12,14,15,16	7,21	3,65
angle bracket 60 R	1,2,4	8,10,11,12,13	4,57	4,74
angle bracket 60/75/2 SH LH	1,2,3,4,5	9,10,11,13,14,15	7,15	4,56
angle bracket 60/75/2,5 SH LH	1,2,3	5,6,7,8	2,93	1,11
angle bracket 60/75/2 SH 2LH	1,2,3	5,6,7,8	2,77	1,49
angle bracket 20/80/2	1,2,3,4,5,6	9,10,11,12,13,14,15,16	5,86	2,23
angle bracket 20/80/2,5	1,2,3,4,5,6	9,10,11,12,13,14,15,16	5,53	2,97
angle bracket 40/80/2	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20, 21,22	6,79	2,72
angle bracket 40/80/2,5	1,2,3,4,5,7,8	12,13,14,15,16,18,19,20, 21,22	6,53	3,71
angle bracket 50/80/2 B	1,2,3,4,5,6,7,8,9	13,14,15,16,17,18,19,20, 21,22,23,24	8,56	3,35
angle bracket 50/80/2,5 B	1,2,3,4,5,6,7,8,9,10	15,16,17,18,19,20,21,22, 23,24,25,26,27,28	10,3	4,39
angle bracket 60/80/2	1,2,3,4,5,6,7,8,9, 10,11,12,13	19,20,21,22,23,24,25,26,27, 28,29,30,31,32,33,34,35,36	13,3	5,49
angle bracket 80/80/2	1,2,3,4,5,6,7,8,9,11, 12,13,14	20,21,22,23,24,25,26,27,28, 30,31,32,33,34,35,36,37,38	13,2	5,50
angle bracket 100/80/2	1,2,3,4,5,6,7,8,9, 10,11,12,13	19,20,21,22,23,24,25,26,27, 28,29,30,31,32,33,34,35,36	12,6	7,53
angle bracket 100/80/2 B	1,2,3,4,5,6,7,8,9, 11,12,13,14	20,21,22,23,24,25,26,27,28, 30,31,32,33,34,35,36,37,38	12,8	7,33
angle bracket 100/80/2,5	1,2,4,5,6,7	11,12	4,01	3,08
angle bracket 100/80/2,5 B	1,2,3,4,5,6,7,9	10,11,12,14,15,16	8,27	5,41
angle bracket 40/90/2,5	1,2,4,5,6,7,9	10,11,13,14,15	7,94	5,08
angle bracket LL	1,2,3,4,5,6,7,9	10,12,14,15,16	6,98	5,98
angle bracket LL	1,2,4,5,6,7,9	10,11,13,14,15	6,97	5,99
angle bracket LL	1,2,4,5,6	8,9,11,12,13	6,46	5,84
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24,25, 26,29,30	7,06	4,59
angle bracket LL	1,2,5,6,9,10	16,17,18,20,21,22,24,25, 26,29,30	6,82	4,50
angle bracket 90 B	1,2,5,6,8,9	13,14,16,17,19,20,23,24	6,93	6,98

Bracket type	Nail number n_V	Nail number n_H	$F_{4,5,Rk}$ [kN]	
			Timber	Steel
angle bracket 90 BL	1,2,5,6,8	14,15,16,17,18,21,22,25,26,27,28	11,3	7,73
angle bracket 90 R	1,2,5,6,8	14,15,16,17,18,21,22,25,26,27,28	11,3	7,54
angle bracket 90/90	1,2,5,6	13,14,15,16,19,20,23,24,25,26	9,77	10,1
angle bracket 90/90 H	1,2,5,6	13,14,15,16,19,20,23,24,25,26	9,79	9,75
angle bracket 90/90 R	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	6,18	2,18
angle bracket 90/90 RH	1,2,3,4,5,6,7,8	11,12,13,14,15,16,17,18,19,20	5,96	2,96
angle bracket 40/100/2	1,2,3,5,6,7,8,9,11,12	16,17,18,19,20,22,23,24,25,26,28,29	7,19	2,66
angle bracket 40/100/2,5	1,2,3,5,6,7,8,9,11,12	16,17,18,19,20,22,23,24,25,26,28,29	7,08	3,64
angle bracket 50/100/2	1,2,3,4,5,9,10	13,14,15,16,20,21,22,23,24	6,22	5,28
angle bracket 50/100/2,5	1,2,3,4,5,6,7,8,9,10,11,12	16,17,18,19,20,21,22,23,24,25,26,27,28,29,30	9,02	3,31
angle bracket 50/100/2,5 R	1,2,3,4,5,6,7,8,9,10,11,12	16,17,18,19,20,21,22,23,24,25,26,27,28,29,30	8,77	4,32
angle bracket 60/100/2	1,2,3,4,5,6,7,8,9,10,11,12,13,14	19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36	11,1	4,27
angle bracket 60/100/2,5	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46	14,1	5,37
angle bracket 80/100/2	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	14,1	5,37
angle bracket 100/100/2	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18	24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46	13,7	7,41
angle bracket 100/100/2 B	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	9,00	9,12
angle bracket 100/100/2,5	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	6,34	6,55
angle bracket 105 R	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	11,5	7,98
angle bracket 105 B	1,2,4,5,8,9,11	17,18,19,20,21,24,25,28,31,33,34	11,5	7,39
angle bracket 105	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	10,1	10,2
angle bracket 105 H	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	10,1	8,91

Bracket type	Nail number n_V	Nail number n_H	$F_{4,5,Rk}$ [kN]	
			Timber	Steel
angle bracket 105/3 R	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30,33,35,36,38	11,5	8,01
angle bracket 105/3 RH	3,4,6,7,10,11,13	19,20,21,22,23,26,27,30,33,35,36,38	5,74	7,42
angle bracket 120	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33,34,36	10,4	10,5
angle bracket 120 H	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33,34,36	10,4	9,97
angle bracket 120 R	1,2,4,5,8,9,12,13,14,15	17,18,19,21,22	5,88	6,07
angle bracket 120 RH	1,2,3,6,7,9,10,13,14,16	22,23,24,25,26,29,30,33,36,38,39,41,43,44	12,5	6,28
angle bracket 65/130	1,2,3,6,7,9,10,13,14,16	22,23,24,25,26,29,30,33,36,38,39,41,43,44	12,5	6,40
angle bracket 140	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34,36,37,39,41,42	10,9	9,73
angle bracket 140 H	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34,36,37,39,41,42	10,9	9,73

Table 10: Basic Force $F_{4,5}$, 2 angle brackets / connection

Bracket type	Nail number n_V	$k_t \perp$	$k_t \parallel$	$F_{4,5Rk}$ [kN]	
				Timber	Steel
angle bracket 60/35/2,5 SR LH	1,2,3,4,5	0,79	0,26	6,00	4,16
angle bracket 60/35/2 SR LH	1,2	0,93	0,18	4,86	3,57

Table 11: Basic Forces F_4 , 1 angle bracket / connection

Bracket type	Nail number n_V	Nail number n_H	$F_{4,Rk}$ [kN]	
			Timber	Steel
angle bracket 90/90 R	1,2,5,6	13,14,15,16,19,20,23,24,25,26	9,77	8,44
angle bracket 90/90 RH	1,2,5,6	13,14,15,16,19,20,23,24,25,26	9,79	8,13
angle bracket 50/100/2,5 R	1,2,3,4,5,9,10	13,14,15,16,20,21,22,23,24	6,22	4,03
angle bracket 105/3 R	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	11,3	7,68
angle bracket 105/3 RH	1,2,4,5,8,9	16,17,18,19,22,23,26,29,31,32	10,1	7,61
angle bracket 120 R	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33,34,36	10,4	8,76
angle bracket 120 RH	3,4,6,7,10,11	18,19,20,21,24,25,28,31,33,34,36	10,4	8,34

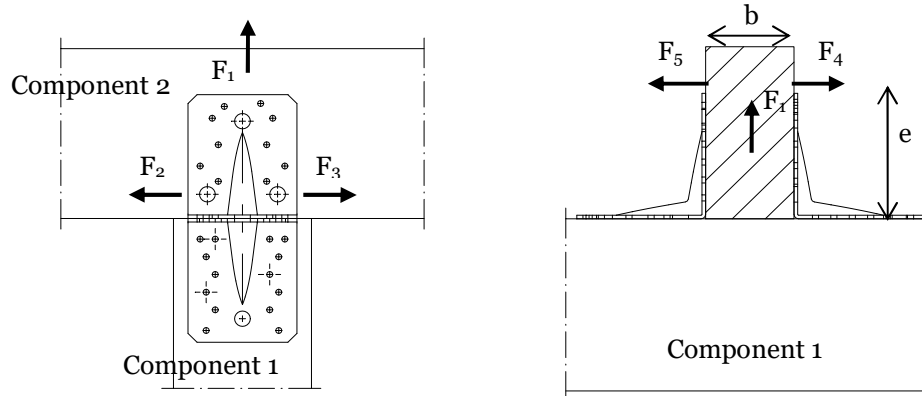
Bracket type	Nail number n_V	Nail number n_H	$F_{4,Rk}$ [kN]	
			Timber	Steel
angle bracket 140 R	1,2,3,6,7,9, 10,13,14	21,22,23,24,27,28,31,34, 36,37,39,41,42	10,9	8,12
angle bracket 140 RH	1,2,3,6,7,9, 10,13,14	21,22,23,24,27,28,31,34, 36,37,39,41,42	10,9	8,12

Table 12: Basic Forces F_5 , 1 angle bracket / connection

Bracket type	Nail number n_V	Nail number n_H	$F_{5,Rk}$ [kN]	
			Timber	Steel
angle bracket 90/90 R	1,2,5,6	13,14,15,16,19,20,23,24, 25,26	1,58	2,06
angle bracket 90/90 RH	1,2,5,6	13,14,15,16,19,20,23,24, 25,26	1,62	2,02
angle bracket 50/100/2,5 R	1,2,3,4,5,9,10	13,14,15,16,20,21,22,23,24	1,47	5,07
angle bracket 105/3 R	1,2,4,5,8,9	16,17,18,19,22,23,26,29, 31,32	1,55	2,10
angle bracket 105/3 RH	1,2,4,5,8,9	16,17,18,19,22,23,26,29, 31,32	1,55	2,10
angle bracket 120 R	3,4,6,7,10,11	18,19,20,21,24,25,28,31, 33,34,36	1,70	2,35
angle bracket 120 RH	3,4,6,7,10,11	18,19,20,21,24,25,28,31, 33,34,36	1,70	2,26
angle bracket 140 R	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34, 36,37,39,41,42	1,80	2,46
angle bracket 140 RH	1,2,3,6,7,9,10,13,14	21,22,23,24,27,28,31,34, 36,37,39,41,42	1,80	2,46

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.

Connection to timber, concrete or steel with a bolt or metal anchor

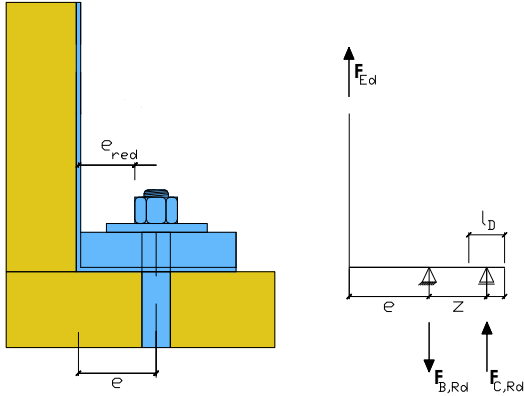
The tensile load $F_{B,Ed}$ for the design of a bolt or metal anchor is calculated as:

$$F_{B,t,Ed} = k_t \cdot F_{Ed} \text{ for tensile load}$$

$$F_{B,v,Ed} = F_{Ed} \text{ for shear load}$$

Where:

- $F_{B,t,Ed}$ Bolt tensile load in N
- $F_{B,v,Ed}$ Bolt shear load in N
- k_t Coefficient taking into account the moment arm ($k_t=1+e/z$)
- F_{Ed} Load on vertical flap of the angle bracket in N



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.

EJOT Angle Brackets

40x40x40x2,0

40x40x40x2,5

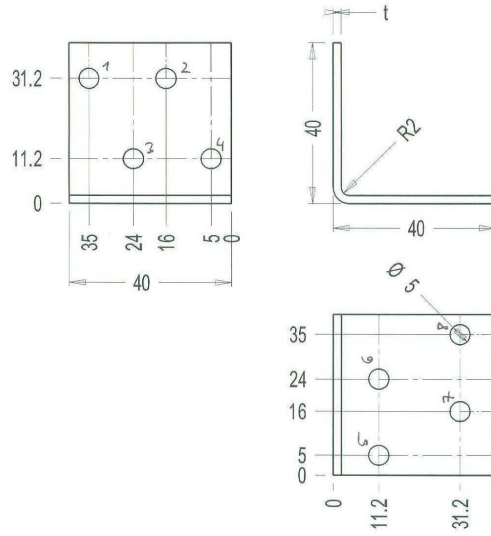
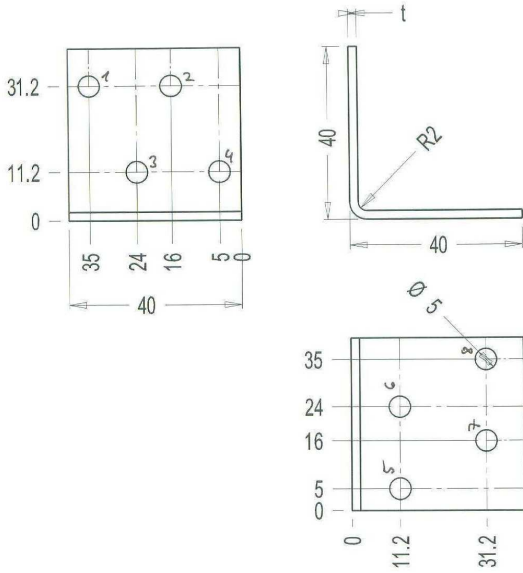


Figure B. 1 Dimensions of angle bracket

Figure B. 2 Dimensions of angle bracket

40/40/40/2,0

40/40/40/2,5

40x40x50x2,0

40x40x50x2,5

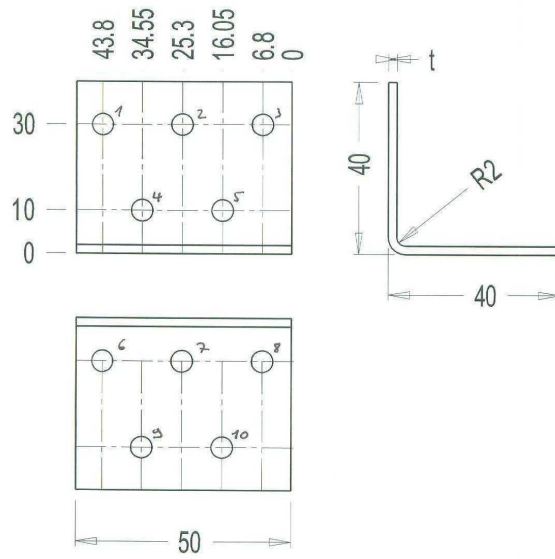
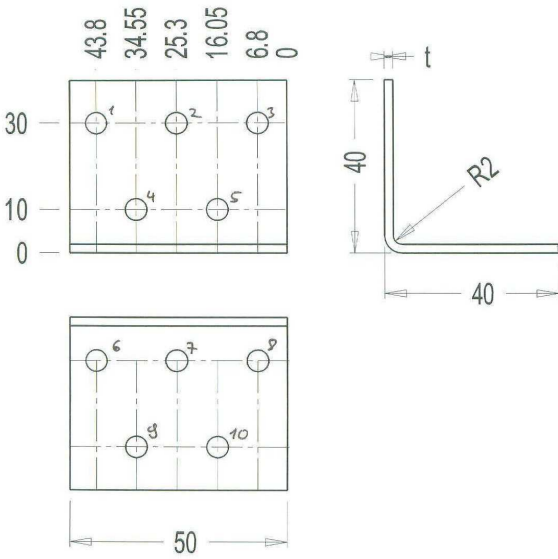


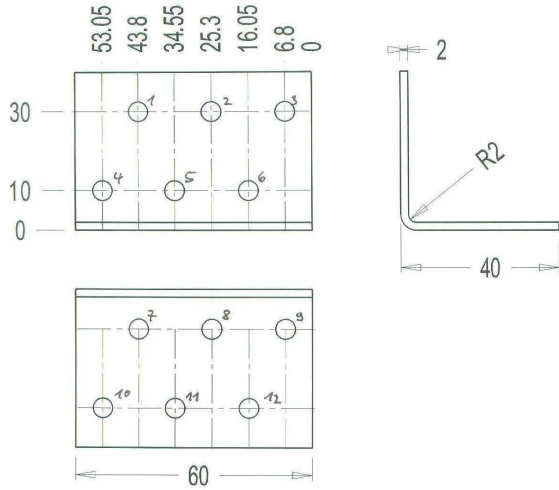
Figure B. 3 Dimensions of angle bracket

Figure B. 4 Dimensions of angle bracket

40/40/50/2,0

40/40/50/2,5

40x40x60x2,0



40x40x60x2,5

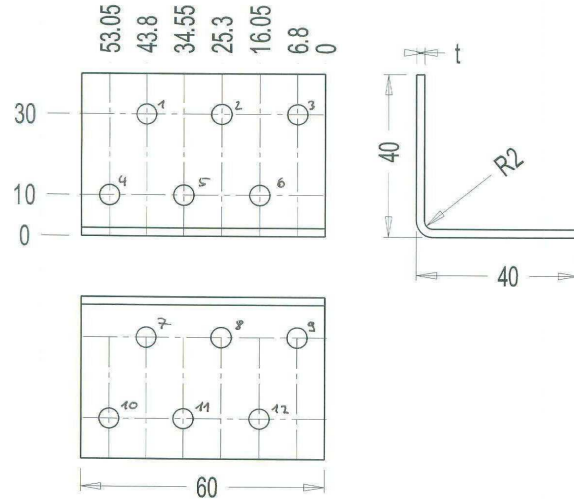


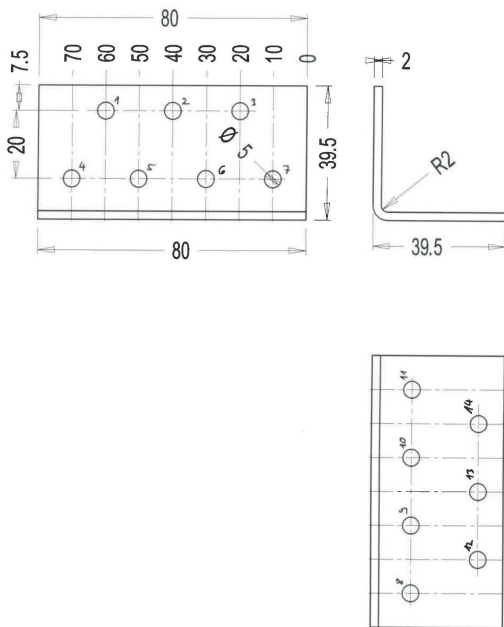
Figure B. 5 Dimensions of angle bracket

Figure B. 6 Dimensions of angle bracket

40/40/60/2,0

40/40/60/2,5

40x40x80x2,0



40x40x80x2,5

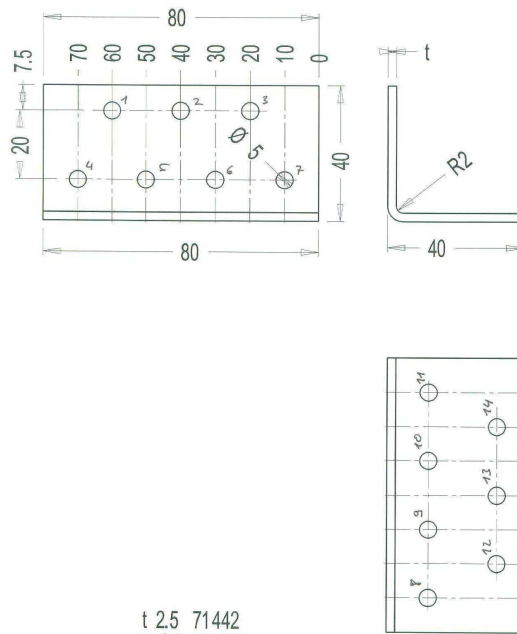


Figure B. 7 Dimensions of angle bracket

Figure B. 8 Dimensions of angle bracket

40/40/80/2,0

40/40/80/2,5

t 2,5 71442
t 2,0 71442

40x40x100x2,0

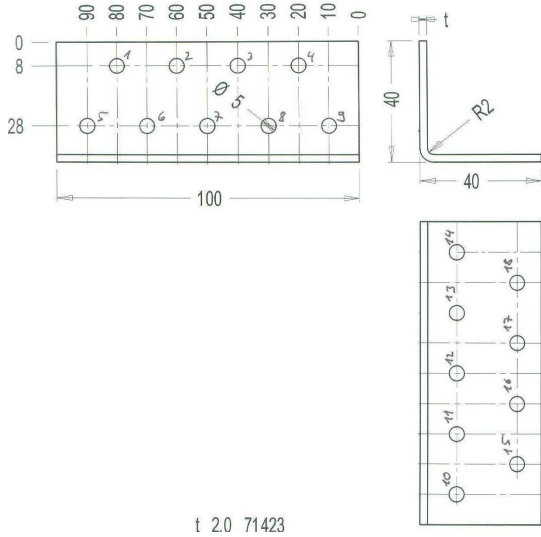


Figure B. 9 Dimensions of angle bracket
40/40/100/2,0

40x40x100x2,5

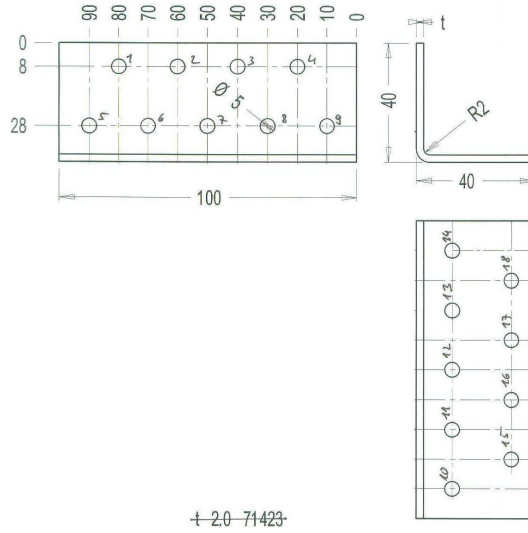


Figure B. 10 Dimensions of angle bracket
40/40/100/2,5

50x50x55x2,5

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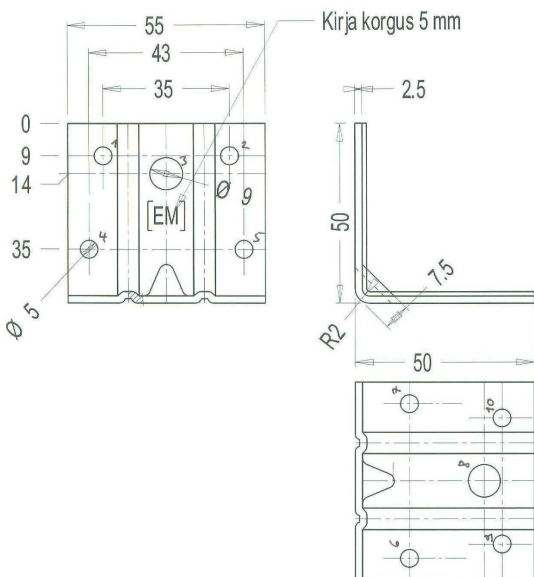


Figure B. 11 Dimensions of angle bracket
50/50/55/2,5

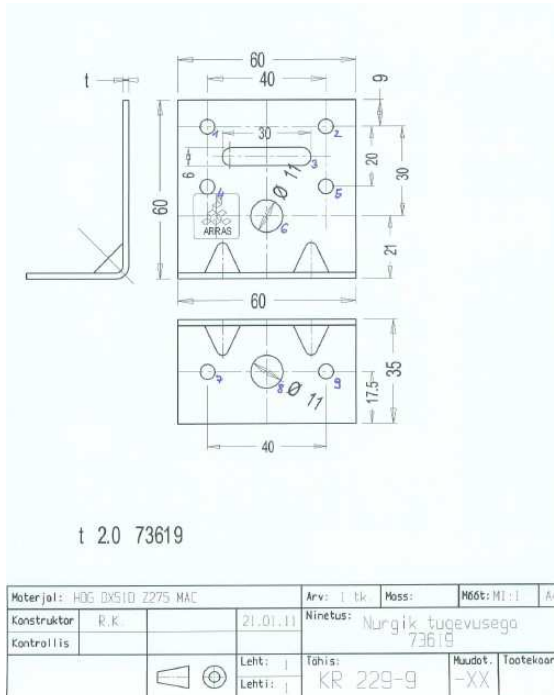


Figure B. 12 Dimensions of angle bracket
60 / 35 / 60 / 2,0 with long hole, with bolt hole

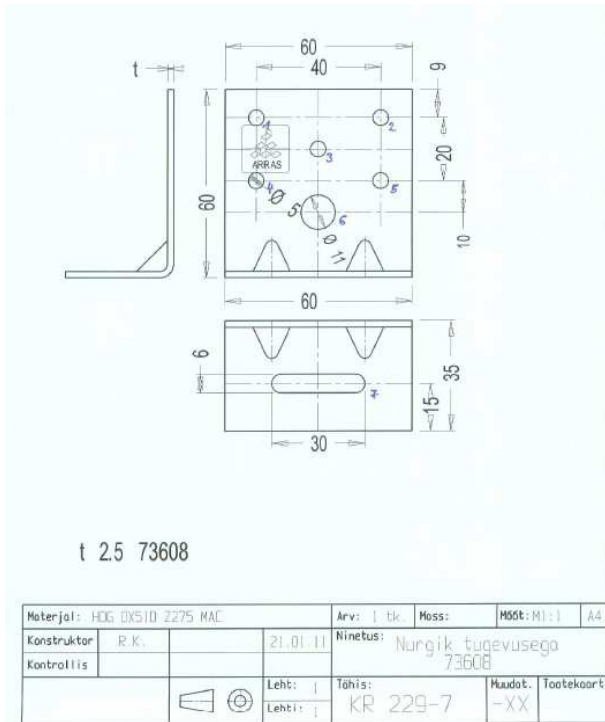


Figure B. 13 Dimensions of angle bracket
60 / 35 / 60 / 2,5 with long hole, with bolt hole

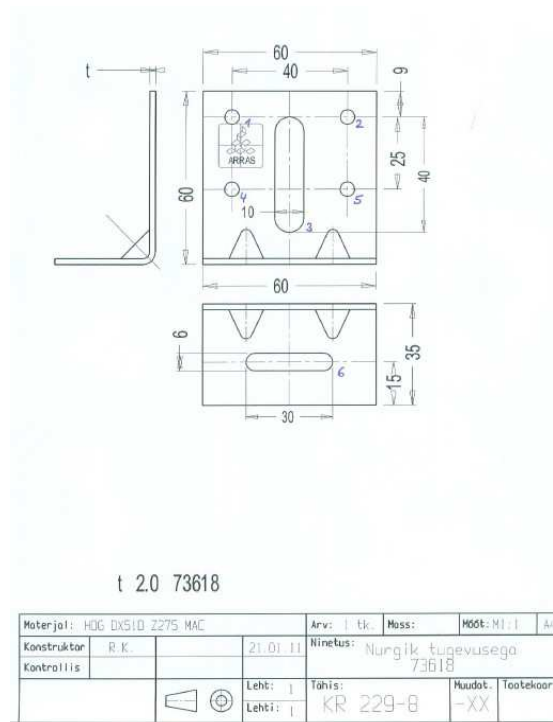


Figure B. 14 Dimensions of angle bracket
60 / 35 / 60 / 2,0 with 2 long holes

60 x 60 x 20 x 2,0

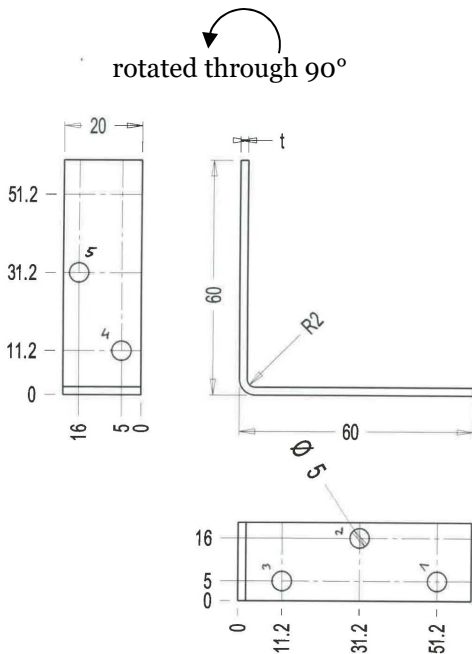


Figure B. 15 Dimensions of angle bracket
60/60/20/2,0

60 x 60 x 20 x 2,5



rotated through 90°

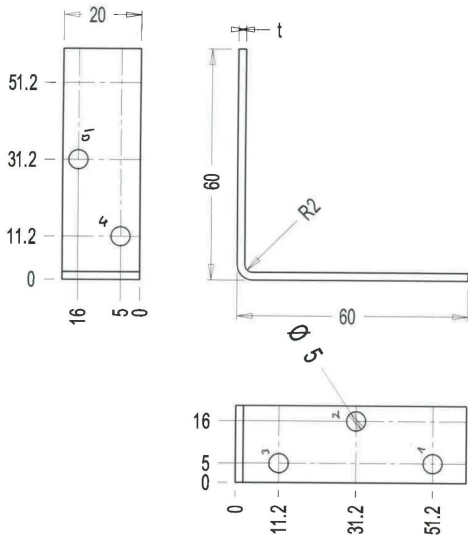


Figure B. 16 Dimensions of angle bracket

60/60/20/2,5

60 x 60 x 30 x 2,0

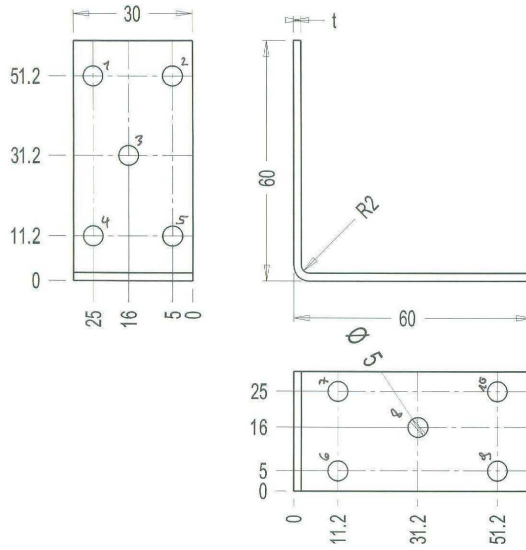


Figure B. 17 Dimensions of angle bracket

60/60/30/2,0

60 x 60 x 30 x 2,5

60 x 60 x 40 x 2,0

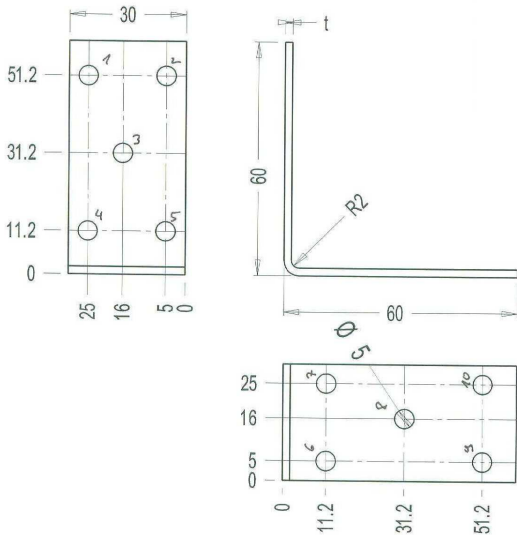


Figure B. 18 Dimensions of angle bracket

60/60/30/2,5

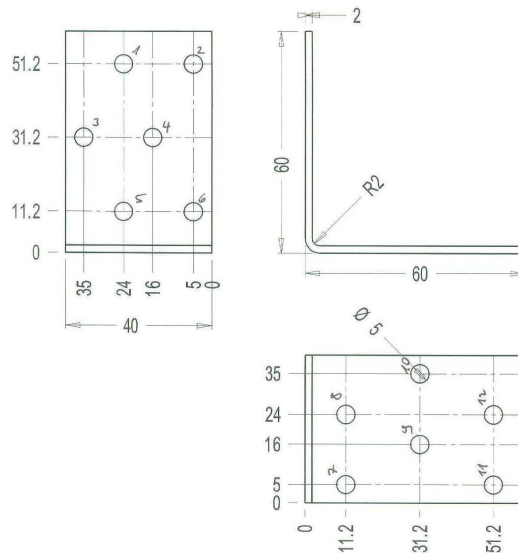


Figure B. 19 Dimensions of angle bracket

60/60/40/2,0

60x60x50x2,0

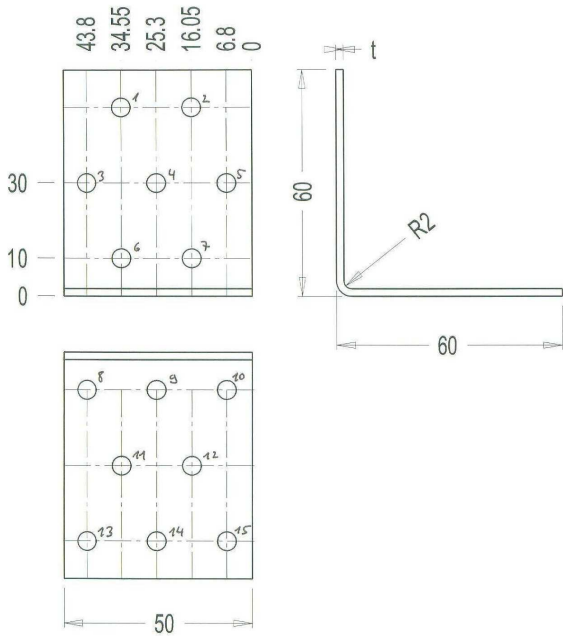


Figure B. 20 Dimensions of angle bracket

60/60/50/2,0

60x60x50x2,0

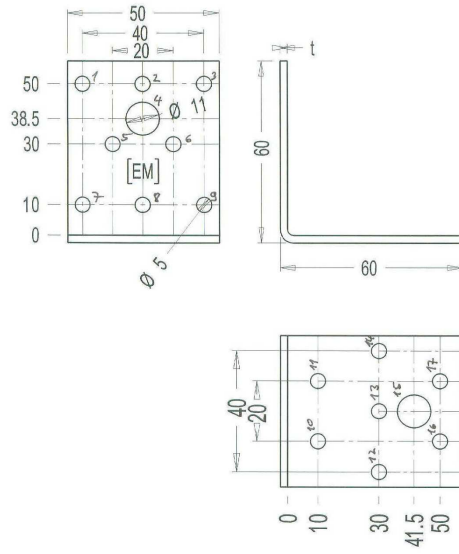


Figure B. 21 Dimensions of angle bracket

60/60/50/2,0; with bolt hole

60x60x60x2,0

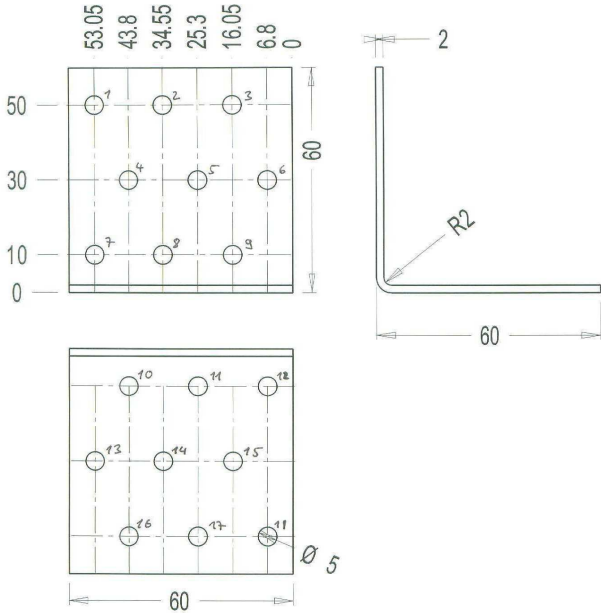


Figure B. 22 Dimensions of angle bracket

60/60/50/2,0

60x60x50x2,5

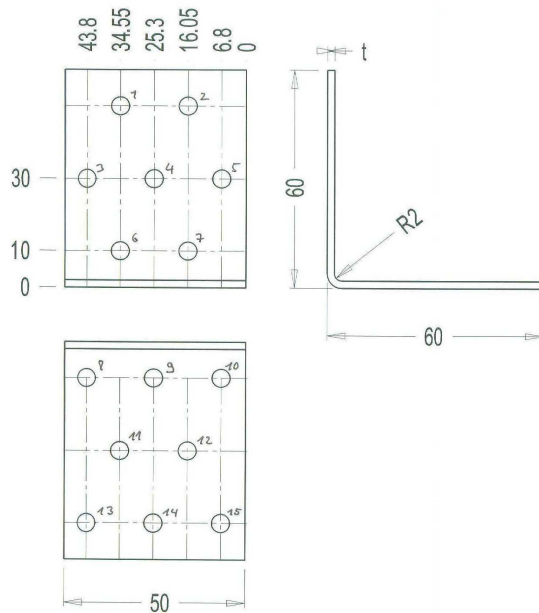


Figure B. 23 Dimensions of angle bracket

60/60/50/2,0

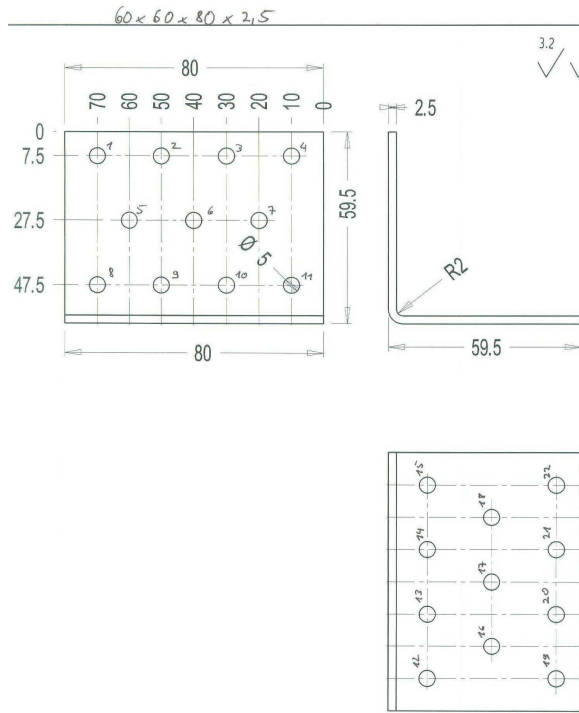
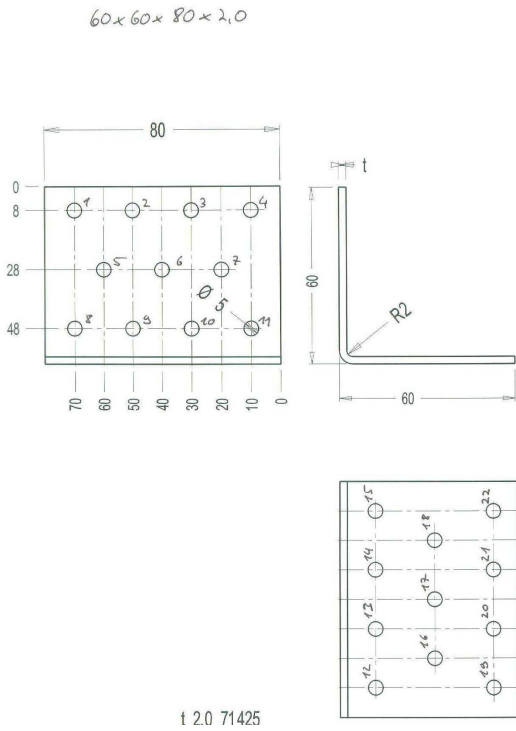


Figure B. 24 Dimensions of angle bracket

60/60/80/2,0

Figure B. 25 Dimensions of angle bracket

60/60/80/2,5

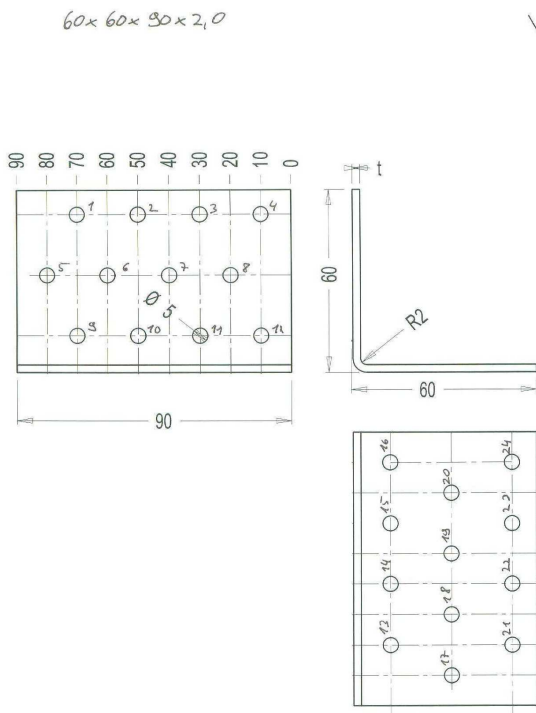


Figure B. 26 Dimensions of angle bracket

60/60/90/2,0

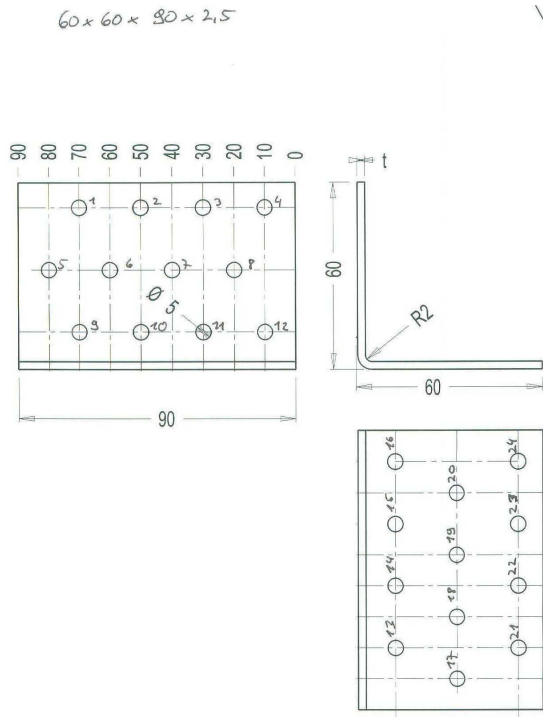


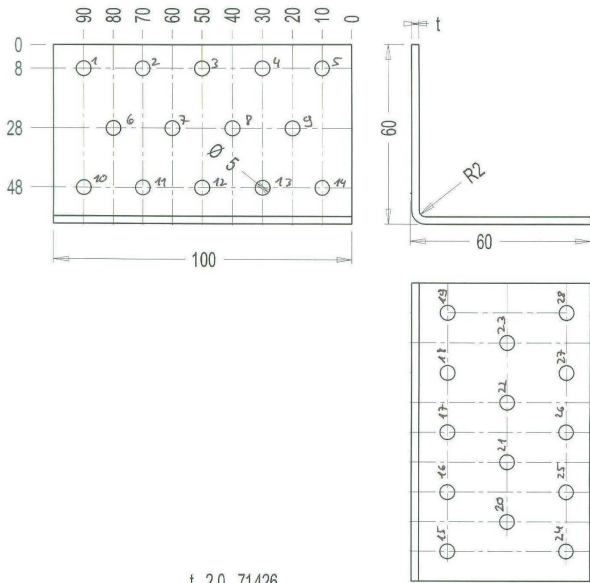
Figure B. 27 Dimensions of angle bracket

60/60/90/2,5

60x60x100x2,0



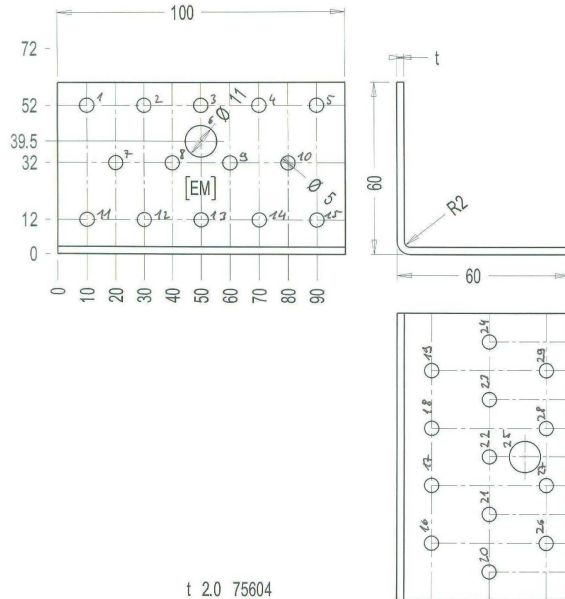
60x60x100x2,0



t 2.0 71426

Figure B. 28 Dimensions of angle bracket

60/60/100/2,0



t 2.0 75604

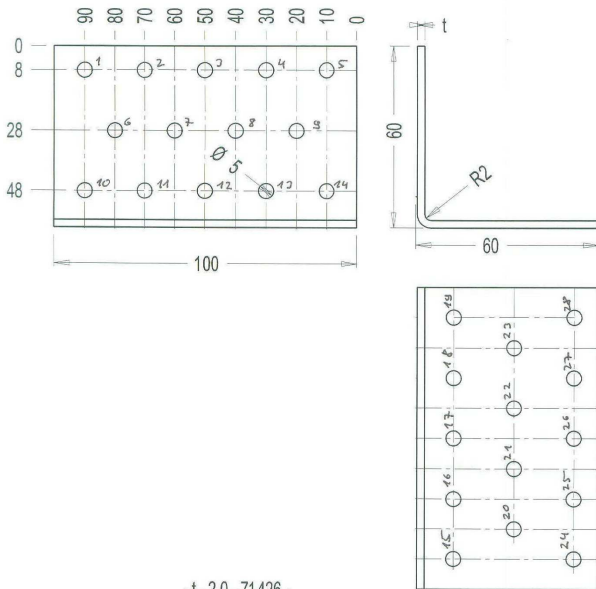
Figure B. 29 Dimensions of angle bracket

60/60/100/2,0; with bolt hole

60x60x100x2,5



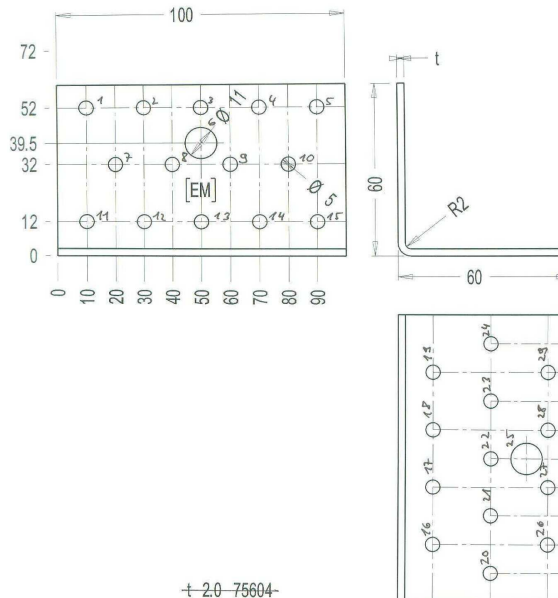
60x60x100x2,5



t 2.0 71426

Figure B. 30 Dimensions of angle bracket

60/60/100/2,5



t 2.0 75604

Figure B. 31 Dimensions of angle bracket

60/60/100/2,5; with bolt hole

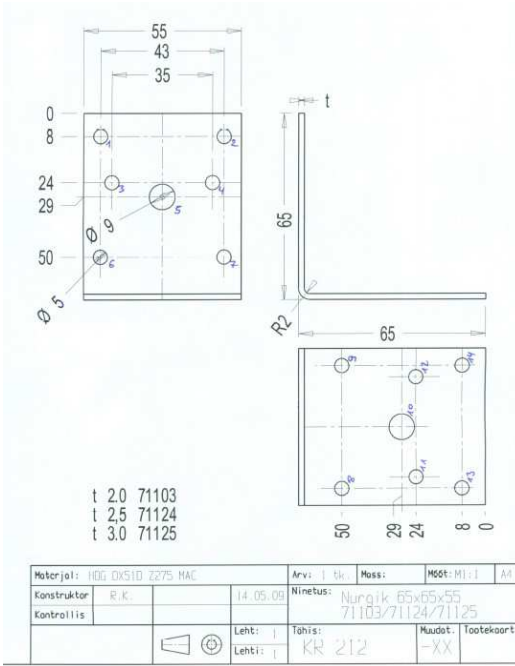


Figure B.32 Dimensions of angle bracket

60 / 65 / 55 / 3,0

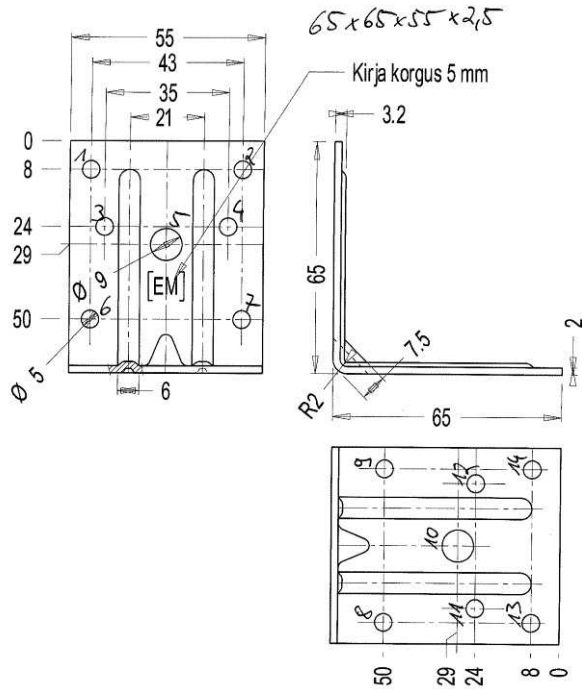


Figure B.33 Dimensions of angle bracket

65/65/55/2,5

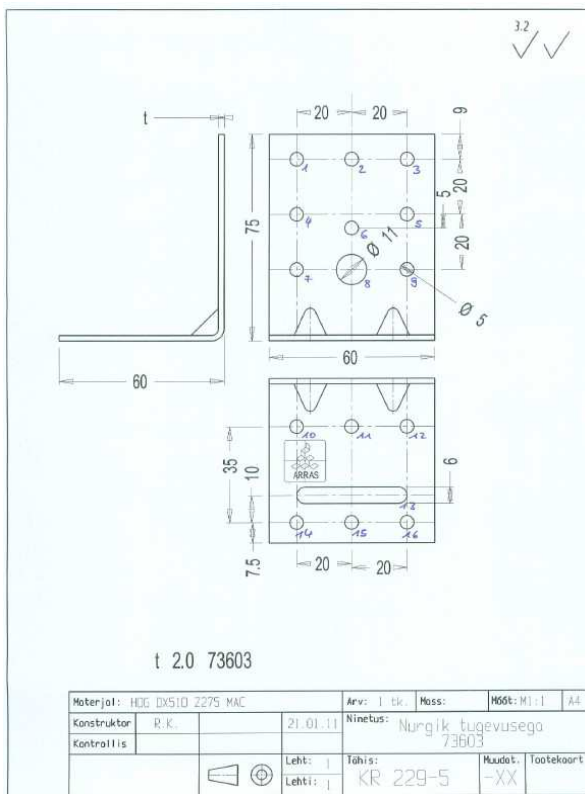


Figure B.34 Dimensions of angle bracket

75 / 60 / 60 / 2,0, short rib, long hole

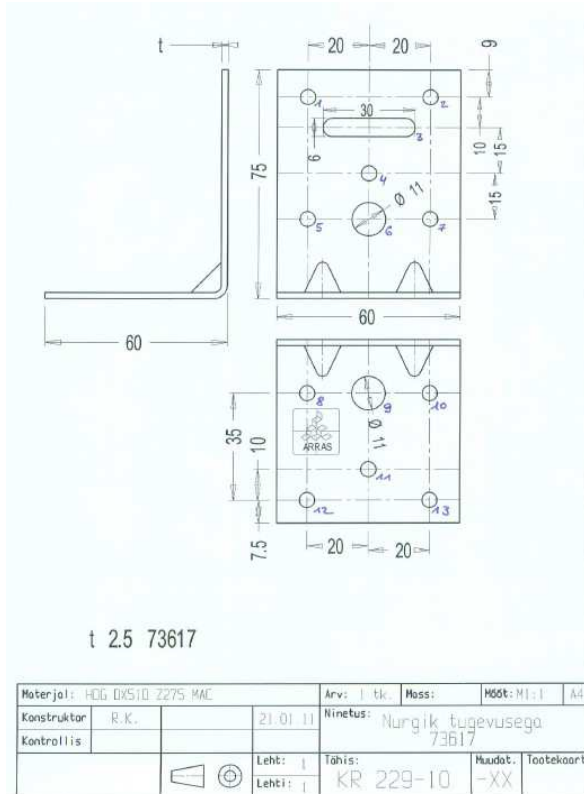


Figure B.35 Dimensions of angle bracket

75 / 60 / 60 / 2,5, short rib, long hole

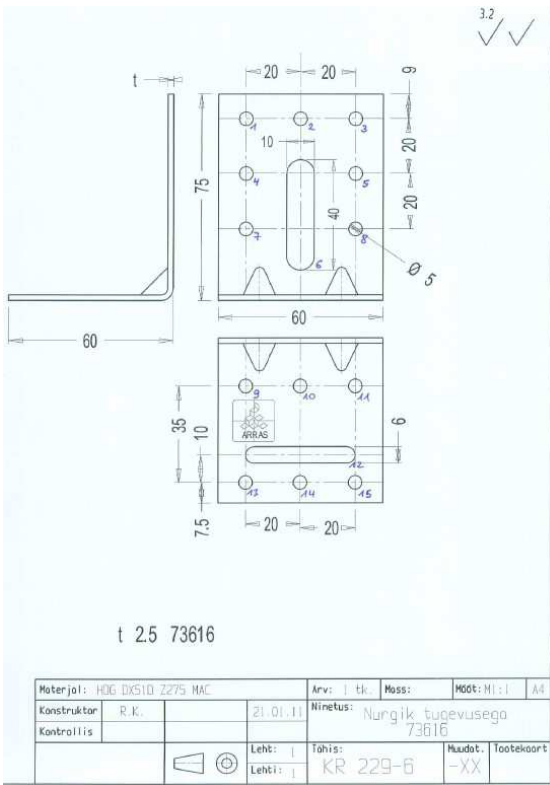


Figure B. 36 Dimensions of angle bracket
75 / 60 / 60 / 2,5, short rib, two long holes

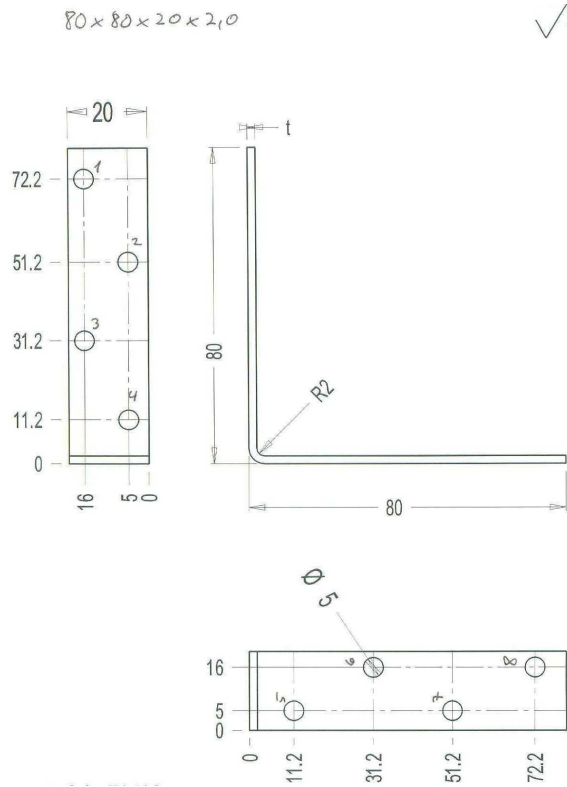


Figure B. 37 Dimensions of angle bracket
80/80/20/2,0

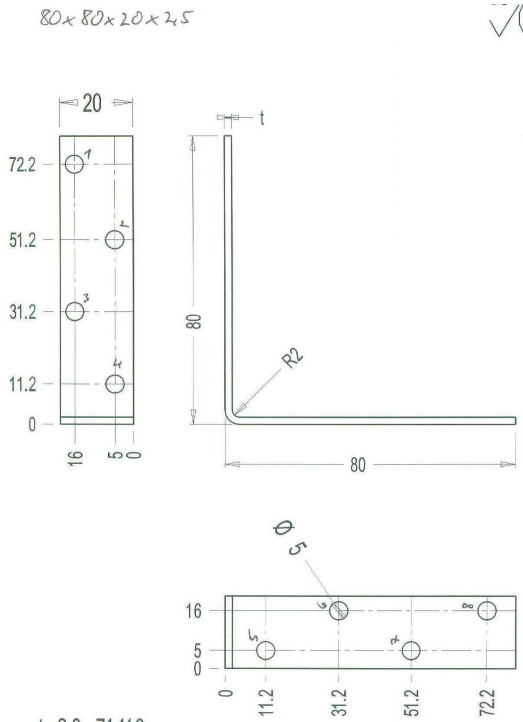


Figure B. 38 Dimensions of angle bracket
80/80/20/2,5

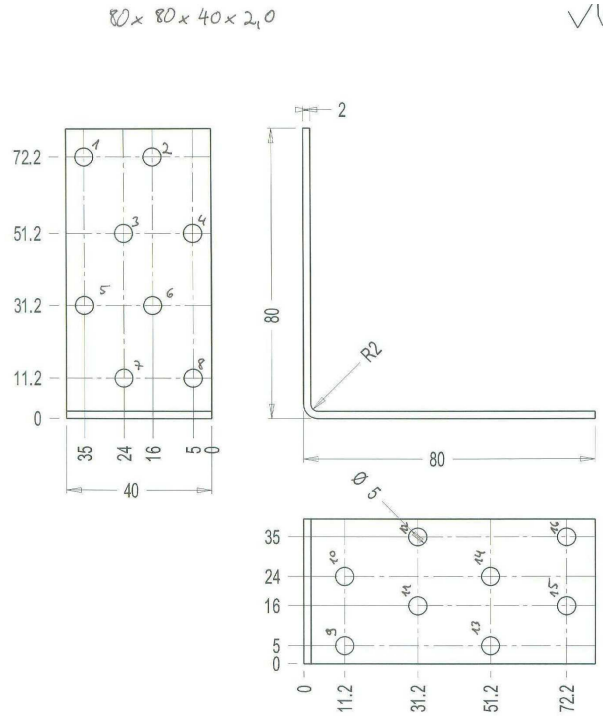


Figure B. 39 Dimensions of angle bracket
80/80/40/2,0

80x80x40x2,5



80x80x50x2,0

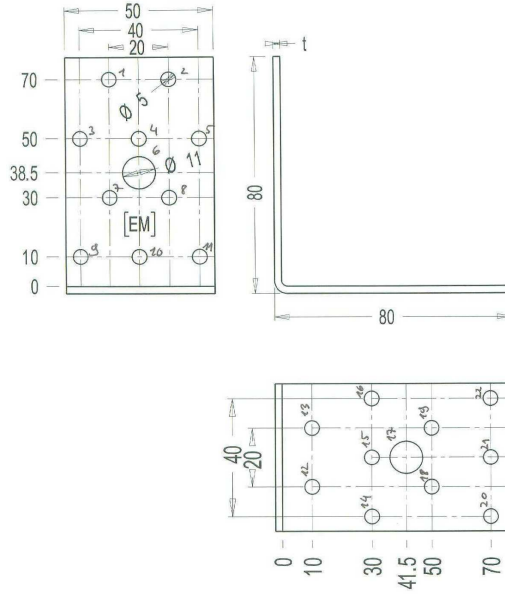
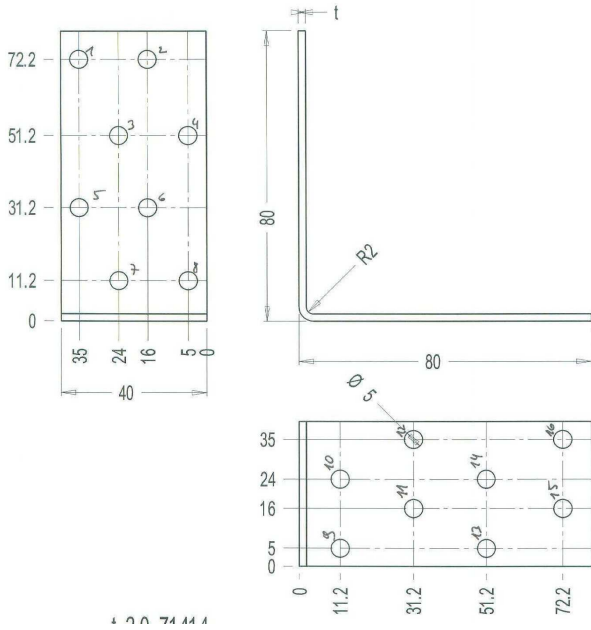


Figure B. 40 Dimensions of angle bracket

Figure B. 41 Dimensions of angle bracket

80/80/40/2,5

80/80/50/2,0; with bolt hole

80x80x50x2,5

80x80x60x2,0

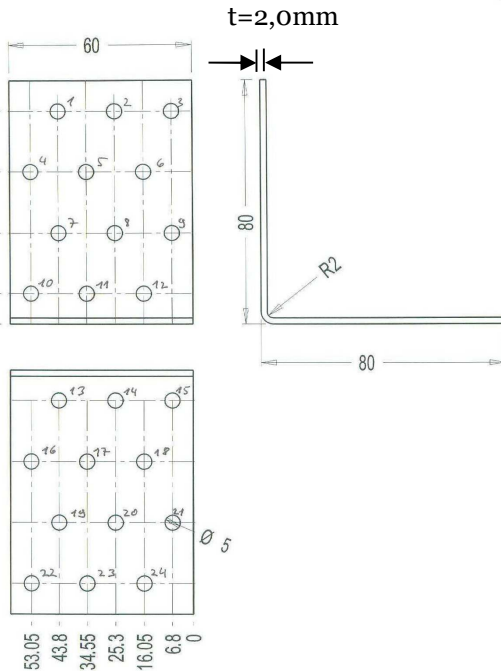
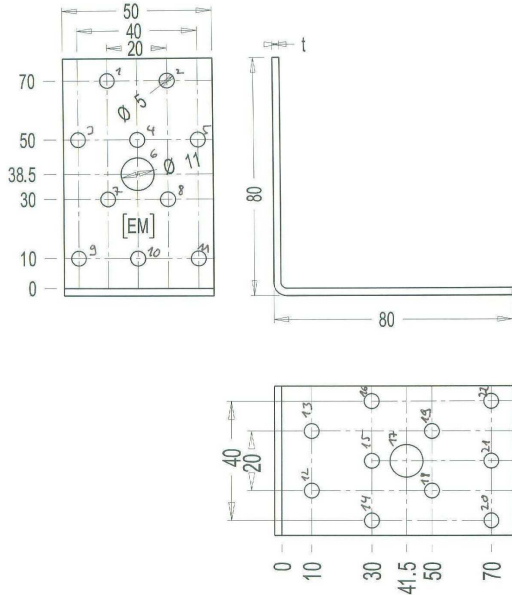


Figure B. 42 Dimensions of angle bracket

Figure B. 43 Dimensions of angle bracket

80/80/50/2,5; with bolt hole

80/80/60/2,0

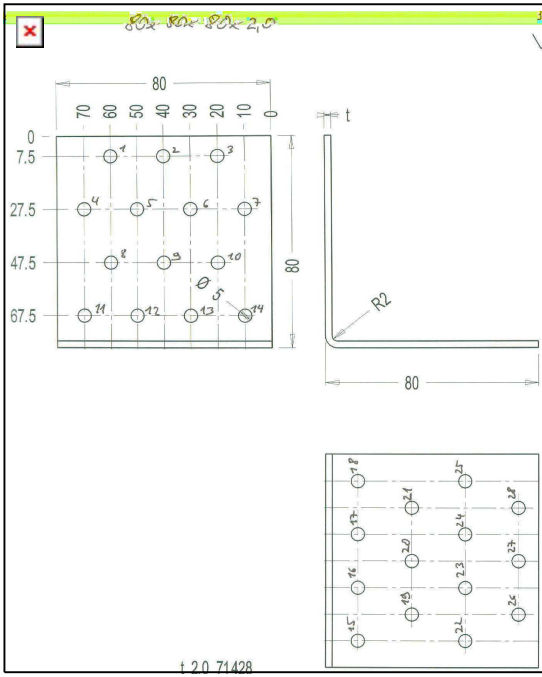


Figure B. 44 Dimensions of angle bracket

80/80/80/2,0

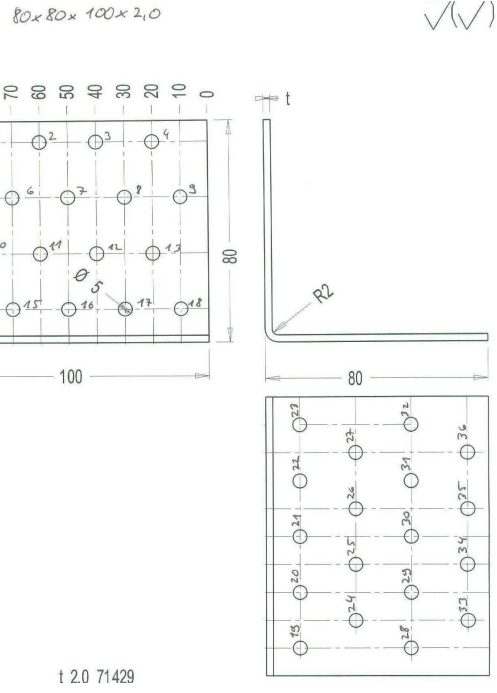


Figure B. 45 Dimensions of angle bracket

80/80/100/2,0

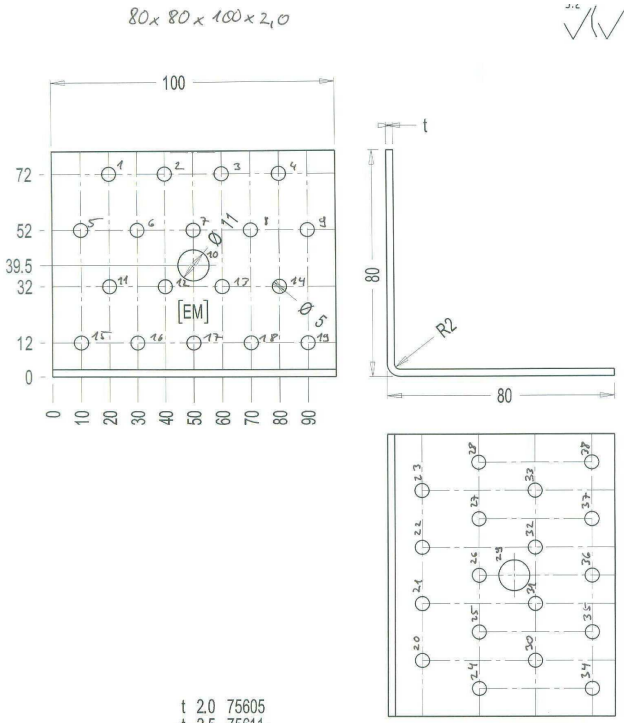


Figure B. 46 Dimensions of angle bracket

80/80/100/2,0; with bolt hole

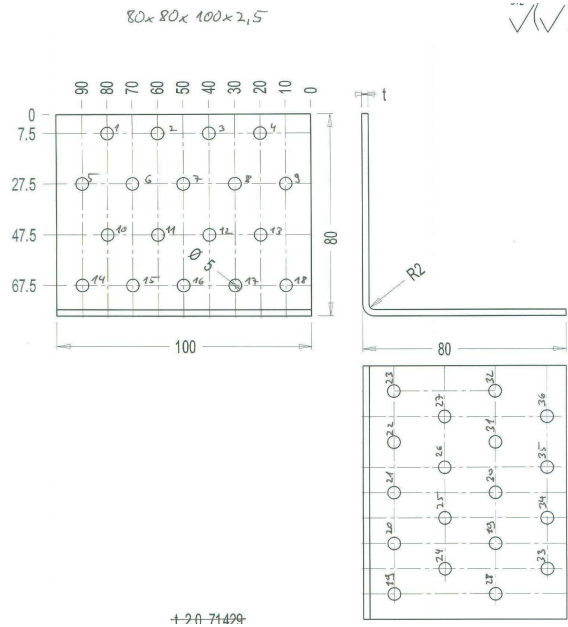


Figure B. 47 Dimensions of angle bracket

80/80/100/2,5;

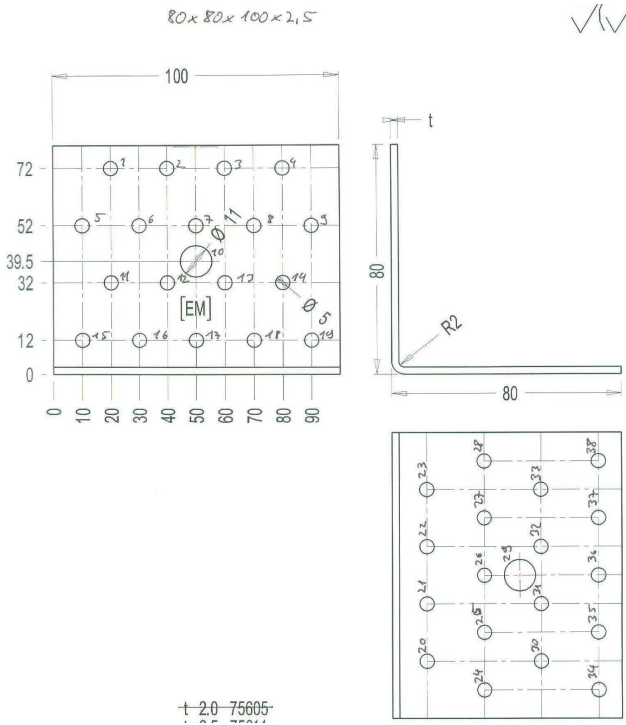


Figure B. 48 Dimensions of angle bracket

80/80/100/2,5; with bolt hole

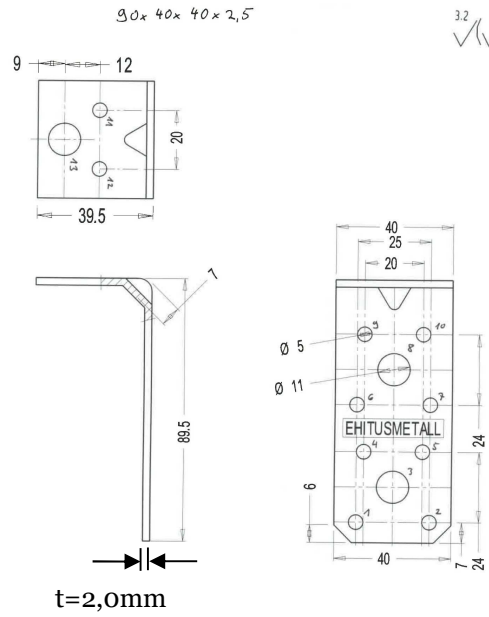


Figure B. 49 Dimensions of angle bracket

90/40/40/2,5

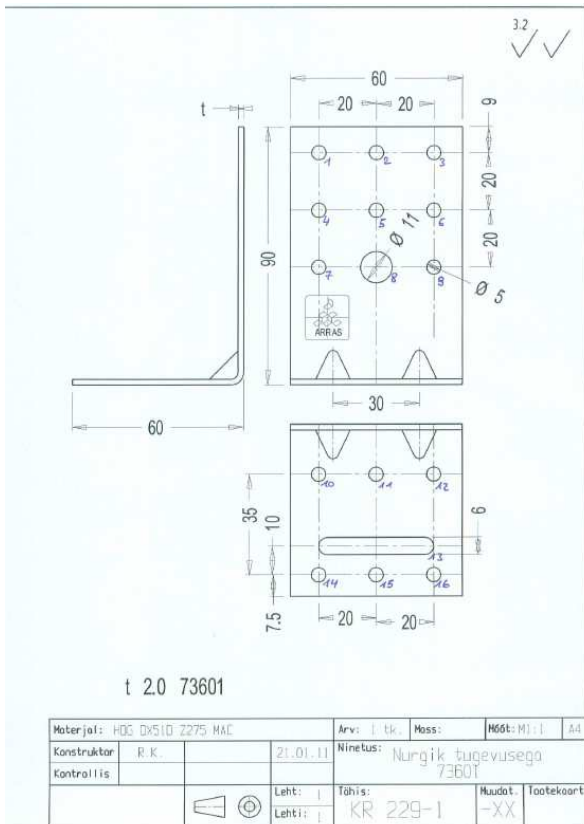


Figure B. 50 Dimensions of angle bracket

90 / 60 / 60 / 2,0, short rib, long hole

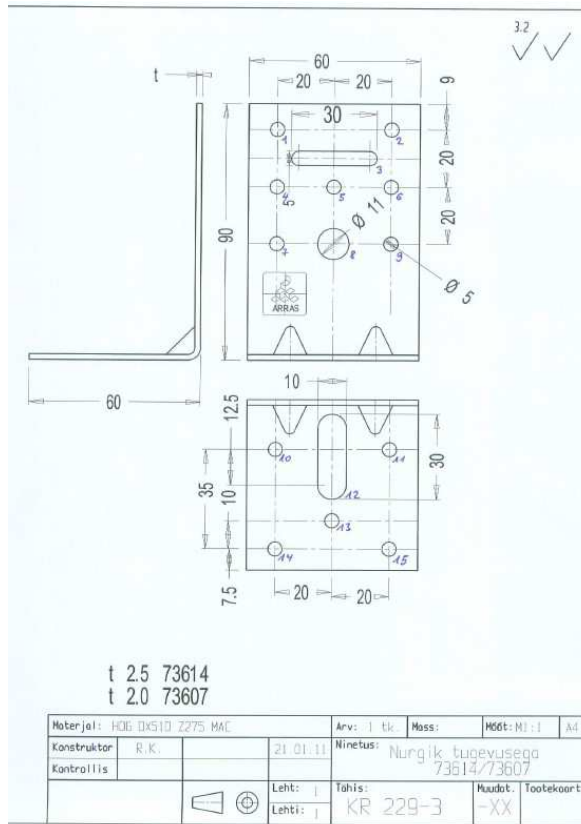


Figure B. 51 Dimensions of angle bracket

90 / 60 / 60 / 2,0, short rib, two long holes

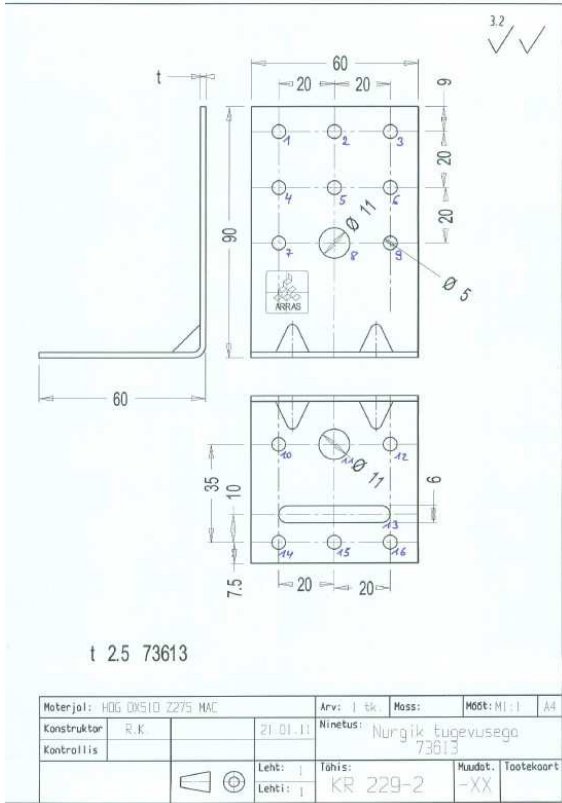


Figure B. 52 Dimensions of angle bracket
90 / 60 / 60 / 2,5, short rib, long hole

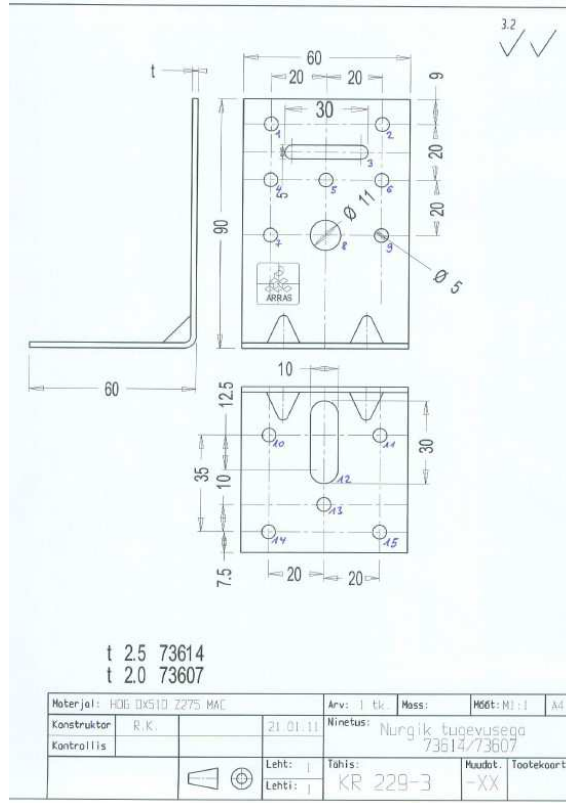


Figure B. 53 Dimensions of angle bracket
90 / 60 / 60 / 2,5, short rib, two long holes

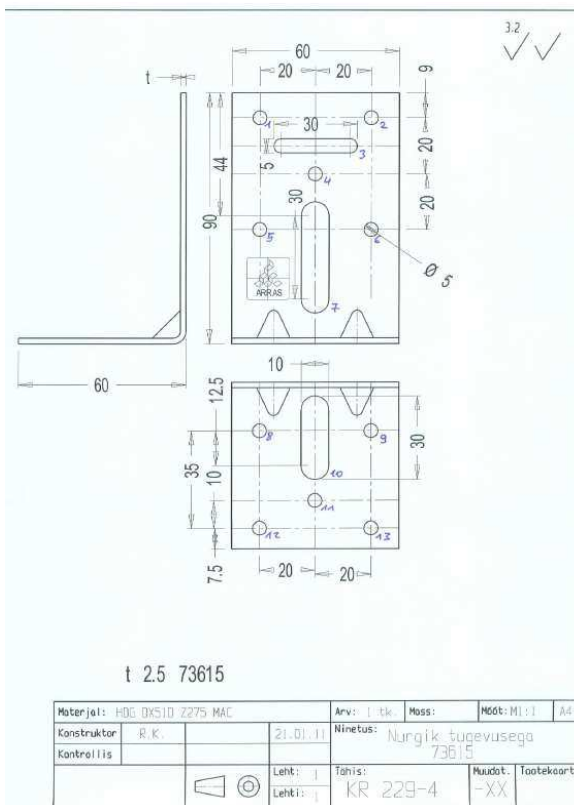


Figure B. 54 Dimensions of angle bracket
90 / 60 / 60 / 2,5, short rib, three long holes

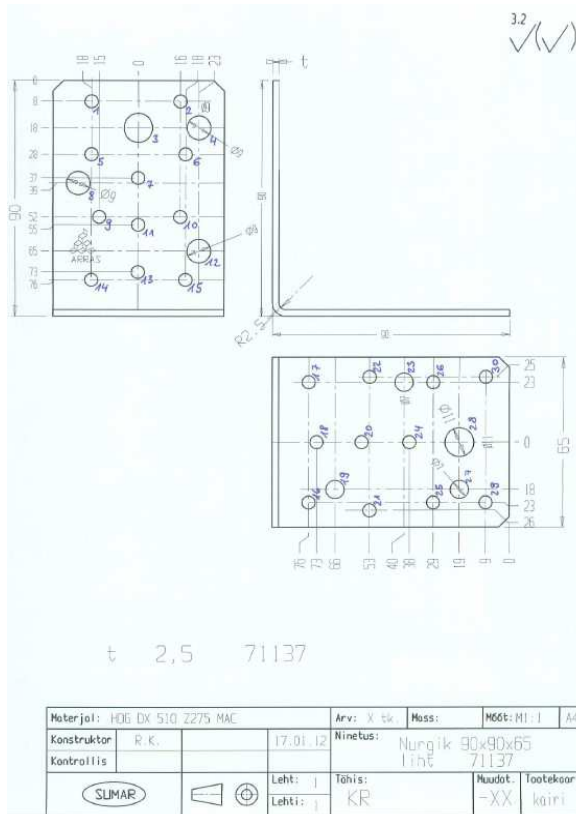


Figure B. 55 Dimensions of angle bracket
90 / 90 / 65 / 2,5, with bolt hole

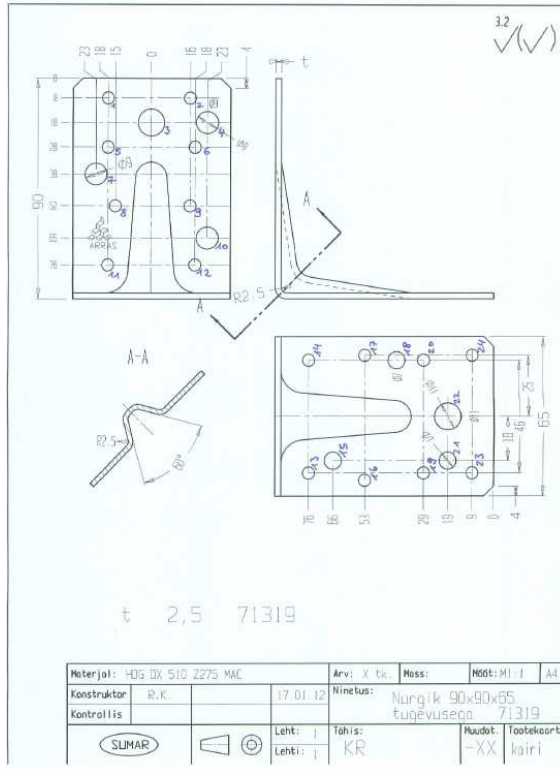
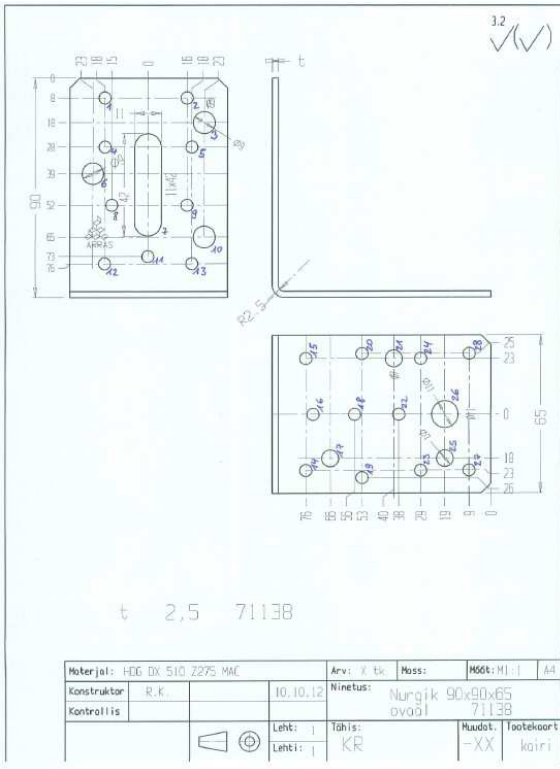


Figure B. 56 Dimensions of angle bracket

90 / 90 / 65 / 2,5 with bolt hole, long hole

Figure B. 57 Dimensions of angle bracket

90 / 90 / 65 / 2,5, with rib

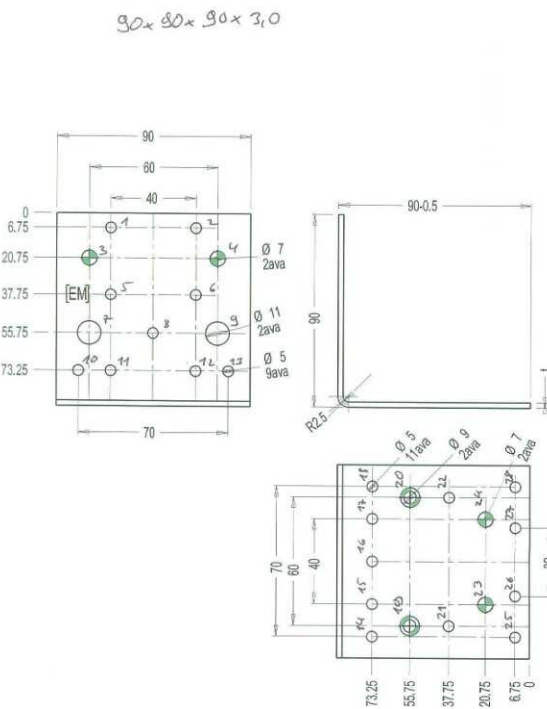


Figure B. 58 Dimensions of angle bracket

90/90/90/3,0

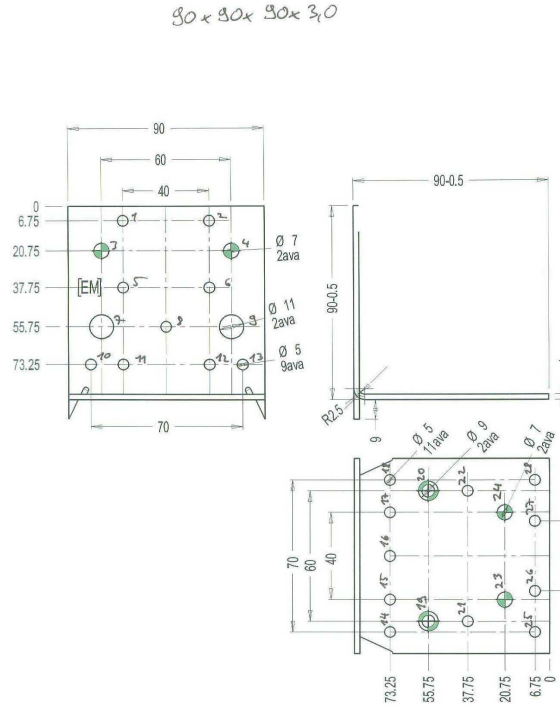


Figure B. 59 Dimensions of angle bracket

90/90/90/3,0; with hook

90x90x90x3,0

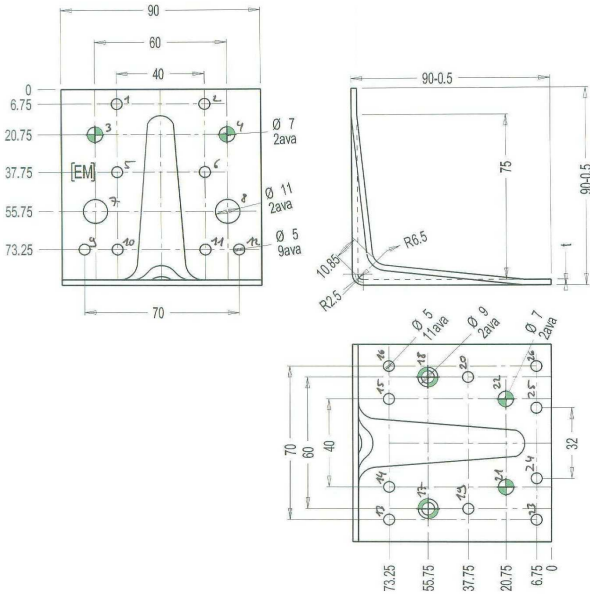


Figure B. 60 Dimensions of angle bracket

90/90/90/3,0; with rib

90x90x90x3,0

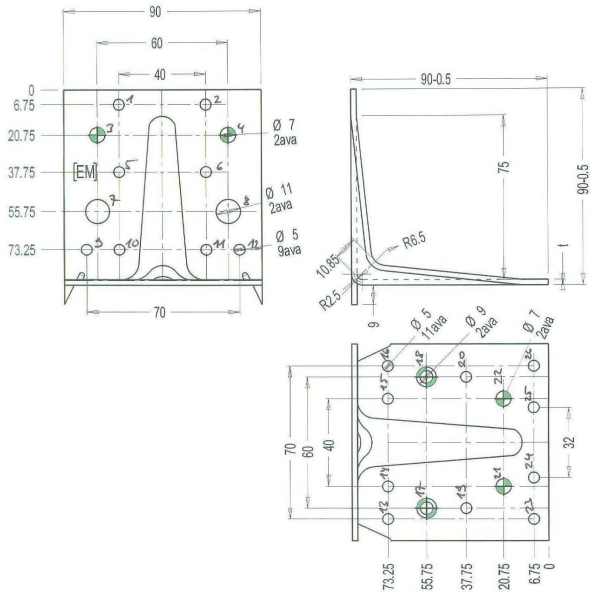


Figure B. 61 Dimensions of angle bracket

90/90/90/3,0; with rib, with hook

100x100x40x2,0

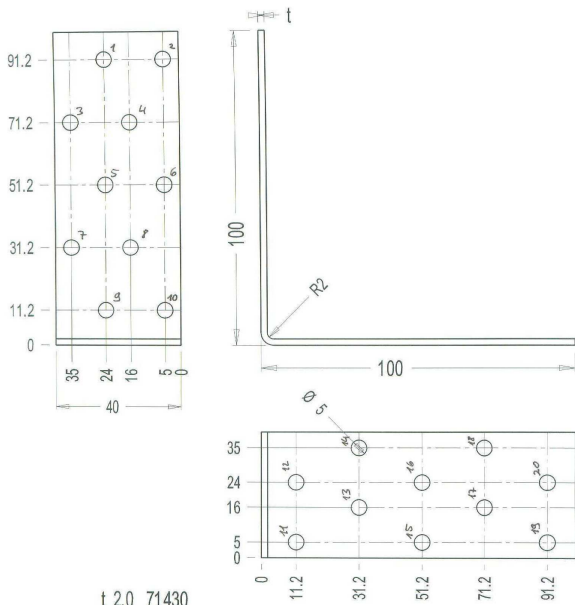


Figure B. 62 Dimensions of angle bracket

100/100/40/2,0

100x100x40x2,5

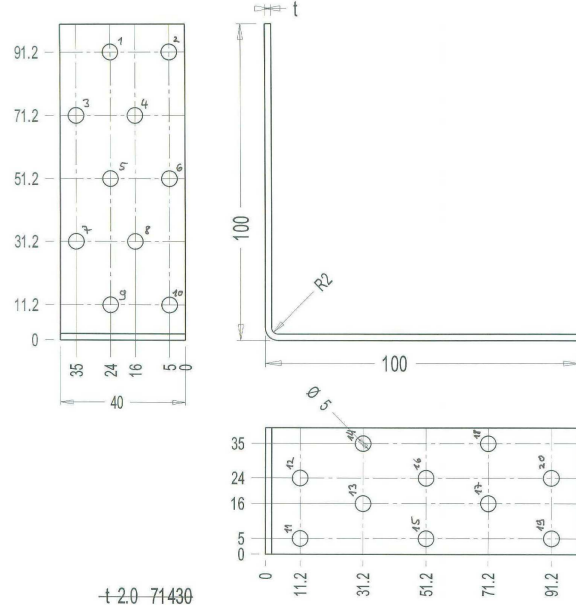


Figure B. 63 Dimensions of angle bracket

100/100/40/2,5

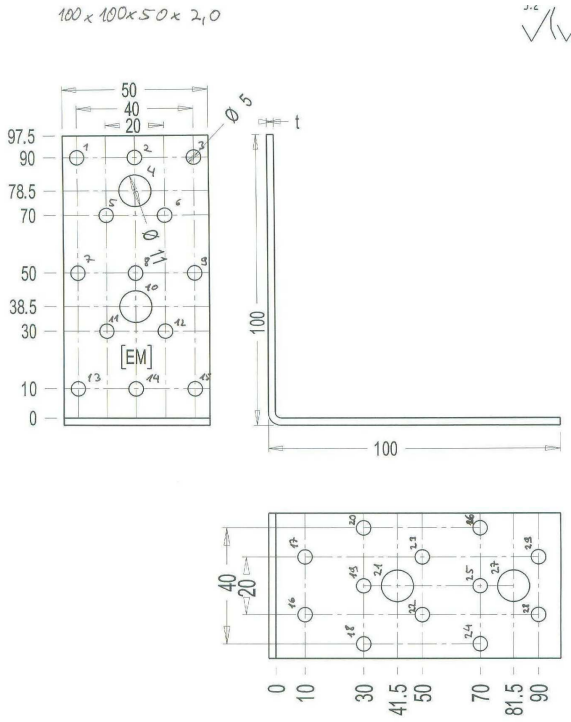


Figure B. 64 Dimensions of angle bracket

100/100/50/2,0; with bolt hole

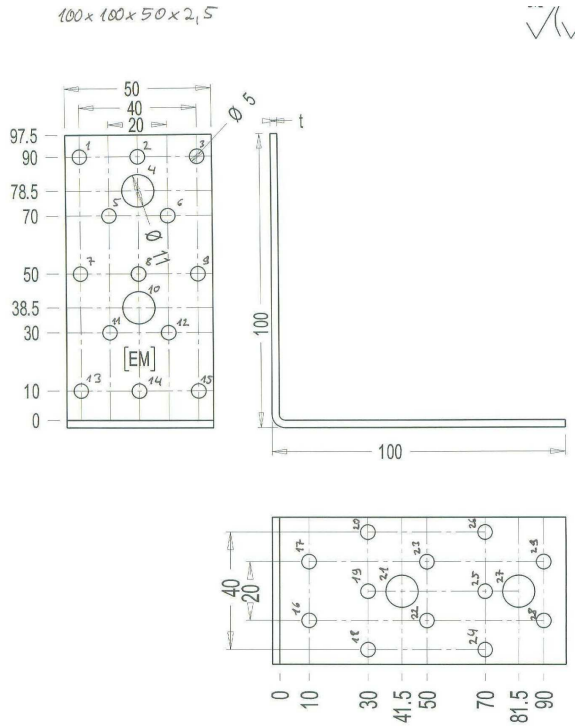


Figure B. 65 Dimensions of angle bracket

100/100/50/2,5; with bolt hole

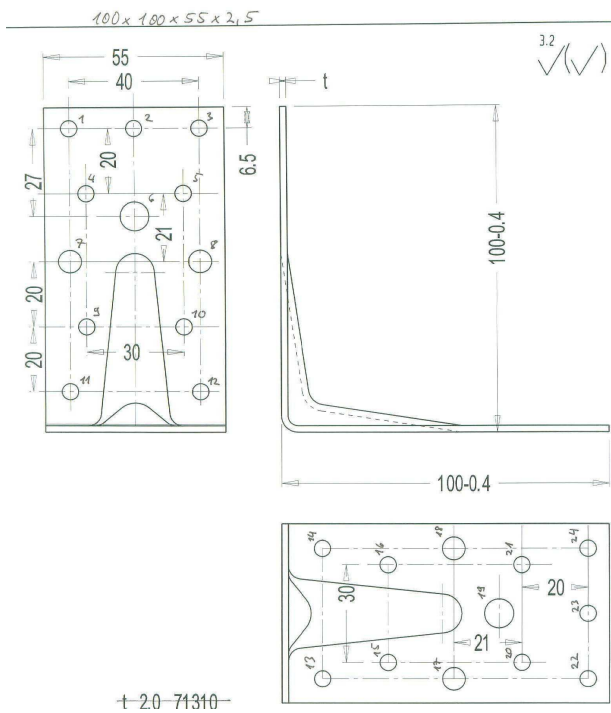


Figure B. 66 Dimensions of angle bracket

100/100/55/2,5; with rib

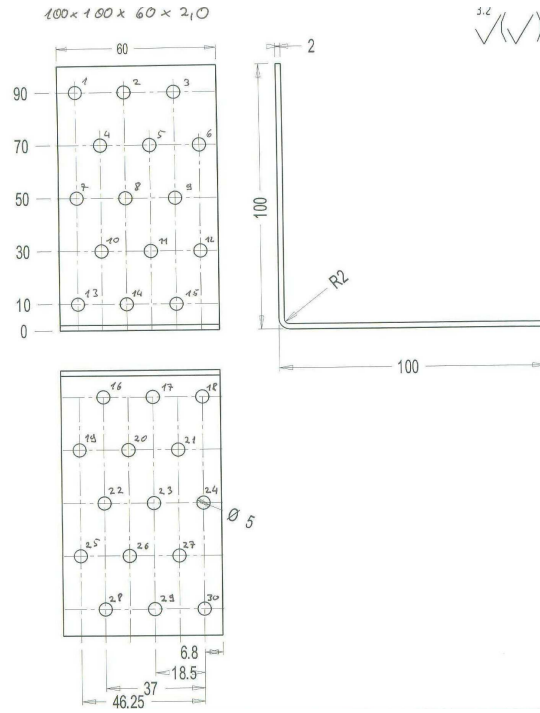


Figure B. 67 Dimensions of angle bracket

100/100/60/2,0

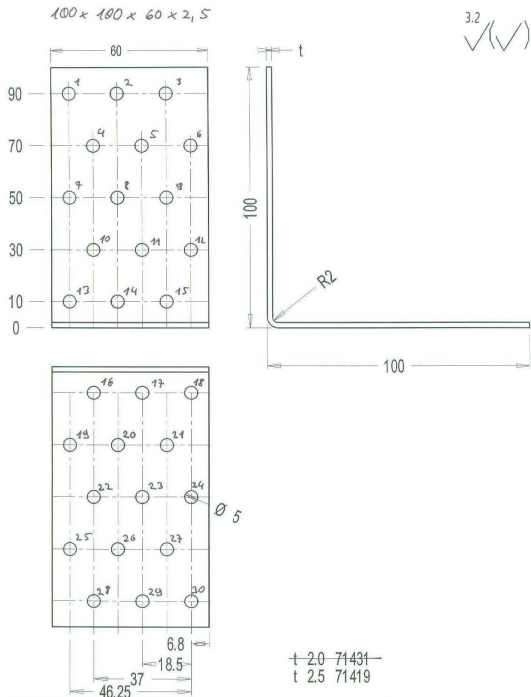


Figure B. 68 Dimensions of angle bracket

100/100/60/2,5

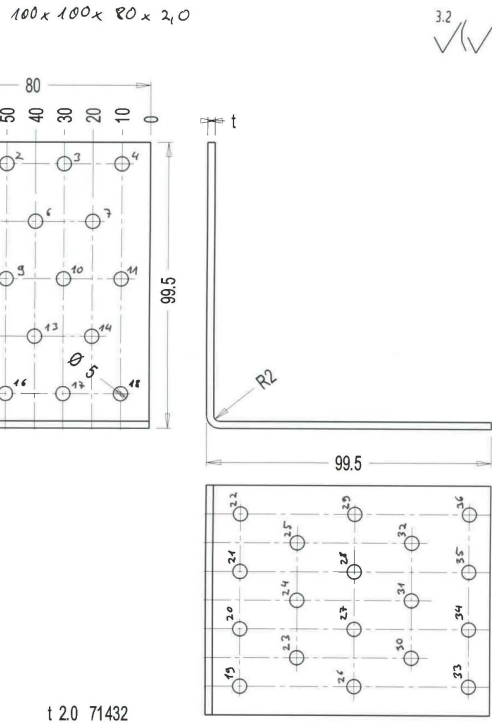


Figure B. 69 Dimensions of angle bracket

100/100/80/2,0

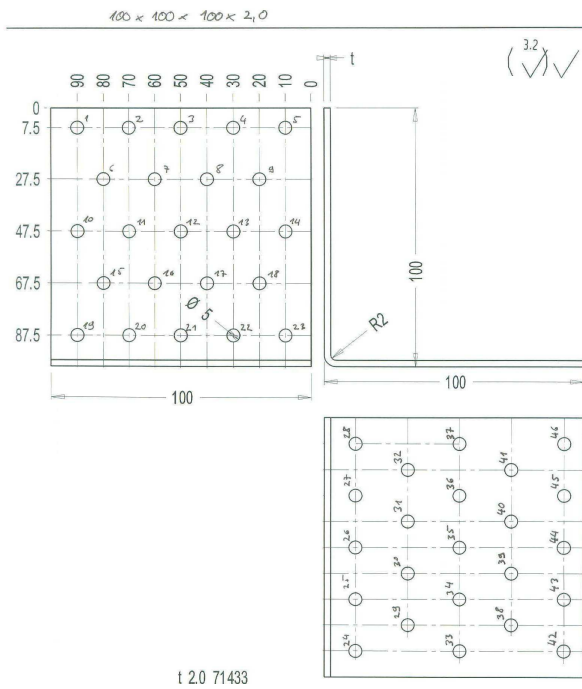


Figure B. 70 Dimensions of angle bracket

100/100/100/2,0

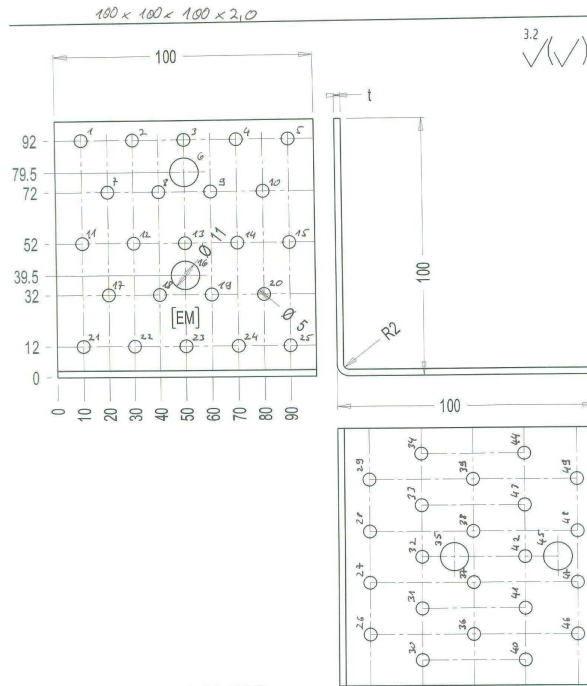


Figure B. 71 Dimensions of angle bracket

100/100/100/2,0; with bolt hole

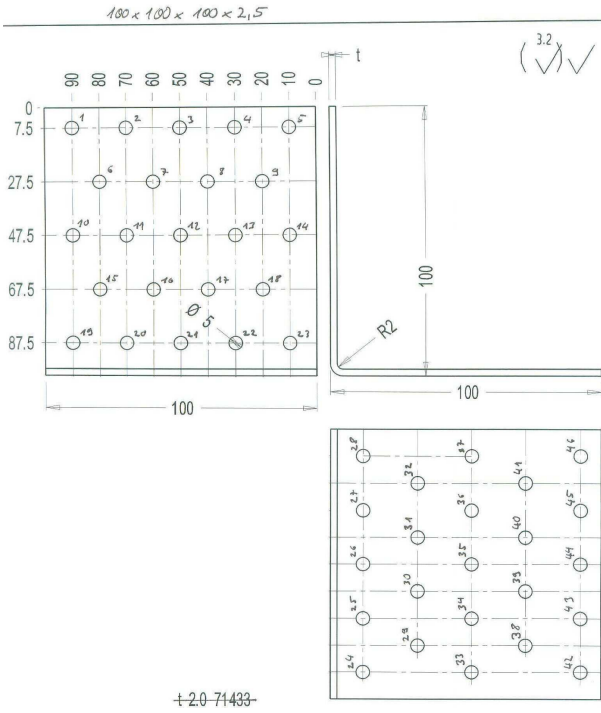


Figure B. 72 Dimensions of angle bracket

100/100/100/2,5

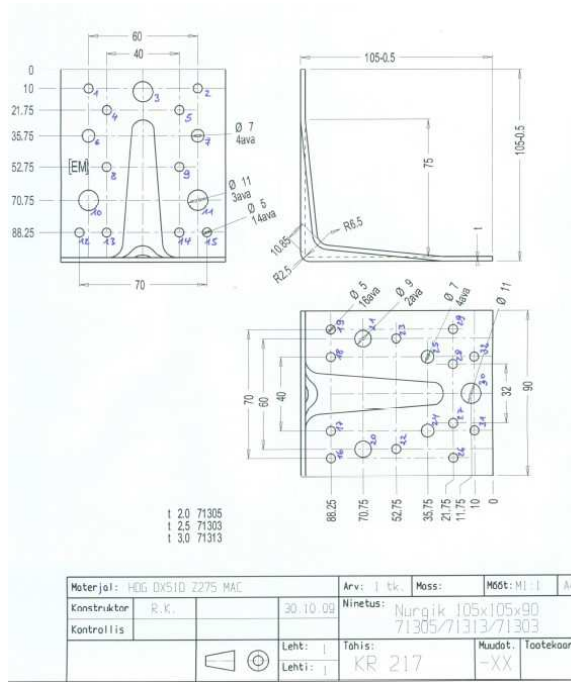


Figure B. 73 Dimensions of angle bracket

105 / 105 / 90 / 2,5, rib, with bolt hole

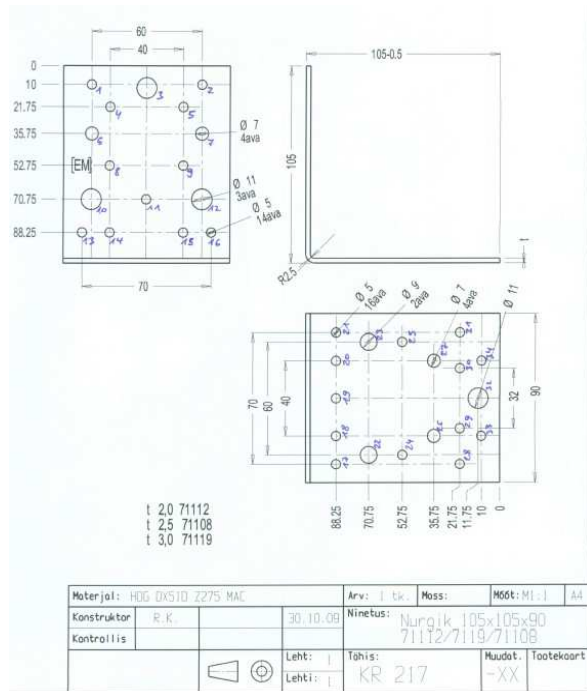


Figure B. 74 Dimensions of angle bracket

105 / 105 / 90 / 2,5, with bolt holes

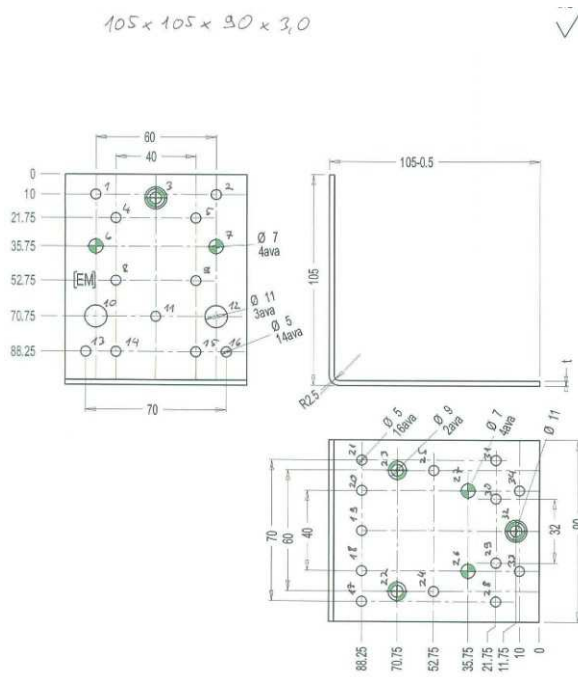


Figure B. 75 Dimensions of angle bracket

105/105/90/3,0

105 x 105 x 90 x 3,0

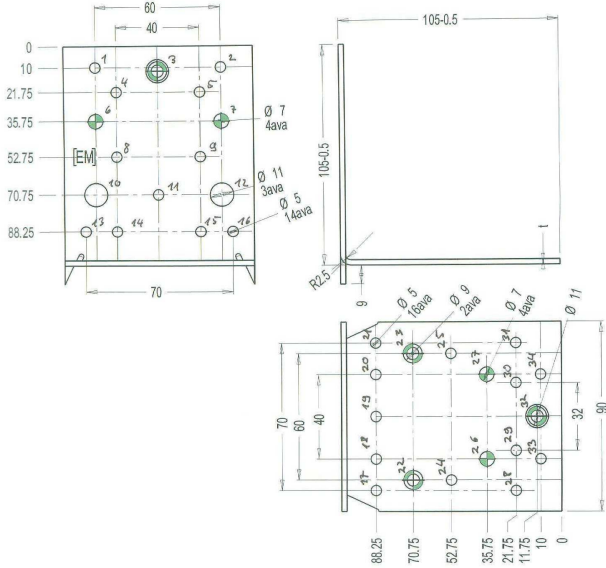


Figure B. 76 Dimensions of angle bracket

105/105/90/3,0; with hook

105 x 105 x 90 x 3,0

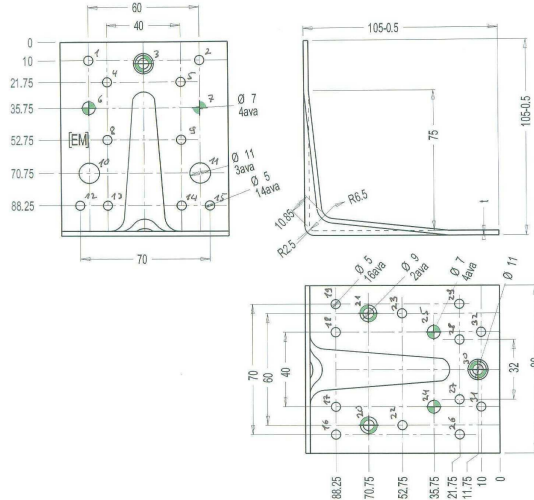


Figure B. 77 Dimensions of angle bracket

105/105/90/3,0; with rib

105 x 105 x 90 x 3,0

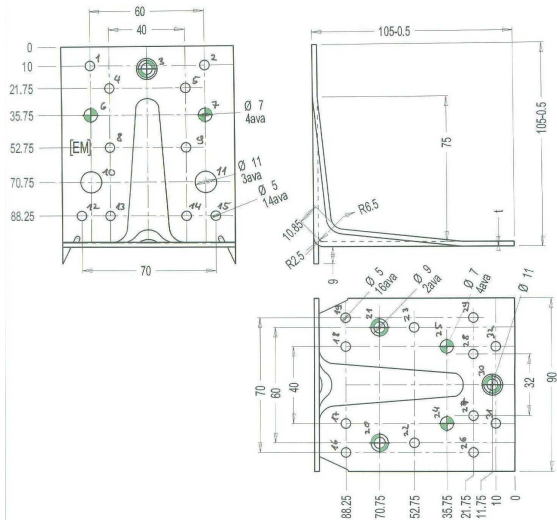


Figure B. 78 Dimensions of angle bracket

105/105/90/3,0; with rib; with hook

120 x 120 x 90 x 3,0

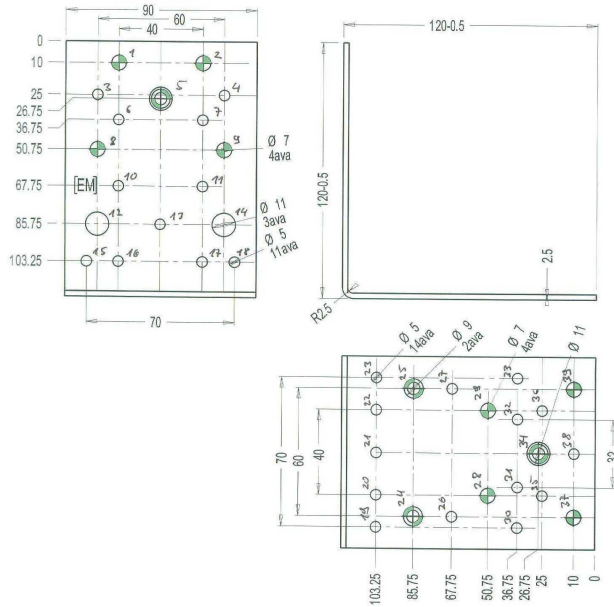


Figure B. 79 Dimensions of angle bracket

120/120/90/3,0

120 x 120 x 90 x 3,0

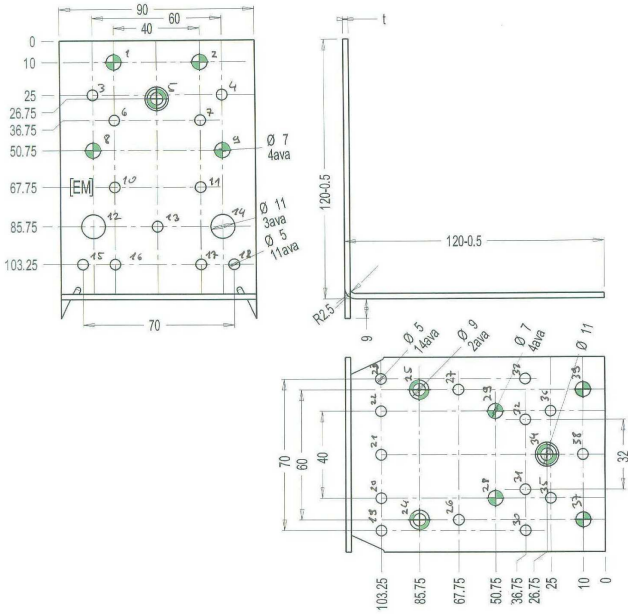


Figure B. 80 Dimensions of angle bracket

120/120/90/3,0; with hook

120 x 120 x 90 x 3,0

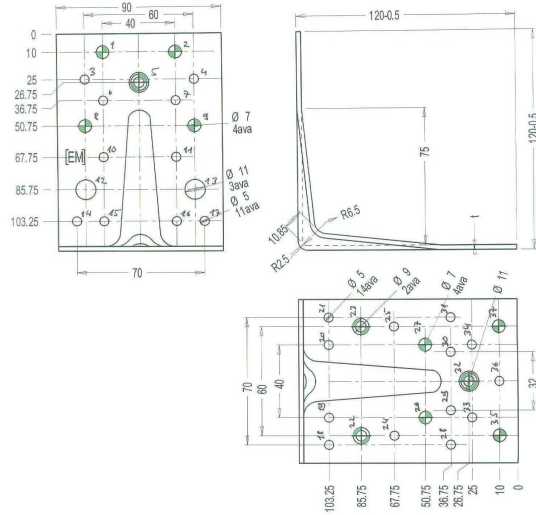


Figure B. 81 Dimensions of angle bracket

120/120/90/3,0; with rib

120 x 120 x 90 x 3,0

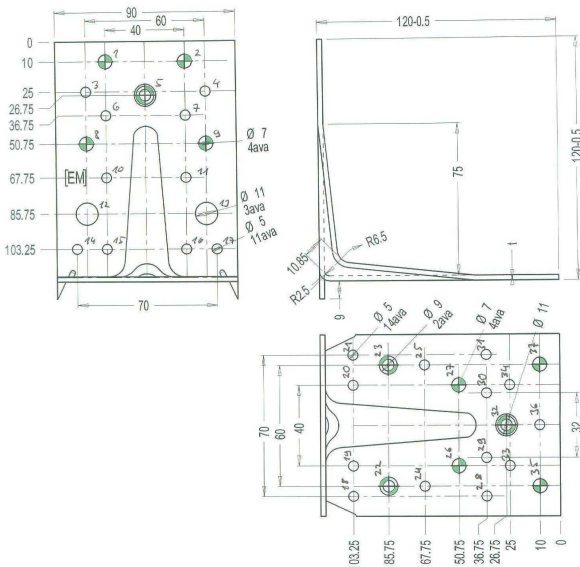


Figure B. 82 Dimensions of angle bracket

120/120/90/3,0; with rib, with hook

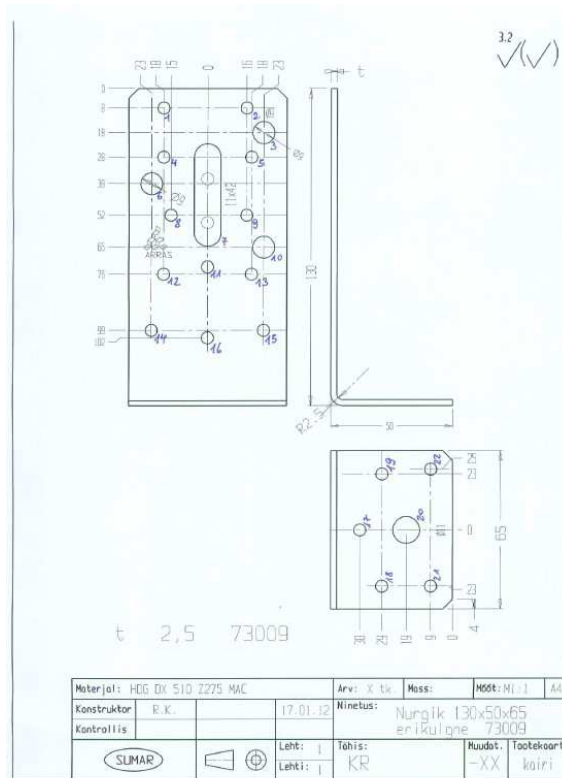


Figure B. 83 Dimensions of angle bracket

130 / 50 / 65 / 2,5 with bolt hole and long hole

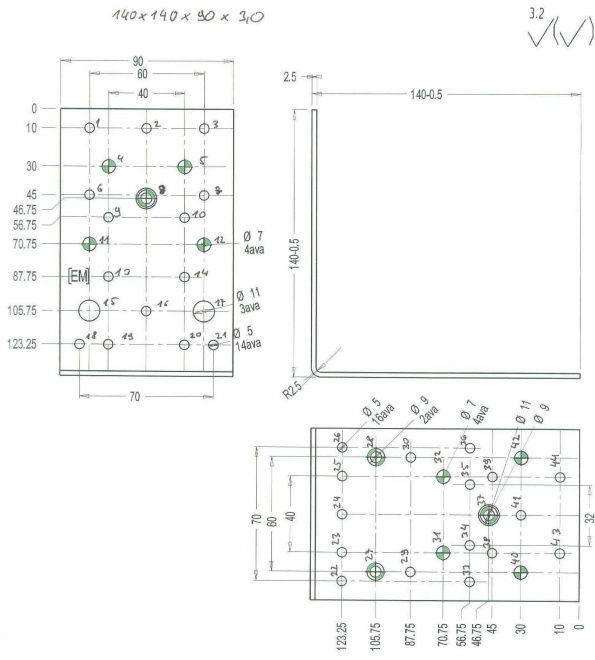


Figure B. 84 Dimensions of angle bracket
140/140/90/3,0

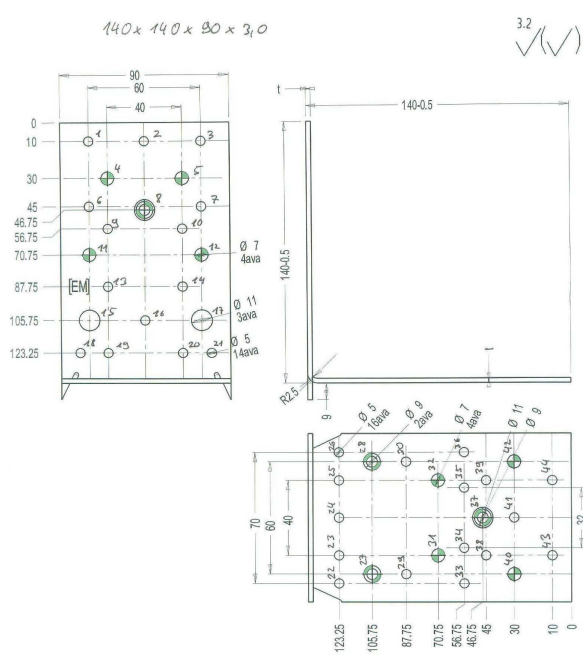


Figure B. 85 Dimensions of angle bracket
140/140/90/3,0; with hook

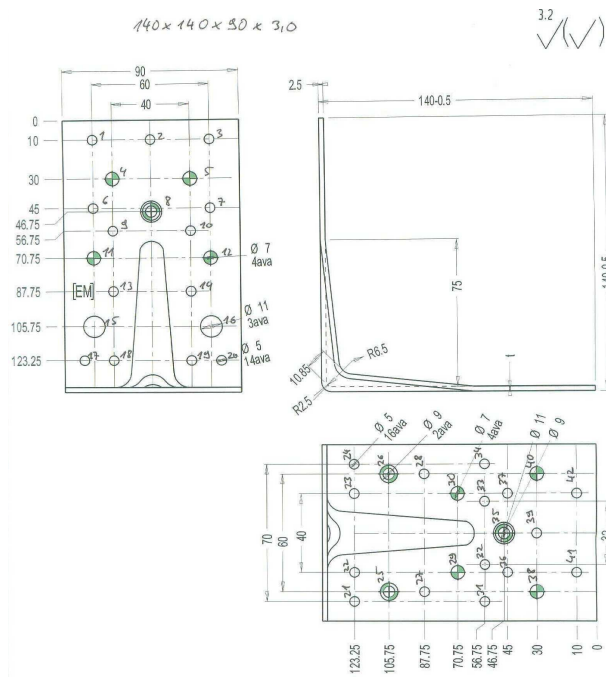


Figure B. 86 Dimensions of angle bracket
140/140/90/3,0; with rib

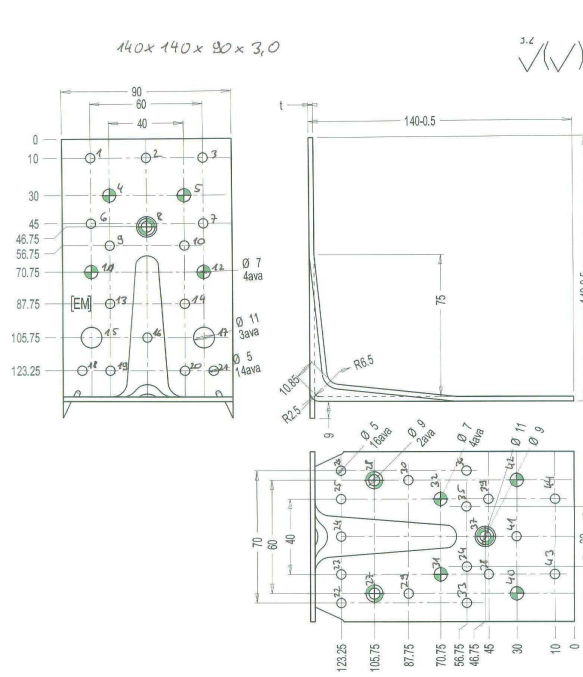


Figure B. 87 Dimensions of angle bracket
140/140/90/3,0; with rib, with hook