RAPID® fullthread

The best technical values - extremely reliable

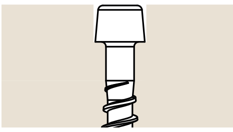
Head types

Cylinder head

> Reduced splitting so that wood surface does not splinter

> Head is able to countersink deep into wood with a long bit

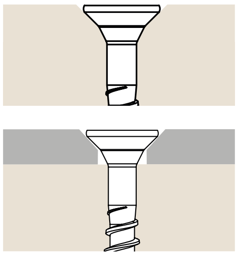
> Improved force transfer thanks to deeper drive



90° countersunk head

> Ideal for metal/wood connections

> Fits perfectly into metal parts



Thread geometry

> Constantly low torque due to anti-friction coating

> Excellent thread pull-out values

> Excellent pressure values

> Maximum load-bearing capacity

By request, also available in:

> Stainless steel A2 and A4 (approved for Ø 8.0 to 300 mm length and Ø 10.0 to 510 mm length)

> alternative surfaces such as: zinc nickel

YellWin 500+, Cr[VI] free

Stainless steel

Zinc nickel 1000+ Cr[VI] free

Patented tip - no pre-drilling necessary

> Self-drilling tip with ridged core

> Minimised splitting

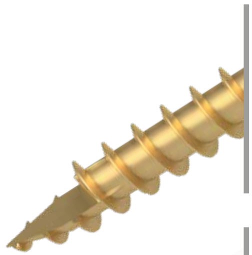
> 50 percent lower screw-in torque

Half tip (HSP)

> Bites rapidly even with oblique and cross grained wood screw connections

> Especially with long screws

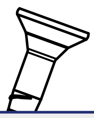
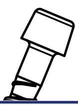
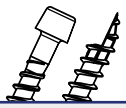
> Can be placed closer to the edge



Full tip with ridged core

> Minimised splitting and bites into wood quickly

Dimensions

		Countersunk head	Cylinder head	HSP cylinder head
				
Ø 8.0	Drive	T 40	T 40	T 40
	Length	120–600 mm	120–400 mm	450–600 mm
	Thread	Single thread	Single thread	Single thread
	Tip	Half tip	Full tip	Half tip
Ø 10.0	Drive	T 50	–	T 50
	Length	120–1000 mm	–	200–1000 mm
	Thread	Single thread	–	Single thread
	Tip	Half tip	–	Half tip
Ø 12.0	Drive	T 50	–	–
	Length	200–1000 mm	–	–
	Thread	Single thread	–	–
	Tip	Half tip	–	–
	Surface	YellWin 500+, Cr[VI] free		

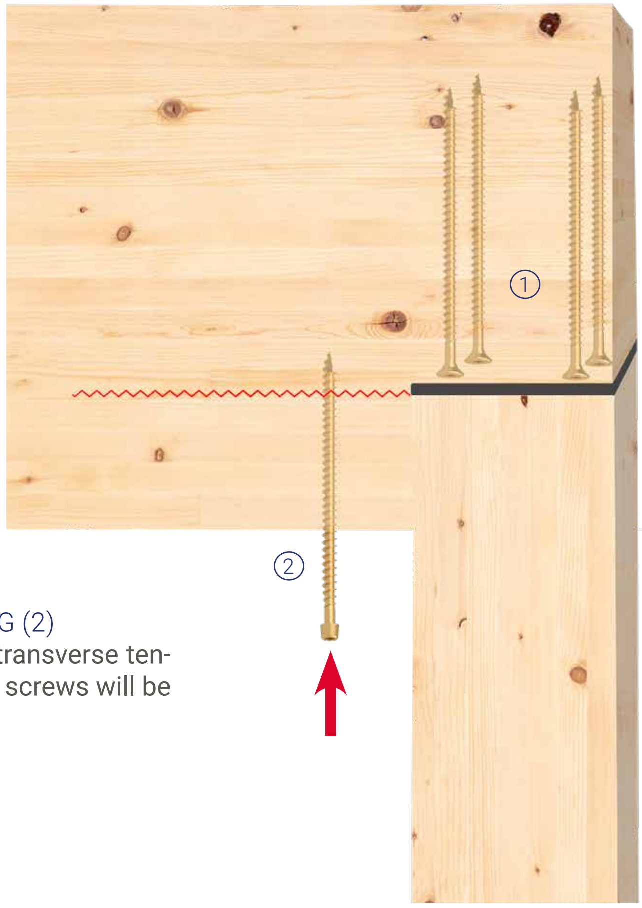
Note: Guide bores of 5d recommended for L > 800 mm

RAPID® fullthread

The best technical values - extremely reliable

Applications

SUPPORT REINFORCEMENT WITH STEEL PLATE AND FULL THREAD SCREWS (1)
RAPID® fullthread screws transfer the support load from the timber section directly
to the steel plate through the screw heads. They distribute the force evenly into the end grain of the support.



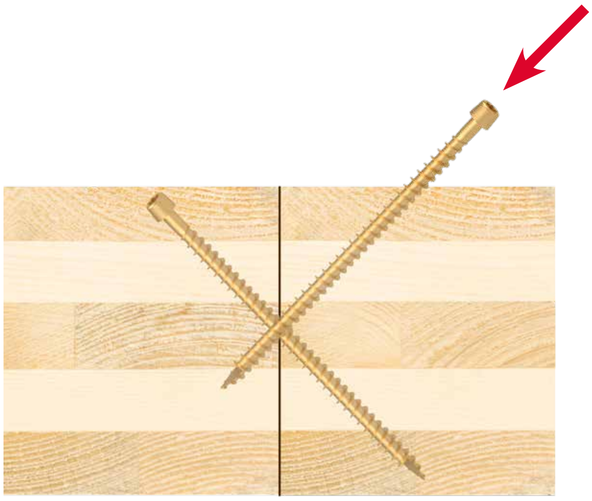
TRANSVERSE TENSILE REINFORCEMENT FOR NOTCHING (2)
The structural engineer must review the requirement. If the transverse tensile load is too high for the timber section, RAPID® fullthread screws will be used to reinforce and secure the beam in the red line area.

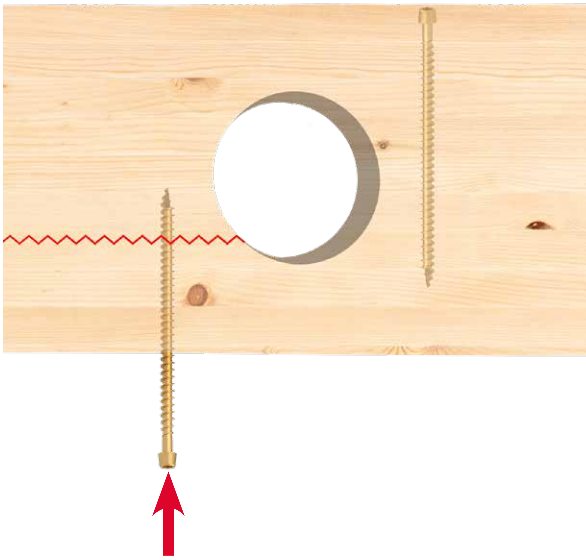
CONNECTIONS AT THE BASE POINT OF THE SUPPORT
RAPID® fullthread screws with a countersunk head are best suited for this application. Shear forces and wind suction are effectively transferred. The RAPID® offers a high degree of security with 500 hours of corrosion resistance.

Info: In areas exposed to weather (use class 3), stainless steel screws should be used in accordance with the timber structure design code. The executive person should perform a final assessment of the necessary corrosion protection.

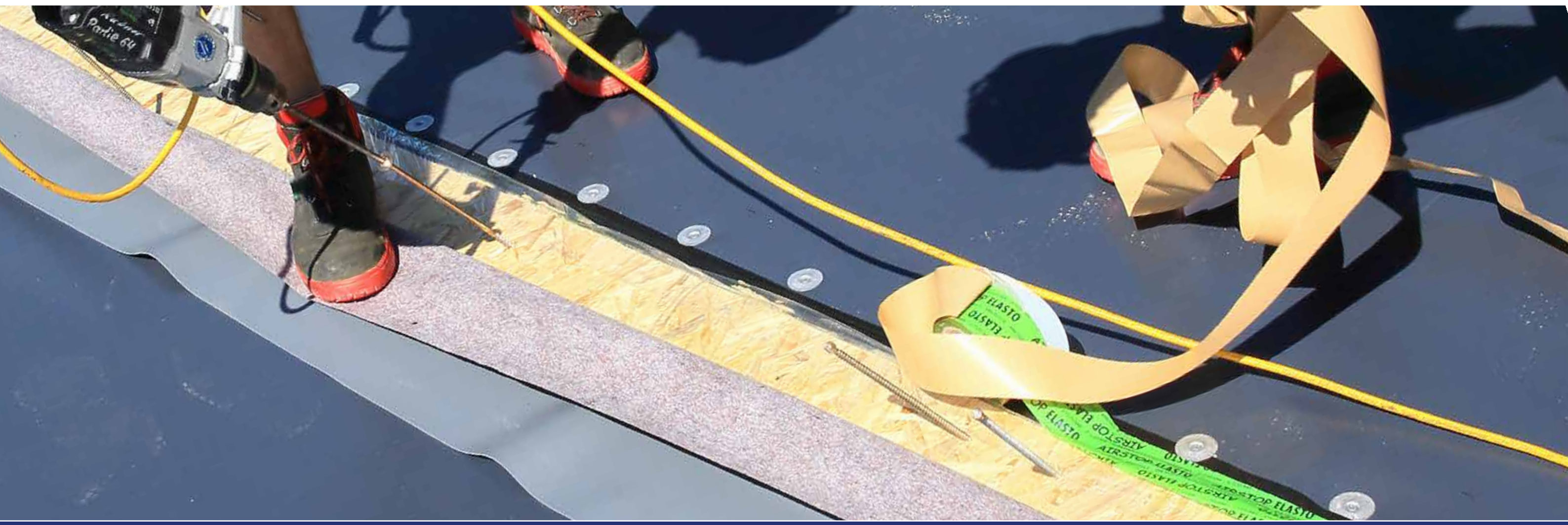
CROSS LAMINATED TIMBER (CEILING RIB)
Shear-resistant crosswise screwing for cross laminated timber ceilings.

Tip: the connection should first be pulled tightly together using e.g., partial thread screws.
The pitch of the screws should be oriented in the direction of the main load.





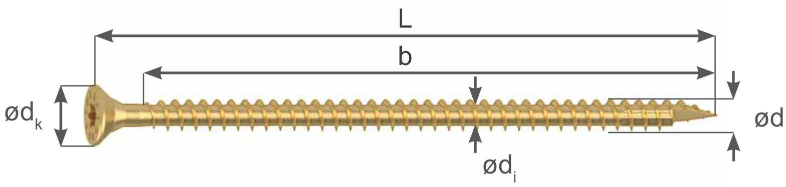
REINFORCEMENT OF OPENINGS WITH LONG FULL THREAD SCREWS
The area marked in red indicates the risk of cracking. The same thread length is required above and below this marking.
Long RAPID® fullthread screws with cylinder heads are recommended. They can be positioned exactly using long bits.



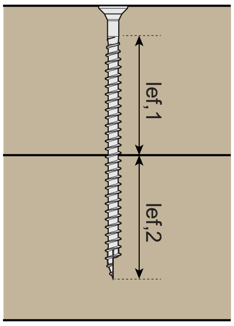
RAPID® fullthread countersunk head

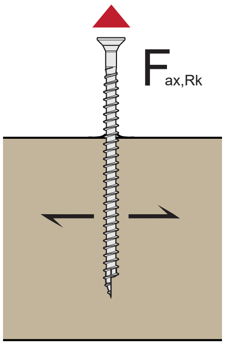
CHARACTERISTICS AND VALUES FOR C24				
D	**[mm]**	**ø 8**	**ø 10**	**ø 12**
d_k	[mm]	15.0	18.5	21.0
d_i	[mm]	5.10	6.30	7.00
$f_{ax,90,k}$	[N/mm²]	13.1	12.5	11.2
$f_{head,k}$	[N/mm²]	12.4	12.2	10.3
$F_{tens,k}$	[kN]	24.1	40.0	46.7
$M_{y,k}$	[Nmm]	20 300	36 700	48 500
$N_{pl,k \cdot kc}$(*)	[kN]	12.2	18.9	23.6

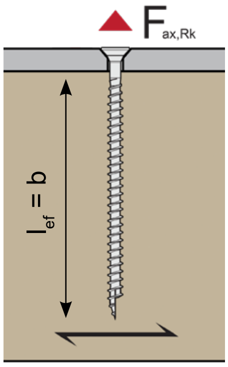
(*) total screw length in timber

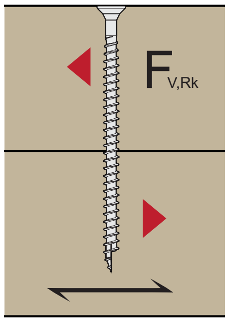


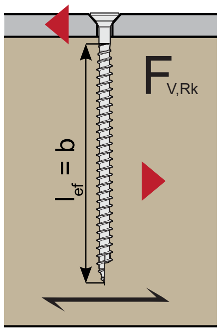
			AXIAL 90°		SHEAR 90°		
			TIMBER - TIMBER	METAL - TIMBER	TIMBER - TIMBER	METAL - TIMBER	
			l_{ef} = b/2	l_{ef} = b	l_{ef} = b/2	l_{ef} = b	
	ø [mm]	**L/b** [mm]	$F_{ax,Rk}$ [kN]	$F_{ax,Rk}$ [kN]	$F_{V,Rk}$ [kN]	$F_{V,Rk,thin}$ [kN]	$F_{V,Rk,thick}$ [kN]
ø 8.0	8.0	**120**/110	5.76	11.53	4.01	5.14	6.52
	8.0	**140**/130	6.81	13.62	4.27	5.14	7.04
	8.0	**160**/150	7.86	15.72	4.54	5.14	7.27
	8.0	**180**/170	8.91	17.82	4.80	5.14	7.27
	8.0	**200**/190	9.96	19.91	5.06	5.14	7.27
	8.0	**220**/210	11.00	22.01	5.14	5.14	7.27
	8.0	**240**/230	12.05	24.10	5.14	5.14	7.27
	8.0	**260**/250	13.10	24.10	5.14	5.14	7.27
	8.0	**280**/270	14.15	24.10	5.14	5.14	7.27
	8.0	**300**/290	15.20	24.10	5.14	5.14	7.27
	8.0	**325**/315	16.51	24.10	5.14	5.14	7.27
	8.0	**350**/340	17.82	24.10	5.14	5.14	7.27
	8.0	**375**/365	19.13	24.10	5.14	5.14	7.27
	8.0	**400**/390	20.44	24.10	5.14	5.14	7.27
	8.0	**450**/428	22.37	24.10	5.14	5.14	7.27
	8.0	**500**/478	24.10	24.10	5.14	5.14	7.27
	8.0	**600**/578	24.10	24.10	5.14	5.14	7.27
ø 10.0	10.0	**120**/108	6.75	13.50	5.08	6.33	8.66
	10.0	**160**/148	9.25	18.50	6.05	7.47	9.91
	10.0	**180**/168	10.50	21.00	6.36	7.47	10.53
	10.0	**200**/188	11.75	23.50	6.67	7.47	10.57
	10.0	**220**/208	13.00	26.00	6.99	7.47	10.57
	10.0	**240**/228	14.25	28.50	7.30	7.47	10.57
	10.0	**260**/248	15.50	31.00	7.47	7.47	10.57
	10.0	**280**/268	16.75	33.50	7.47	7.47	10.57









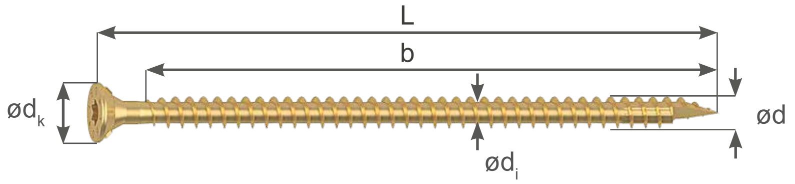


			AXIAL 90°		SHEAR 90°		
			TIMBER - TIMBER	METAL - TIMBER	TIMBER - TIMBER	METAL - TIMBER	
			l_{ef} = b/2	l_{ef} = b	l_{ef} = b/2	l_{ef} = b	
	ø [mm]	L/b [mm]	$F_{ax,Rk}$ [kN]	$F_{ax,Rk}$ [kN]	$F_{V,Rk}$ [kN]	$F_{V,Rk,thin}$ [kN]	$F_{V,Rk,thick}$ [kN]
ø 10.0	10.0	**300**/288	18.00	36.00	7.47	7.47	10.57
	10.0	**325**/301	18.81	37.63	7.47	7.47	10.57
	10.0	**350**/326	20.38	40.00	7.47	7.47	10.57
	10.0	**375**/351	21.94	40.00	7.47	7.47	10.57
	10.0	**400**/376	23.50	40.00	7.47	7.47	10.57
	10.0	**450**/426	26.63	40.00	7.47	7.47	10.57
	10.0	**500**/476	29.75	40.00	7.47	7.47	10.57
	10.0	**600**/576	36.00	40.00	7.47	7.47	10.57
	10.0	**700**/676	40.00	40.00	7.47	7.47	10.57
	10.0	**800**/776	40.00	40.00	7.47	7.47	10.57
	10.0	**1000**/976	40.00	40.00	7.47	7.47	10.57
ø 12.0	12.0	**200**/180	12.10	24.19	7.60	9.16	12.52
	12.0	**220**/200	13.44	26.88	7.94	9.16	12.95
	12.0	**240**/220	14.78	29.57	8.27	9.16	12.95
	12.0	**260**/240	16.13	32.26	8.61	9.16	12.95
	12.0	**280**/260	17.47	34.94	8.95	9.16	12.95
	12.0	**300**/280	18.82	37.63	9.16	9.16	12.95
	12.0	**350**/330	22.18	44.35	9.16	9.16	12.95
	12.0	**400**/380	25.54	46.70	9.16	9.16	12.95
	12.0	**500**/480	32.26	46.70	9.16	9.16	12.95
	12.0	**600**/580	38.98	46.70	9.16	9.16	12.95
	12.0	**700**/680	45.70	46.70	9.16	9.16	12.95
	12.0	**800**/780	46.70	46.70	9.16	9.16	12.95
	12.0	**1000**/980	46.70	46.70	9.16	9.16	12.95

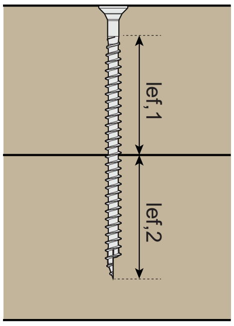
RAPID® fullthread countersunk head

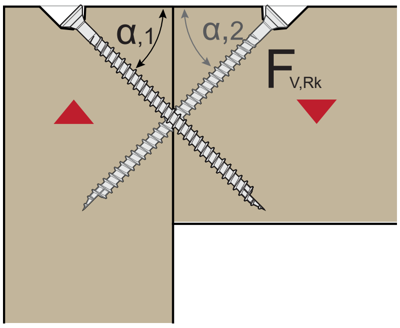
CHARACTERISTICS AND VALUES FOR C24				
d	**[mm]**	**ø 8**	**ø 10**	**ø 12**
d_k	[mm]	15.0	18.5	21.0
d_i	[mm]	5.10	6.30	7.00
$f_{ax,90,k}$	[N/mm²]	13.1	12.5	11.2
$f_{head,k}$	[N/mm²]	12.4	12.2	10.3
$F_{tens,k}$	[kN]	24.1	40.0	46.7
$M_{y,k}$	[Nmm]	20 300	36 700	48 500
$N_{pl,k \cdot kc(*)}$	[kN]	12.2	18.9	23.6

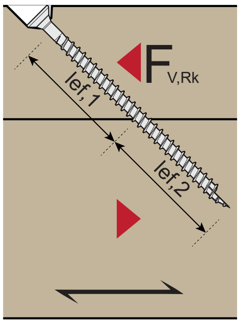
(*) total screw length in timber

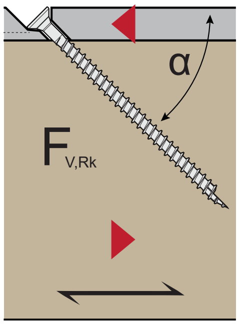


			AXIAL 45°			SHEAR 45°	
			CROSS-TYPE SCREW FITTING			TIMBER-TIMBER	METAL-TIMBER
			l_{ef} = b/2			l_{ef} = b/2	l_{ef} = b
	ø [mm]	**L/b** [mm]	$F_{v,X1,Rk}$ [kN]	$F_{v,X2,Rk}$ [kN]	$F_{v,X3,Rk}$ [kN]	$F_{v,Rk}$ [kN]	$F_{V,Rk}$ [kN]
ø 8.0	8.0	**120**/110	8.15	14.67	22.01	5.09	10.19
	8.0	**140**/130	9.63	17.34	26.01	6.02	12.04
	8.0	**160**/150	11.12	20.01	30.01	6.95	13.89
	8.0	**180**/170	12.60	22.68	34.01	7.87	15.75
	8.0	**200**/190	14.08	25.34	38.02	8.80	17.60
	8.0	**220**/210	15.56	28.01	42.02	9.73	19.45
	8.0	**240**/230	16.58	29.84	44.76	10.65	21.30
	8.0	**260**/250	17.32	31.17	46.76	11.58	21.30
	8.0	**280**/270	18.06	32.51	48.76	12.51	21.30
	8.0	**300**/290	18.80	33.84	50.76	13.43	21.30
	8.0	**325**/315	19.73	35.51	53.26	14.59	21.30
	8.0	**350**/340	20.65	37.18	55.76	15.75	21.30
	8.0	**375**/365	21.58	38.84	58.26	16.91	21.30
	8.0	**400**/390	22.51	40.51	60.77	18.06	21.30
	8.0	**450**/428	23.88	42.98	64.47	19.78	21.30
	8.0	**500**/478	25.10	45.17	67.76	21.30	21.30
	8.0	**600**/578	25.10	45.17	67.76	21.30	21.30
ø 10.0	10.0	**120**/108	9.55	17.18	25.77	5.97	11.93
	10.0	**160**/148	13.08	23.55	35.32	8.18	16.35
	10.0	**180**/168	14.85	26.73	40.09	9.28	18.56
	10.0	**200**/188	16.62	29.91	44.87	10.39	20.77
	10.0	**220**/208	18.38	33.09	49.64	11.49	22.98
	10.0	**240**/228	20.15	36.27	54.41	12.60	25.19
	10.0	**260**/248	21.92	39.46	59.18	13.70	27.40
	10.0	**280**/268	23.69	42.64	63.96	14.81	29.61









			AXIAL45°			SHEAR 45°	
			CROSS-TYPE SCREW FITTING			TIMBER-TIMBER	METAL-TIMBER
			l_{ef} = b/2			l_{ef} = b/2	l_{ef} = b
	ø [mm]	L/b [mm]	$F_{v,X1,Rk}$ [kN]	$F_{v,X2,Rk}$ [kN]	$F_{v,X3,Rk}$ [kN]	$F_{v,Rk}$ [kN]	$F_{V,Rk}$ [kN]
ø 10.0	10.0	**300**/288	25.26	45.46	68.19	15.91	31.82
	10.0	**325**/301	25.83	46.49	69.74	16.63	33.26
	10.0	**350**/326	26.93	48.48	72.72	18.01	35.36
	10.0	**375**/351	28.04	50.47	75.71	19.39	35.36
	10.0	**400**/376	29.14	52.46	78.69	20.77	35.36
	10.0	**450**/426	31.35	56.44	84.66	23.53	35.36
	10.0	**500**/476	33.56	60.41	90.62	26.30	35.36
	10.0	**600**/576	37.98	68.37	102.55	31.82	35.36
	10.0	**700**/676	40.81	73.46	110.19	35.36	35.36
	10.0	**800**/776	40.81	73.46	110.19	35.36	35.36
	10.0	**1000**/976	40.81	73.46	110.19	35.36	35.36
ø 12.0	12.0	**200**/180	17.11	30.79	46.19	10.69	21.38
	12.0	**220**/200	19.01	34.21	51.32	11.88	23.76
	12.0	**240**/220	20.91	37.63	56.45	13.07	26.13
	12.0	**260**/240	22.81	41.06	61.58	14.26	28.51
	12.0	**280**/260	24.71	44.48	66.71	15.44	30.89
	12.0	**300**/280	26.61	47.90	71.85	16.63	33.26
	12.0	**350**/330	31.36	56.45	84.68	19.60	39.20
	12.0	**400**/380	33.79	60.82	91.23	22.57	41.28
	12.0	**500**/480	38.54	69.37	104.06	28.51	41.28
	12.0	**600**/580	43.29	77.92	116.89	34.45	41.28
	12.0	**700**/680	48.04	86.48	129.72	40.39	41.28
	12.0	**800**/780	48.75	87.76	131.63	41.28	41.28
	12.0	**1000**/980	48.75	87.76	131.63	41.28	41.28

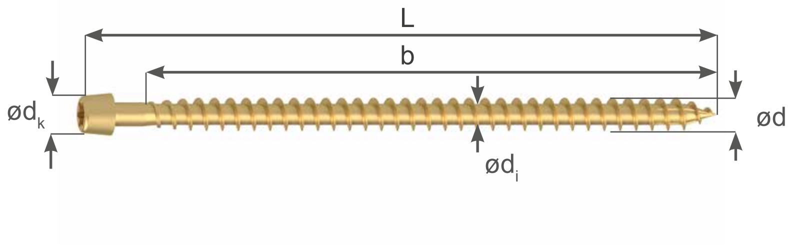
Values for C24 (ρ_k=350kg/m³), axial axis to grain: 30° - 90°, $F_{ax,Rk}$ = thread withdrawal, $F_{head,Rk}$ = head pull through, $F_{v,Rk}$ = shear (// to grain 0° – ⊥ to grain 90°), wood/steel plate: l_{ef} = thread length b, t_1 min= minimum wood thickness, t_1 max= maximum wood thickness add-on part (L-b), $F_{V,Rk,thin}$= steel sheet t ≤ d/2, $F_{V,RK,thick}$= steel sheet t ≥ d

RAPID® fullthread cylinder head

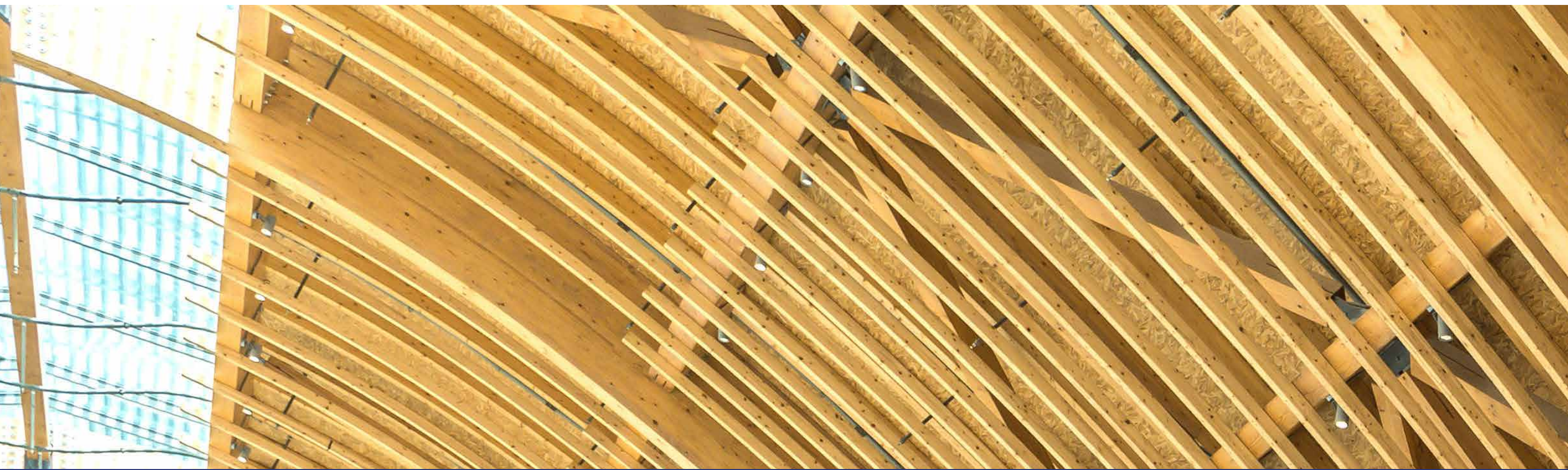
Values apply to the RAPID® FT CL with core fins tip and to the RAPID® FT CL with half tip. The RAPID® FT cylinder head is not suitable for timber/steel plate screw fittings; our range has the RAPID® FT countersunk head for this.

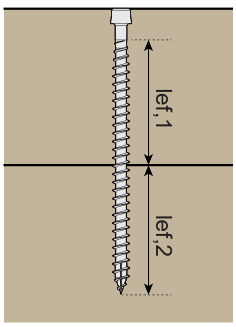
CHARACTERISTICS AND VALUES FOR C24			
d	**[mm]**	**ø 8**	**ø 10**
d_k	[mm]	10.2	13.4
d_i	[mm]	5.10	6.30
$f_{ax,90,k}$	[N/mm²]	13.1	12.5
$f_{head,k}$	[N/mm²]	0	0
$F_{tens,k}$	[kN]	24.1	40.0
$M_{y,k}$	[Nmm]	20 300	36 700
$N_{pl,k \cdot kc(*)}$	[kN]	12.2	18.9

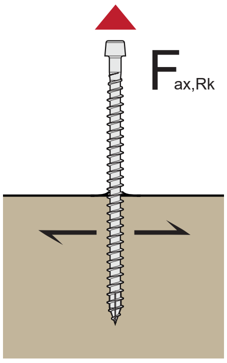
(*) total screw length in timber

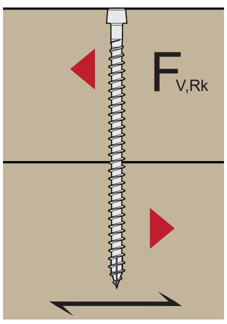


			AXIAL 90°	SHEAR 90°
			HEAD PULL THROUGH	TIMBER - TIMBER
			l_{ef} = b/2	l_{ef} = b/2
	ø	**L/b**	$F_{ax,Rk}$	$F_{V,Rk}$
	[mm]	[mm]	[kN]	[kN]
ø 8.0	8.0	**120**/110	5.76	4.01
	8.0	**140**/130	6.81	4.27
	8.0	**160**/150	7.86	4.54
	8.0	**180**/170	8.91	4.80
	8.0	**200**/190	9.96	5.06
	8.0	**220**/210	11.00	5.14
	8.0	**240**/230	12.05	5.14
	8.0	**260**/250	13.10	5.14
	8.0	**280**/270	14.15	5.14
	8.0	**300**/290	15.20	5.14
	8.0	**325**/315	16.51	5.14
	8.0	**350**/340	17.82	5.14
	8.0	**375**/365	19.13	5.14
	8.0	**400**/390	20.44	5.14
	8.0	**450**/428	22.37	5.14
	8.0	**500**/478	24.10	5.14
	8.0	**600**/578	24.10	5.14









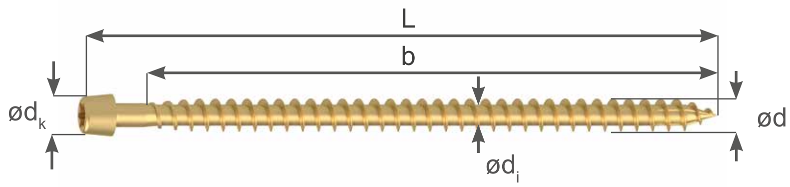
			AXIAL 90°	SHEAR 90°
			HEAD PULL THROUGH	TIMBER - TIMBER
			l_{ef} = b/2	l_{ef} = b/2
	ø [mm]	L/b [mm]	$F_{ax,Rk}$ [kN]	$F_{V,Rk}$ [kN]
ø 10.0	10.0	**200**/188	11.75	6.67
	10.0	**240**/228	14.25	7.30
	10.0	**260**/248	15.50	7.47
	10.0	**280**/268	16.75	7.47
	10.0	**300**/288	18.00	7.47
	10.0	**325**/301	18.81	7.47
	10.0	**350**/326	20.38	7.47
	10.0	**375**/351	21.94	7.47
	10.0	**400**/376	23.50	7.47
	10.0	**450**/426	26.63	7.47
	10.0	**500**/476	29.75	7.47
	10.0	**600**/576	36.00	7.47
	10.0	**700**/676	40.00	7.47
	10.0	**800**/776	40.00	7.47
	10.0	**1000**/976	40.00	7.47

RAPID® fullthread cylinder head

Values apply to the RAPID® FT CL with core fins tip and to the RAPID® FT CL with half tip. The RAPID® FT cylinder head is not suitable for timber/steel plate screw fittings; our range has the RAPID® FT countersunk head for this.

CHARACTERISTICS AND VALUES FOR C24			
D	**[mm]**	**ø 8**	**ø 10**
d_k	[mm]	10.2	13.4
d_i	[mm]	5.10	6.30
$f_{ax,90,k}$	[N/mm²]	13.1	12.5
$f_{head,k}$	[N/mm²]	0	0
$F_{tens,k}$	[kN]	24.1	40.0
$M_{y,k}$	[Nmm]	20 300	36 700
$N_{pl,k \cdot kc}$(*)	[kN]	12.2	18.9

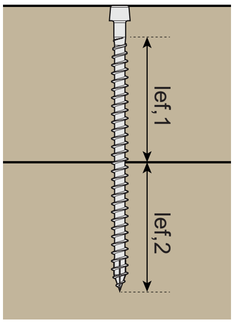
(*) total screw length in timber

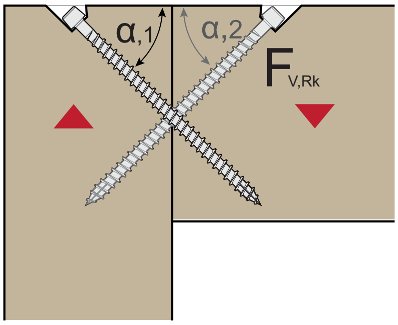


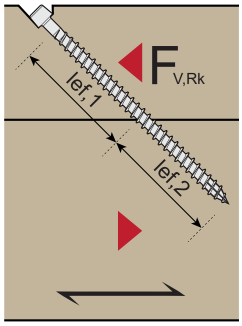
	ø	L/b	AXIAL 45°			SHEAR 45°
			CROSS-TYPE SCREW FITTING			TIMBER - TIMBER
			l_{ef} = b/2			l_{ef} = b/2
			$F_{v,X1,Rk}$	$F_{v,X2,Rk}$	$F_{v,X3,Rk}$	$F_{v,Rk}$
	[mm]	[mm]	[kN]	[kN]	[kN]	[kN]
ø 8.0	8.0	**120**/110	8.15	14.67	22.01	5.09
	8.0	**140**/130	9.63	17.34	26.01	6.02
	8.0	**160**/150	11.12	20.01	30.01	6.95
	8.0	**180**/170	12.60	22.68	34.01	7.87
	8.0	**200**/190	14.08	25.34	38.02	8.80
	8.0	**220**/210	15.56	28.01	42.02	9.73
	8.0	**240**/230	16.58	29.84	44.76	10.65
	8.0	**260**/250	17.32	31.17	46.76	11.58
	8.0	**280**/270	18.06	32.51	48.76	12.51
	8.0	**300**/290	18.80	33.84	50.76	13.43
	8.0	**325**/315	19.73	35.51	53.26	14.59
	8.0	**350**/340	20.65	37.18	55.76	15.75
	8.0	**375**/365	21.58	38.84	58.26	16.91
	8.0	**400**/390	22.51	40.51	60.77	18.06
	8.0	**450**/428	23.88	42.98	64.47	19.78
	8.0	**500**/478	25.10	45.17	67.76	21.30
	8.0	**600**/578	25.10	45.17	67.76	21.30

RAPID® FT CL

Values for C24 (ρ_k =350kg/m³), Axial axis to grain: 30° - 90°, $F_{ax,Rk}$ = thread withdrawal, $F_{v,Rk}$ = shear (// to grain 0° – ⊥ to grain 90°),

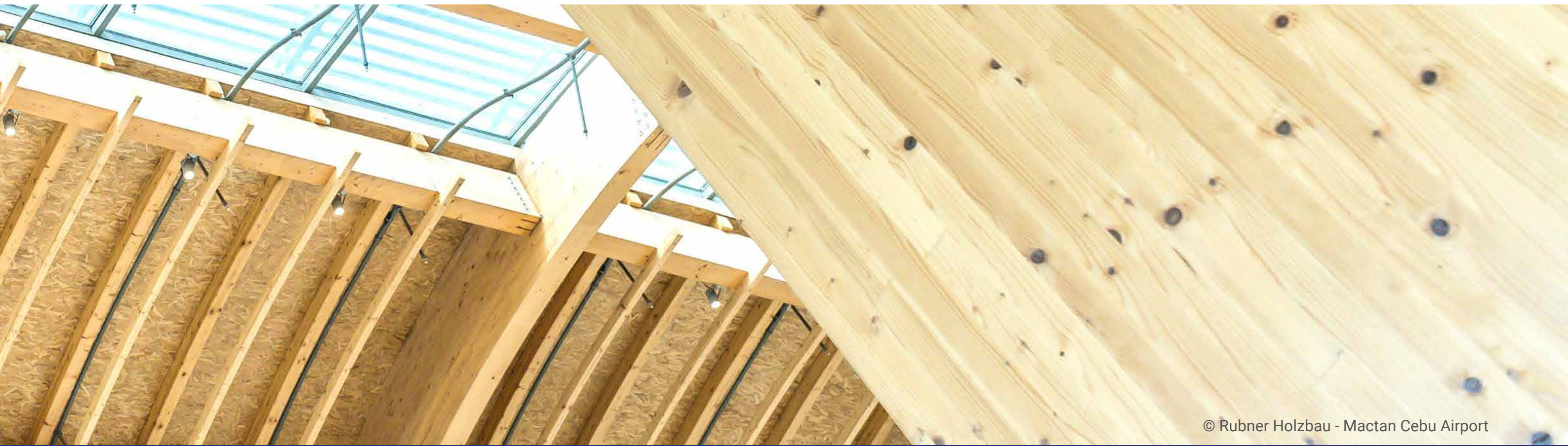






			AXIAL 45°			SHEAR 45°
			CROSS-TYPE SCREW FITTING			TIMBER - TIMBER
			l_{ef} = b/2			l_{ef} = b/2
	ø [mm]	**L/b** [mm]	$F_{v,X1,Rk}$ [kN]	$F_{v,X2,Rk}$ [kN]	$F_{v,X3,Rk}$ [kN]	$F_{v,Rk}$ [kN]
ø 10.0	10.0	**200**/188	16,62	29,91	44,87	10.39
	10.0	**240**/228	20,15	36,27	54,41	12.60
	10.0	**260**/248	21,92	39,46	59,18	13.70
	10.0	**280**/268	23,69	42,64	63,96	14.81
	10.0	**300**/288	25,26	45,46	68,19	15.91
	10.0	**325**/301	25,83	46,49	69,74	16.63
	10.0	**350**/326	26,93	48,48	72,72	18.01
	10.0	**375**/351	28,04	50,47	75,71	19.39
	10.0	**400**/376	29,14	52,46	78,69	20.77
	10.0	**450**/426	31,35	56,44	84,66	23.53
	10.0	**500**/476	33,56	60,41	90,62	26.30
	10.0	**600**/576	37,98	68,37	102,55	31.82
	10.0	**700**/676	40,81	73,46	110,19	35.36
	10.0	**800**/776	40,81	73,46	110,19	35.36
	10.0	**1000**/976	40,81	73,46	110,19	35.36

Type and printing errors reserved. The values stated are meant to serve as planning guides; projects should only be undertaken by authorised professionals.



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Minimum spacing

for self-drilling screws RAPID©, StarDrive GPR and for screws with drill bit

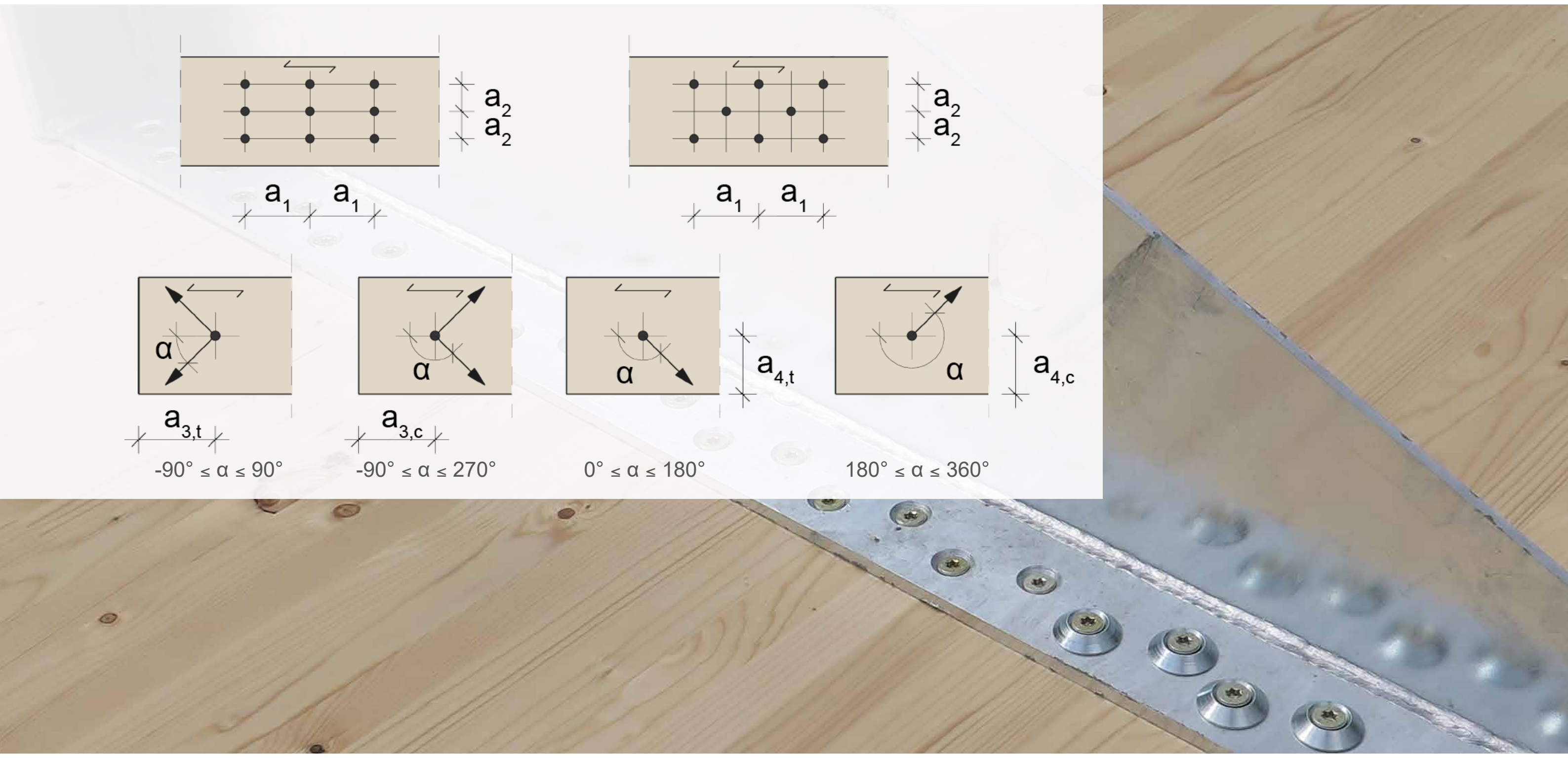
		Axial loaded screws		Subjected to axial and shear or only shear stress								
		Softwood and softwood based materials (predrilled, not-predrilled) and Hardwood (predrilled)		Cross laminated timer		Softwood and softwood based materials (predrilled, not-predrilled) and Hardwood (predrilled)						
		end-grain and side-grain		wide face	narrow face	end-grain and side-grain						
Conditions	a1 x a2	≥ 25 x d²	≥ 21 x d²	-	-	α	Screwing in pre-drilled coniferous wood, deciduous wood and LVL deciduous wood*		Screwing **without pre-drilling**			
							d < 5mm	d> 5 mm	Screws d < 5 mm in coniferous wood**	Screws d ≥ 5 mm in coniferous wood**	Screws d ≥ 5 mm with HSP in coniferous wood*	RAPID® Hardwood d=8 mm in deciduous wood and LVL beech**
Axial spacing	a1	5 x d	7 x d	4 x d	10 x d	0°	5 x d		10 x d	12 x d	5 x d	15 x d
						90°	4 x d		5 x d	5 x d	4 x d	7 x d
Edge distance	a1, c	5 x d		-	-	0°			-	-	-	-
						90°						
Axial spacing ⊥	a2	2.5 x d	3 x d	2.5 x d	3 x d	0°	3 x d		5 x d		3 x d	7 x d
						90°	4 x d				4 x d	
Edge distance ⊥	a2, c	4 x d		-	-	0°	-		-	-	-	-
						90°						
Edge distance // loaded	a3, t	-	-	6 x d	12 x d	0°	12 x d		15 x d		12 x d	20 x d
						90°	7 x d		10 x d (15 x d if screw d ≥ 8 and timber thickness t < 5d)		7 x d	15 x d
Edge distance // unloaded	a3, c	-	-	6 x d	7 x d	0°	7 x d				7 x d	15 x d
						90°						
Edge distance ⊥ loaded	a4, t	-	-	6 x d	5 x d	0°	3 x d		5 x d	5 x d	3 x d	7 x d
						90°	5 x d	7 x d	7 x d	10 x d	7 x d	12 x d
Edge distance ⊥ unloaded	a4, c	-	-	2.5 x d	3 x d	0°	3 x d		5 x d (3 x d if a1 and a3 min. 25 x d, even if timber thickness t < 5d)		3 x d	7 x d
						90°						
Distance between screws in screw cross	a cross	1.5 x d										
Minimum timber thickness	t	12d		10d								

Screw diameter	< 8	8	10	12
Minimum thickness t for load-bearing timber parts [mm]	24	30	40	80

- If the timber does not meet the minimum thickness, it should generally be pre-drilled
- Pre-drilling diameter: di (-0.5/+1.0) for coniferous wood di (-0/+0.5) for deciduous wood and LVL
- Woods at risk of splintering (e.g. Douglas fir, silver fir) should be pre-drilled or use a higher minimum thickness according to EN1995-1-1
- Drilled holes for positioning, guidance or orientation are NOT PRE-DRILLED
- All screws (d ≥ 5 mm) may be screwed into deciduous wood and LVL beech up to 10d in length without pre-drilling; the distances for RAPID® Hardwood should be observed

- The minimum binding anchoring depth for screws is 4d, or 20d in end wood.
- The minimum anchoring depth for CLT is 4d on the face side and 10d on the narrow edge (front face)

d = outer thread diameter, d_i = thread core diameter,
α = angle between direction of force and direction of grain
*See EN1995-1-1, table 8.2 how nails are pre-drilled
**See EN1995-1-1, table 8.2 how nails are not pre-drilled



Information

- Geometry and mechanical properties correspond to ETA 12/0373.
- In connections between main and secondary beams, the main beam must be able to adequately with stand torsion and fixed with fork support.
- The values stated for main/secondary beam connections only apply to vertically oriented loads. Any transverse stress must be verified separately.
- The rope effect has been factored into the calculation of shear-off values.
partial thread, Z-9.1-435 for StarDrive GPR, Z-9.1-656 for RAPID® fullthread, these lower values are only intended as guidance.
- Characteristic values F_{Rk}: Design according to EC5 and ETA 12/0373, these values should be used for calculations
- The design value of the ultimate limit state $F_{v,Rd}$ for the final design of the timber connection is taken from the characteristic values as follows:

$$F_{Rd} = \frac{F_{Rk} \cdot k_{mod}}{Y_m}$$

F_{Rd} ... Design value of ultimate limit state subjected to shear-off stress or tension depending on connection
F_{Rk} ... characteristic value of ultimate limit state subjected to shear-off stress or tension depending on connection
Y_m , k_{mod} ... Additional values from corresponding national norms