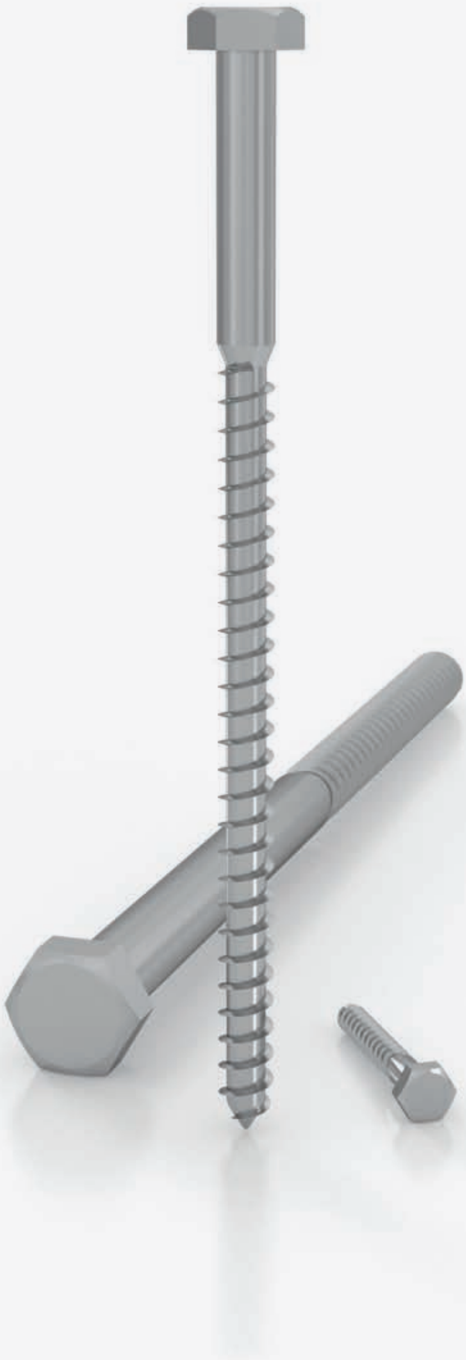
KOP

CE
EN14592

Coach screw DIN571

Available in carbon steel with white galvanic zinc coating and in stainless steel A2

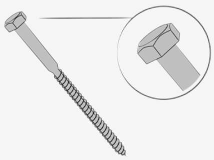


CE MARKING

Screws with the CE mark, in accordance with EN14592

HEXAGONAL HEAD

Appropriate for use on plates in steel-wood applications, thanks to its hexagonal head

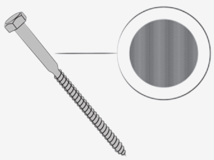


ECO-FRIENDLY

Trivalent Cr^{3}+ chrome coating, replacing hexavalent chrome Cr^{6}

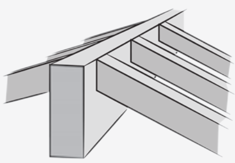
VERSION FOR OUTDOOR USE

Also available in stainless steel AISI304/A2 for outdoor use (service class 3)



FIELDS OF USE

Solid-wood, glulam, X-Lam, LVL, wood-based panels.
Service classes 1 and 2.

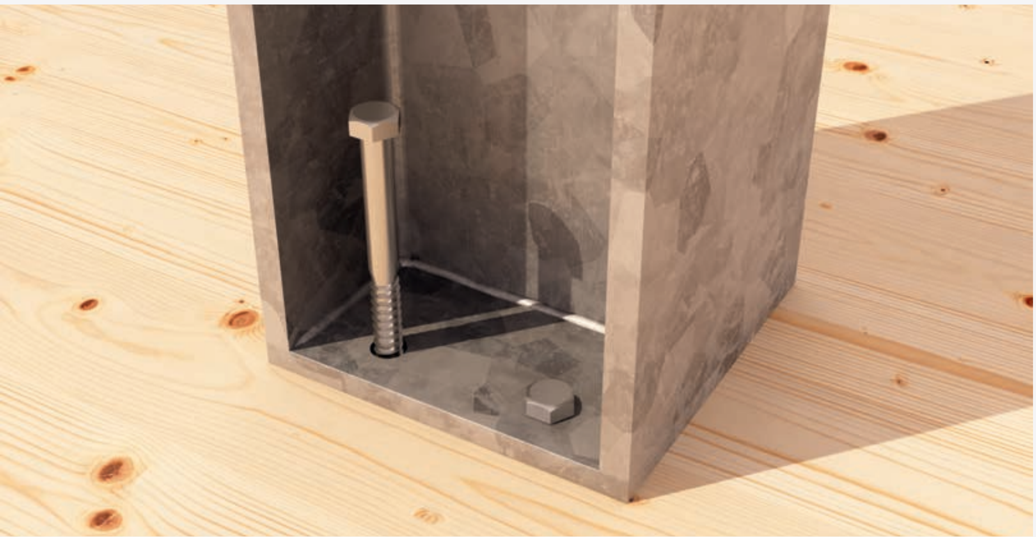


LARGE DIAMETERS

The lag bolt is a wood screw available in diameters up to 16 mm for specific applications

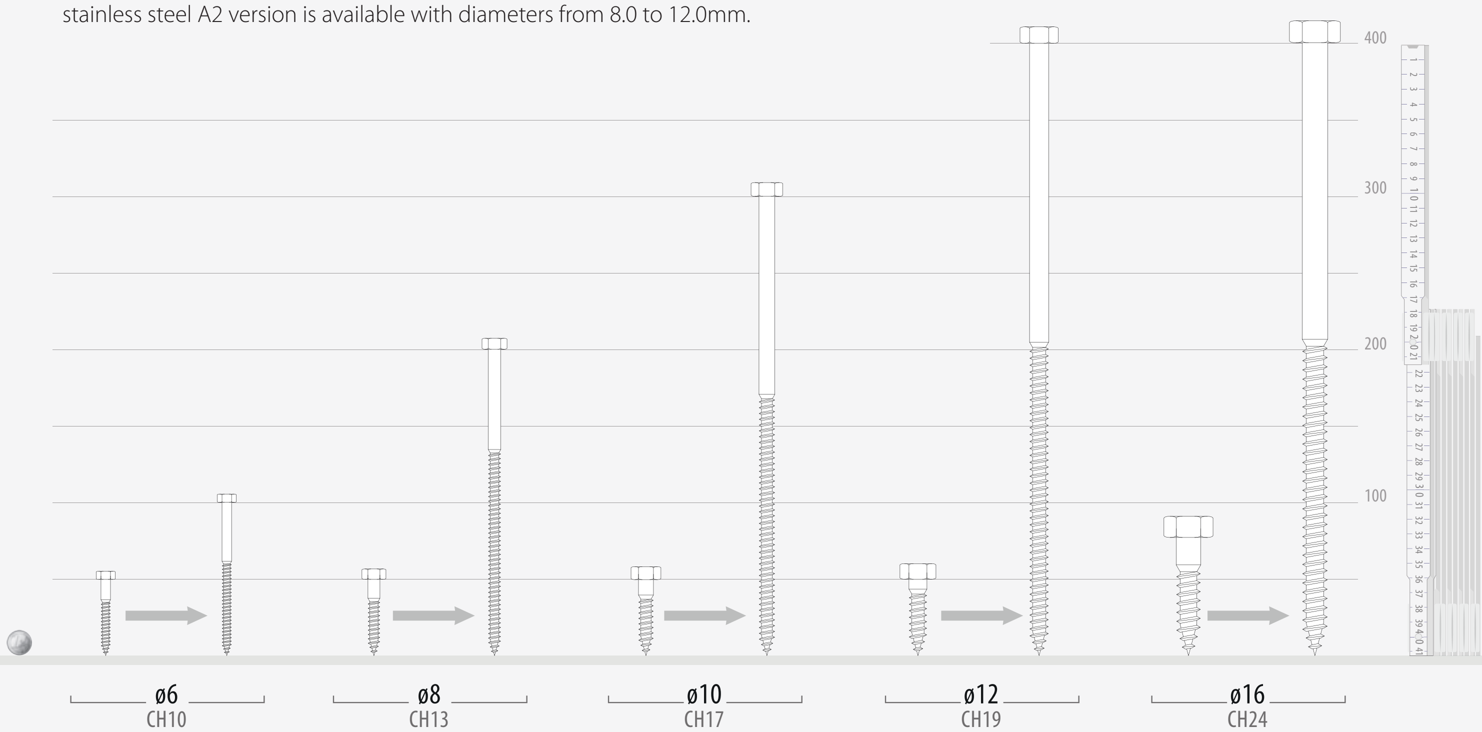
VERSATILE FASTENING

The wooden thread (which requires a pre-bored hole) is also appropriate for use in combination with plastic screw anchors for fastening to cement or brickwork supports

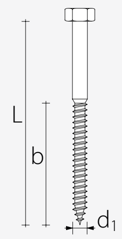


Range

The carbon steel with zinc coating version is available with diameters from 6.0 to 16.0mm. The stainless steel A2 version is available with diameters from 8.0 to 12.0mm.



Codes and dimensions



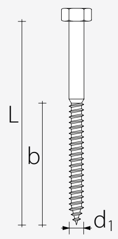
CARBON STEEL WITH WHITE GALVANIC ZINC COATING

d_1 [mm]	code	L [mm]	pcs/pckg
6 *CH10*	**KOP650**	50	200
	KOP660	60	100
	KOP670	70	
	KOP680	80	
	KOP6100	100	
8 *CH13*	**KOP850**	50	100
	KOP860	60	
	KOP870	70	
	KOP880	80	
	KOP8100	100	50
	KOP8120	120	
	KOP8140	140	
	KOP8160	160	
	KOP8180	180	
	KOP8200	200	
10 *CH17*	**KOP1050**	50	50
	KOP1060	60	
	KOP1080	80	
	KOP10100	100	
	KOP10120	120	
	KOP10140	140	
	KOP10150	150	
	KOP10160	160	
	KOP10180	180	
	KOP10200	200	
	KOP10220	220	
	KOP10240	240	
	KOP10260	260	
	KOP10280	280	
	KOP10300	300	
12 *CH19*	**KOP1250**	50	50
	KOP1260	60	
	KOP1270	70	
	KOP1280	80	
	KOP1290	90	25
	KOP12100	100	
	KOP12120	120	
	KOP12140	140	
	KOP12150	150	
	KOP12160	160	
	KOP12180	180	
	KOP12200	200	
	KOP12220	220	
	KOP12240	240	
	KOP12260	260	
	KOP12280	280	
	KOP12300	300	
	KOP12320	320	
	KOP12340	340	
	KOP12360	360	
	KOP12380	380	
	KOP12400	400	

d_1 [mm]	code	L [mm]	pcs/pckg
16 *CH24*	**KOP1680**	80	25
	KOP16100	100	
	KOP16120	120	
	KOP16140	140	
	KOP16150	150	
	KOP16160	160	
	KOP16180	180	
	KOP16200	200	
	KOP16220	220	
	KOP16240	240	
	KOP16260	260	
	KOP16280	280	
	KOP16300	300	
	KOP16320	320	
	KOP16340	340	
	KOP16360	360	
	KOP16380	380	
	KOP16400	400	

Diameter 6 screws have not been granted the CE mark

Codes and dimensions



STAINLESS STEEL AISI304/A2 VERSION

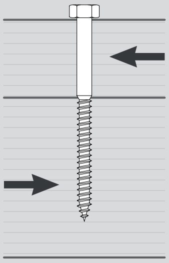
d_1 [mm]	code	L [mm]	pcs/pckg
8 *CH13*	**AI571850**	50	100
	AI571860	60	
	AI571870	70	
	AI571880	80	
	AI5718100	100	50
	AI5718120	120	
10 *CH17*	**AI5711050**	50	50
	AI5711060	60	
	AI5711080	80	
	AI57110100	100	
	AI57110120	120	
	AI57110140	140	
	AI57110150	150	
	AI57110160	160	
	AI57110180	180	
	AI57110200	200	
	AI57110220	220	
	AI57110240	240	
	AI57110260	260	25
12 *CH19*	**AI5711260**	60	50
	AI5711270	70	
	AI5711280	80	
	AI5711290	90	25
	AI57112100	100	
	AI57112120	120	
	AI57112140	140	
	AI57112150	150	
	AI571121560	160	
	AI57112180	180	
	AI57112200	200	
	AI57112220	220	
	AI57112240	240	
	AI57112260	260	

The stainless steel screws have not been granted the CE mark

Carpenter statics

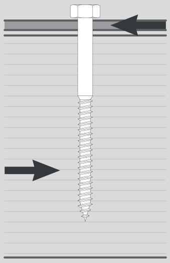
ALLOWABLE VALUES
DIN 1052:1988

SHEAR V_{adm}



WOOD-WOOD

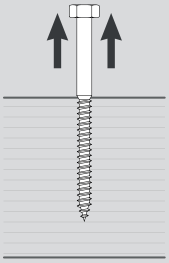
d_1 [mm]	L [mm]	V_{adm}
8	≥ 100	109 kg
10	≥ 120	170 kg
12	≥ 140	245 kg
16	≥ 180	435 kg



STEEL-WOOD

d_1 [mm]	L [mm]	V_{adm}
8	≥ 50	136 kg
10	≥ 50	213 kg
12	≥ 50	306 kg
16	≥ 80	544 kg

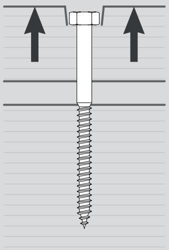
THREAD WITHDRAWAL N_{adm}



	Length L [mm]									
d_1 [mm]	50	60	70	80	90	100	120	140	150	160
8	72 kg	86 kg	101 kg	115 kg	-	144 kg	173 kg	202 kg	-	230 kg
10	90 kg	108 kg	-	144 kg	-	180 kg	216 kg	252 kg	270 kg	288 kg
12	108 kg	130 kg	151 kg	173 kg	194 kg	216 kg	259 kg	302 kg	324 kg	346 kg
16	-	-	-	230 kg	-	288 kg	346 kg	403 kg	432 kg	461 kg

	Length L [mm]									
d_1 [mm]	180	200	220	240	260	280	300	320	340	360 ÷ 400
8	259 kg	288 kg	-	-	-	-	-	-	-	-
10	324 kg	360 kg	396 kg	432 kg	468 kg	504 kg	540 kg	-	-	-
12	389 kg	432 kg	475 kg	518 kg	562 kg	605 kg	648 kg	691 kg	702 kg	702 kg
16	518 kg	576 kg	634 kg	691 kg	749 kg	806 kg	864 kg	922 kg	979 kg	984 kg

HEAD PENETRATION N_{adm}



d_1 [mm]	N_{adm}
8	29 kg
10	52 kg
12	60 kg
16	89 kg

CALCULATION FORMULAS - SHEAR DIN 1052-2:1988

WOOD-WOOD
$V_{adm} = \min\{0{,}4 \cdot A \cdot d_1 ; 1{,}7 \cdot d_1^{\,2}\}$
d_1 [mm]
A [mm]
V_{adm} [kg]

STEEL-WOOD
$V_{adm} = 1{,}25 \cdot 1{,}7 \cdot d_1^{\,2}$
d_1 [mm]
V_{adm} [kg]

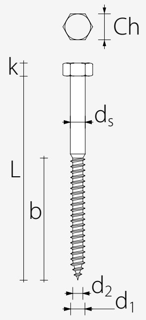
EXAMPLE WOOD-WOOD
KOP 12 x 180 mm
$d_1 = 12$ mm
A = 72 mm
$V_{adm} = \min\{0{,}4 \cdot A \cdot d_1; 1{,}7 \cdot d_1^{\,2}\}$
$V_{adm} = \min\{0{,}4 \cdot 72 \cdot 12 ; 1{,}7 \cdot 12^2\} = \min\{346 ; 245\} = 245$ kg

NOTE

- Allowable values in accordance with DIN 1052:1988.
- The allowable extraction values are calculated considering the threaded part as being completely inserted into the wood.

Geometry and minimum distances

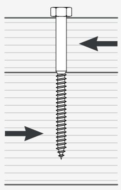
GEOMETRY AND MECHANICAL CHARACTERISTICS



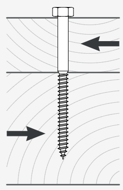
LAG BOLT KOP						
Nominal diameter	**d_1 [mm]**	**6 ***	**8**	**10**	**12**	**16**
Wrench	Ch [mm]	10	13	17	19	24
Head thickness	k [mm]	4,00	5,50	7,00	8,00	10,00
Tip diameter	d_2 [mm]	4,20	5,60	7,00	9,00	12,00
Shank diameter	d_S [mm]	6,00	8,00	10,00	12,00	16,00
Diameter pre-bored hole - smooth part	d_{V1} [mm]	6,0	8,0	10,0	12,0	16,0
Diameter pre-bored hole - threaded part	d_{V2} [mm]	4,0	5,5	7,0	8,5	11,0
Thread length	b [mm]	≥ 0,6 L				
Characteristic yield moment	$M_{y,k}$ [Nmm]	-	16900,0	32200,0	65700,0	138000,0
Characteristic extraction-resistance parameter	$f_{ax,k}$ [N/mm^2]	-	12,9	10,6	10,2	10,0
Associated density	ρ_a [kg/m^3]	-	*400*	*400*	*440*	*360*
Characteristic head-penetration parameter	$f_{head,k}$ [N/mm^2]	-	22,8	19,8	16,4	16,5
Associated density	ρ_a [kg/m^3]	-	*440*	*420*	*430*	*430*
Characteristic tensile strength	$f_{tens,k}$ [kN]	-	15,7	23,6	37,3	75,3

* This screw has not been granted the CE mark.

MINIMUM DISTANCES FOR SHEAR LOADS

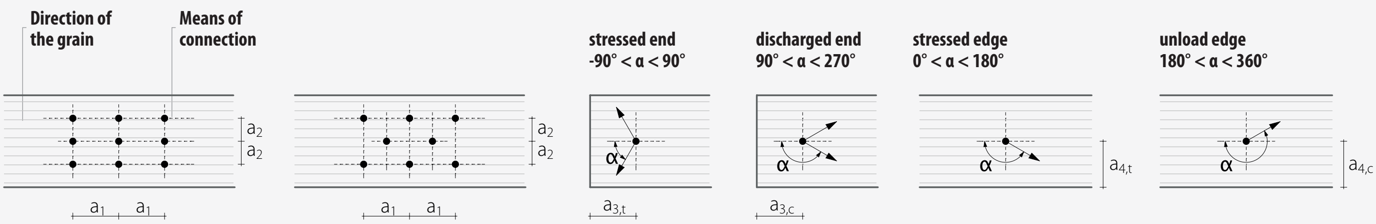


Angle between strength and grain α = 0°



Angle between strength and grain α = 90°

SCREWS INSERTED WITH PRE-BORED HOLES											
		6	**8**	**10**	**12**	**16**	**6**	**8**	**10**	**12**	**16**
a_1	[mm]	30	40	50	60	80	24	32	40	48	64
a_2	[mm]	18	32	40	48	64	24	32	40	48	64
$a_{3,t}$	[mm]	72	80	80	84	112	42	80	80	84	112
$a_{3,c}$	[mm]	42	32	40	48	64	42	56	70	84	112
$a_{4,t}$	[mm]	18	24	30	36	48	42	32	40	48	64
$a_{4,c}$	[mm]	18	24	30	36	48	18	24	30	36	48

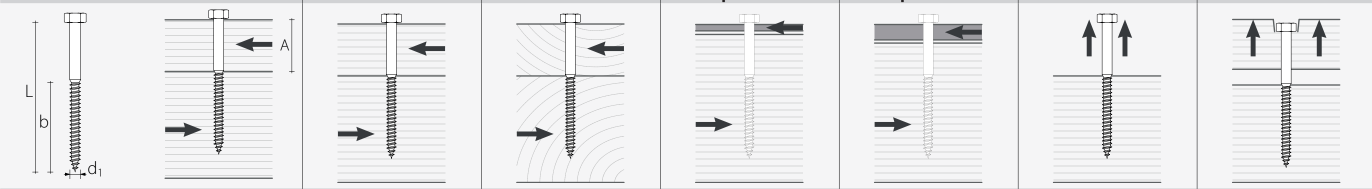


NOTE

- Minimum distances in accordance with EN 1995:2008.
- For screws with diameters d > 6 mm, a pre-bored hole is required (EN 1995:2008).

Designer statics

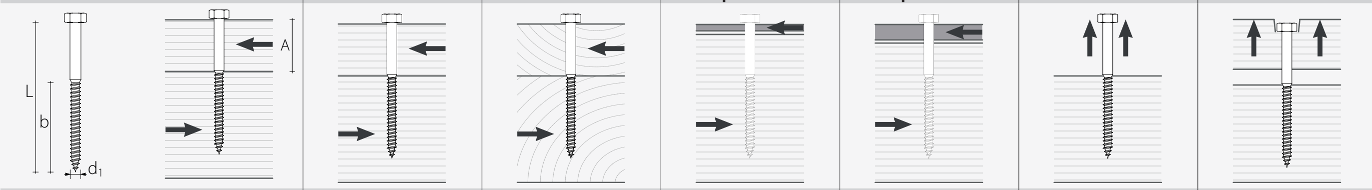
CHARACTERISTIC VALUES
EN 1995:2008



				SHEAR						TRACTION	
geometry				wood-wood α = 0° (1)	wood-wood α = 90° (2)	thin steel-wood plate (3)		thick steel-wood plate (4)		thread withdrawal (5)	head penetration (6)
d_1 [mm]	L [mm]	b (7) [mm]	A [mm]	$R_{V,k}$ [kN]	$R_{V,k}$ [kN]		$R_{V,k}$ [kN]		$R_{V,k}$ [kN]	$R_{ax,k}$ [kN]	$R_{head,k}$ [kN]
8	50	30	20	2,96	2,23	$S_{PLATE} \leq 4$ mm	2,64	$S_{PLATE} \geq 8$ mm	3,75	2,78	3,54
	60	36	24	3,28	2,68		3,22		4,38	3,34	3,54
	70	42	28	3,55	2,87		3,51		4,56	3,90	3,54
	80	48	32	3,78	3,01		3,65		4,70	4,45	3,54
	100	60	40	3,96	3,32		3,93		4,98	5,56	3,54
	120	72	48	3,96	3,42		4,20		5,25	6,68	3,54
	140	84	56	3,96	3,42		4,48		5,53	7,79	3,54
	160	96	64	3,96	3,42		4,76		5,81	8,90	3,54
	180	108	72	3,96	3,42		5,04		6,09	10,02	3,54
	200	120	80	3,96	3,42		5,07		6,37	11,13	3,54
10	50	30	20	3,48	2,56	$S_{PLATE} \leq 5$ mm	3,10	$S_{PLATE} \geq 10$ mm	4,65	2,86	5,45
	60	36	24	4,18	3,07		3,79		5,30	3,43	5,45
	80	48	32	5,01	4,01		4,97		6,56	4,57	5,45
	100	60	40	5,78	4,56		5,26		6,84	5,72	5,45
	120	72	48	6,05	4,92		5,54		7,13	6,86	5,45
	140	84	56	6,05	5,19		5,83		7,42	8,00	5,45
	150	90	60	6,05	5,19		5,97		7,56	8,57	5,45
	160	96	64	6,05	5,19		6,12		7,70	9,14	5,45
	180	108	72	6,05	5,19		6,40		7,99	10,29	5,45
	200	120	80	6,05	5,19		6,69		8,27	11,43	5,45
	220	132	88	6,05	5,19		6,97		8,56	12,57	5,45
	240	144	96	6,05	5,19		7,26		8,85	13,72	5,45
	260	156	104	6,05	5,19		7,54		9,13	14,86	5,45
	280	168	112	6,05	5,19		7,66		9,42	16,00	5,45
	300	180	120	6,05	5,19		7,66		9,70	17,15	5,45
12	50	30	20	4,01	2,89	$S_{PLATE} \leq 6$ mm	3,49	$S_{PLATE} \geq 12$ mm	6,10	3,06	5,54
	60	36	24	4,81	3,46		4,28		6,67	3,67	5,54
	70	42	28	5,61	4,04		5,07		7,36	4,28	5,54
	80	48	32	6,42	4,62		5,86		8,12	4,89	5,54
	90	54	36	6,92	5,19		6,66		8,94	5,50	5,54
	100	60	40	7,20	5,63		7,40		9,78	6,12	5,54
	120	72	48	7,82	6,02		7,70		10,13	7,34	5,54
	140	84	56	8,50	6,41		8,01		10,44	8,56	5,54
	150	90	60	8,64	6,62		8,16		10,59	9,17	5,54
	160	96	64	8,64	6,84		8,31		10,74	9,78	5,54
	180	108	72	8,64	7,25		8,62		11,05	11,01	5,54
	200	120	80	8,64	7,25		8,92		11,36	12,23	5,54
	220	132	88	8,64	7,25		9,23		11,66	13,45	5,54
	240	144	96	8,64	7,25		9,54		11,97	14,68	5,54
	260	156	104	8,64	7,25		9,84		12,27	15,90	5,54
	280	168	112	8,64	7,25		10,15		12,58	17,12	5,54
	300	180	120	8,64	7,25		10,45		12,88	18,35	5,54
	320	192	128	8,64	7,25		10,76		13,19	19,57	5,54
	340	195 *	145	8,64	7,25		10,84		13,27	19,88	5,54
	360	195 *	165	8,64	7,25		10,84		13,27	19,88	5,54
	380	195 *	185	8,64	7,25		10,84		13,27	19,88	5,54
	400	195 *	205	8,64	7,25		10,84		13,27	19,88	5,54

Designer statics

SHEAR / TRACTION



geometry				SHEAR: wood-wood $\alpha = 0°$ (1)	SHEAR: wood-wood $\alpha = 90°$ (2)	SHEAR: thin steel-wood plate (3) ($S_{PLATE} \leq 8$ mm)	SHEAR: thick steel-wood plate (4) ($S_{PLATE} \geq 16$ mm)	TRACTION: thread withdrawal (5)	TRACTION: head penetration (6)
d_1 [mm]	L [mm]	b (7) [mm]	A [mm]	$R_{V,k}$ [kN]	$R_{V,k}$ [kN]	$R_{V,k}$ [kN]	$R_{V,k}$ [kN]	$R_{ax,k}$ [kN]	$R_{head,k}$ [kN]
16	80	48	32	8,49	6,03	6,99	11,17	7,51	8,89
	100	60	40	10,48	7,42	8,93	13,02	9,39	8,89
	120	72	48	11,43	8,46	10,87	15,10	11,26	8,89
	140	84	56	12,18	9,28	12,70	16,59	13,14	8,89
	150	90	60	12,58	9,50	12,93	16,83	14,08	8,89
	160	96	64	12,99	9,72	13,16	17,06	15,02	8,89
	180	108	72	13,86	10,20	13,63	17,53	16,89	8,89
	200	120	80	14,09	10,72	14,10	18,00	18,77	8,89
	220	132	88	14,09	11,26	14,57	18,47	20,65	8,89
	240	144	96	14,09	11,63	15,04	18,94	22,53	8,89
	260	156	104	14,09	11,63	15,51	19,41	24,40	8,89
	280	168	112	14,09	11,63	15,98	19,88	26,28	8,89
	300	180	120	14,09	11,63	16,45	20,35	28,16	8,89
	320	192	128	14,09	11,63	16,92	20,82	30,04	8,89
	340	204	136	14,09	11,63	17,39	21,29	31,91	8,89
	360	205 *	155	14,09	11,63	17,43	21,33	32,07	8,89
	380	205 *	175	14,09	11,63	17,43	21,33	32,07	8,89
	400	205 *	195	14,09	11,63	17,43	21,33	32,07	8,89

GENERAL PRINCIPLES

- Characteristic values comply with EN 1995:2008.
- Design values are obtained from the following characteristic values:

$$R_d = \frac{R_k \cdot k_{mod}}{\gamma_m}$$

  The coefficients γ_m and k_{mod} should be taken according to the current regulations used for the calculation.
- In the calculations, the density of the wood elements was considered equal to $\rho_k = 350$ kg/m³.
- Values were calculated considering the minimum threaded part as being completely inserted into the wood.
- Sizing and verification of the wooden elements and steel plates must be done separately.
- The characteristic shear resistance values are calculated for screws inserted with pre-bored holes.

NOTE

(1) The characteristic shear resistance values are calculated using an angle α between the strength and the grain of 0°.
(2) The characteristic shear resistance values are calculated using an angle α between the strength and the grain of 90°.
(3) The shear characteristic resistances are calculated considering the case of a thin plate ($S_{PLATE} \leq 0,5\, d_1$).
(4) The shear characteristic resistances are calculated considering the case of a thick plate ($S_{PLATE} \geq d_1$).
(5) The axial thread-extraction resistance was calculated considering a 90° angle between the grain and the connector and for a fixing length of b.
(6) The axial resistance to head penetration was calculated using wood elements. In the case of steel-wood connections, generally the steel tensile strength is binding with respect to head separation or penetration.
(7) During calculation, a thread length of b = 0.6 L is used, with the exception of the measures (*).