

RAPID® T-Lift

lifting capacity for CLT wall elements

The lifting capacities in Table 1 are based on the RAPID® T-Lift operating instruction of the Schmid Schrauben Hainfeld GmbH and the ON B 1995-1-1:2019, Annex K. The values are valid for CLT (softwood) with a characteristic density ρ_k of the inner layers of at least 350 kg/m³ and:

- a) orthogonal insertion to the members narrow face (RAPID® T-Lift screw insertion angle of 90°)
- b) insertion of the screw in the middle of the narrow face (independent of layer orientation)
- c) no insertion of the screw in gaps and in special wood characteristics (e.g., knots)
- d) distance between the screw axis and the end of the wall of at least 25*d (compare Figure 1 and 2)
- e) embedding of entire threaded part in the CLT member to be lifted
- f) only axial load for the RAPID® T-Lift screw (compare Figure 1)
- g) once-only use of the RAPID® T-Lift screw
- h) short duration of loading (≤ 30 min)
- i) minimum wall thickness of 60 mm (d = 12 mm) or 80 mm (d = 16 mm)
- j) For RAPID® T-Lift screws with d = 16 mm, a positioning and orientation hole with $\varnothing 10$ mm and a depth of $5*d \geq 80$ mm is required

Table 1: maximum lifting capacity M (actual total weight) per RAPID® T-Lift screw for selected dynamic coefficients ϕ

		max. lifting capacity M per RAPID® T-Lift screw				
		stationary crane (slewing or gantry crane)		lifting and transport with mobile crane		
		lifting velocity		terrain		
		≤ 90 m/min	> 90 m/min	even (asphalt, etc.)	uneven (gravel, etc.)	
dimension d x L	I_{ef}	$\phi = 1,10$	$\phi = 1,30$	$\phi = 1,65$	$\phi = 2,00$	
[mm]	[mm]	[kg]	[kg]	[kg]	[kg]	
$\varnothing 12.0$	$\varnothing 12 \times 140$	125	505	428	337	278
	$\varnothing 12 \times 160$	145	577	489	385	318
	$\varnothing 12 \times 180$	165	649	549	432	357
	$\varnothing 12 \times 220$	205	789	667	526	434
	$\varnothing 12 \times 300$	285	1061	898	707	583
	$\varnothing 12 \times 380$	365	1300	1121	884	729
$\varnothing 16.0$	$\varnothing 16 \times 180$	155	772	653	515	425
	$\varnothing 16 \times 240$	215	1036	877	691	570
	$\varnothing 16 \times 320$	295	1377	1166	918	758
	$\varnothing 16 \times 400$	375	1709	1446	1140	940
	$\varnothing 16 \times 600$	575	2500	2125	1674	1381

Note 1: The actual dynamic coefficient ϕ depends on the given boundary conditions (type of crane, drive, weather conditions (wind), terrain, etc.) and has to be defined by the user. The dynamic coefficients in Table 1 rely on recommended values given in the RAPID® T-Lift operating instruction of the Schmid Schrauben Hainfeld GmbH.

Note 2: The capacity of the corresponding spherical head anchor must not be exceeded in any case. (for d = 12 mm max. 1.3 t and for d = 16 mm max. 2.5 t)

The German original of this document shall apply in the event of any doubt.

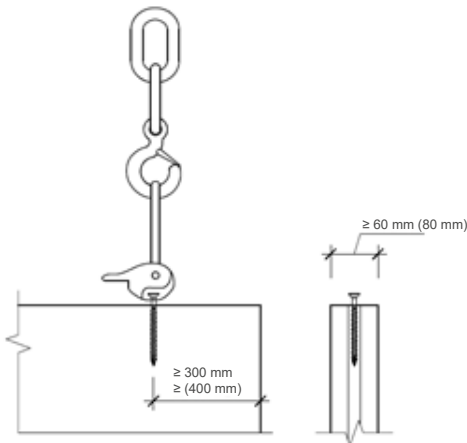


Figure 1: exclusively axial screw loading through orthogonal lifting valid for d = 12 mm (d = 16 mm)

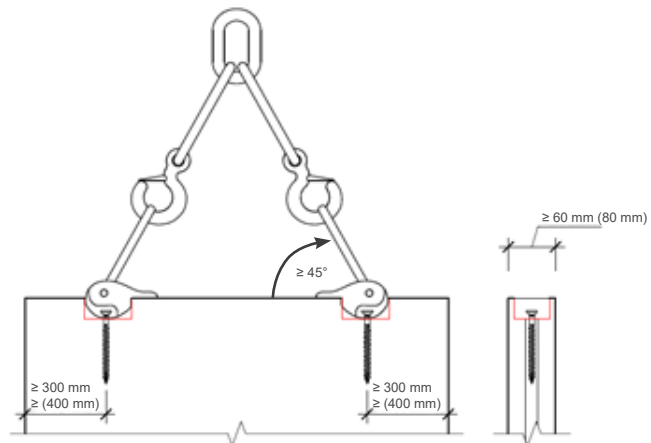


Figure 2: exclusively axial screw loading through applying exact plug hole valid for d = 12 mm (d = 16 mm)

Background:

lifting capacity for CLT wall elements

$$M \leq \min \left\{ \begin{array}{l} \text{withdrawal} \\ \text{steel failure (screw)} \\ \text{max load lifting anchor} \end{array} \right\} = \min \left\{ \frac{1}{g \cdot \gamma_G \cdot \varphi} * \min \left\{ \begin{array}{l} \frac{F_{ax,Rk} * k_{mod}}{\gamma_M} \\ \frac{f_{tens,k}}{1.25} \end{array} \right\} \right\} \dots \text{lifting capacity [kg]}$$

with:

$$F_{ax,Rk} = \frac{0.35 * d^{0.8} * l_{ef}^{0.9} * \rho_k^{0.75}}{1.5} \dots [N]$$

$$\varnothing 12 \text{ mm: } f_{tens,k} = 45\,000 [N]$$

$$\varnothing 16 \text{ mm: } f_{tens,k} = 88\,600 [N]$$

$$k_{mod} = 0.9 \quad \gamma_M = 1.3 \quad \gamma_G = 1.35 \quad g = 9.81 \left[\frac{m}{s^2} \right]$$

φ ... dynamic coefficients (acc. Table 1)

Table 2: correction factors for varying densities

strength class	standard	density ρ_k [kg/m ³]	factor
C16	EN 338	310	0.91
C24	EN 338	350	1.00
C30	EN 338	380	1.06

Note: The correction factor for the lowest corresponding strength class has to be used.

Further details on the correct use of the RAPID® T-Lift transport system can be found in our operating instructions. Available to download at our home page: www.schmid-screw.com/en/downloadcenter

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