schmid schrauben hainfeld

Design Guide

ETA-12/0373:2025 | Eurocode

Solutions for timber construction

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www.schmid-screw.com

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Imprint

Schmid Schrauben Hainfeld GmbH
Landstal 10, 3170 Hainfeld, Austria
T +43 (0)2764 2652
F +43 (0)2764 3149
E info@schrauben.at
www.schmid-screw.com

About us

Based in Austria with more than 180 years of experience, Schmid Schrauben Hainfeld is one of Europe's technology leaders in screw production and fastening solution.
Originally founded as a nail and scythe factory, the potential of timber construction screws was recognised early on. Today, we produce high-tech screws for timber constructions with around 150 employees.
Compared to conventional timber screws our selftapping RAPID® and StarDrive GPR screws are optimised in material properties and geometry. We offer high-performance fasteners and reliable products, based on our profound knowledge of the forging trade. Buildings of all shapes and sizes are built with screws of Schmid Schrauben Hainfeld and confirm the high quality and durability.
Our mission and vision drive us to always deliver the best solutions and push the boundaries of what is possible in fastening technology. With focus on innovation, quality and sustainability, we are ready to actively shape the future and are a reliable partner for our worldwide customers from the timber construction industry, timber design engineers and qualified tradespeople.

THE MOST IMPORTANT CHANGES AT A GLANCE (ETA-12/0373:2025)

> Calculation of **metal-timber connections** with $t \geq d$ as thick steel plate using screws with flat head (180° heads), p. 20 (metal-timber)

> New to the range: **RAPID® FT CL ø 6.0 mm**

> **Higher resistance** due to higher rope effect in shear connections

> Maximum penetration depths for RAPID® and RAPID® FT in **hardwood** without pre-drilling, p. 16 (hardwood table)

> K_{ser} **values** for **head pull-through** and mechanical model for determining connection stiffness with partially and fully threaded screws

ETA-12/0373

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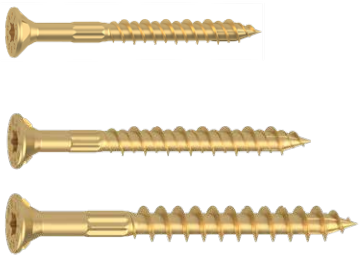


Technical values fully threaded screws

Specialised products

References

RAPID® and StarDrive GPR screws

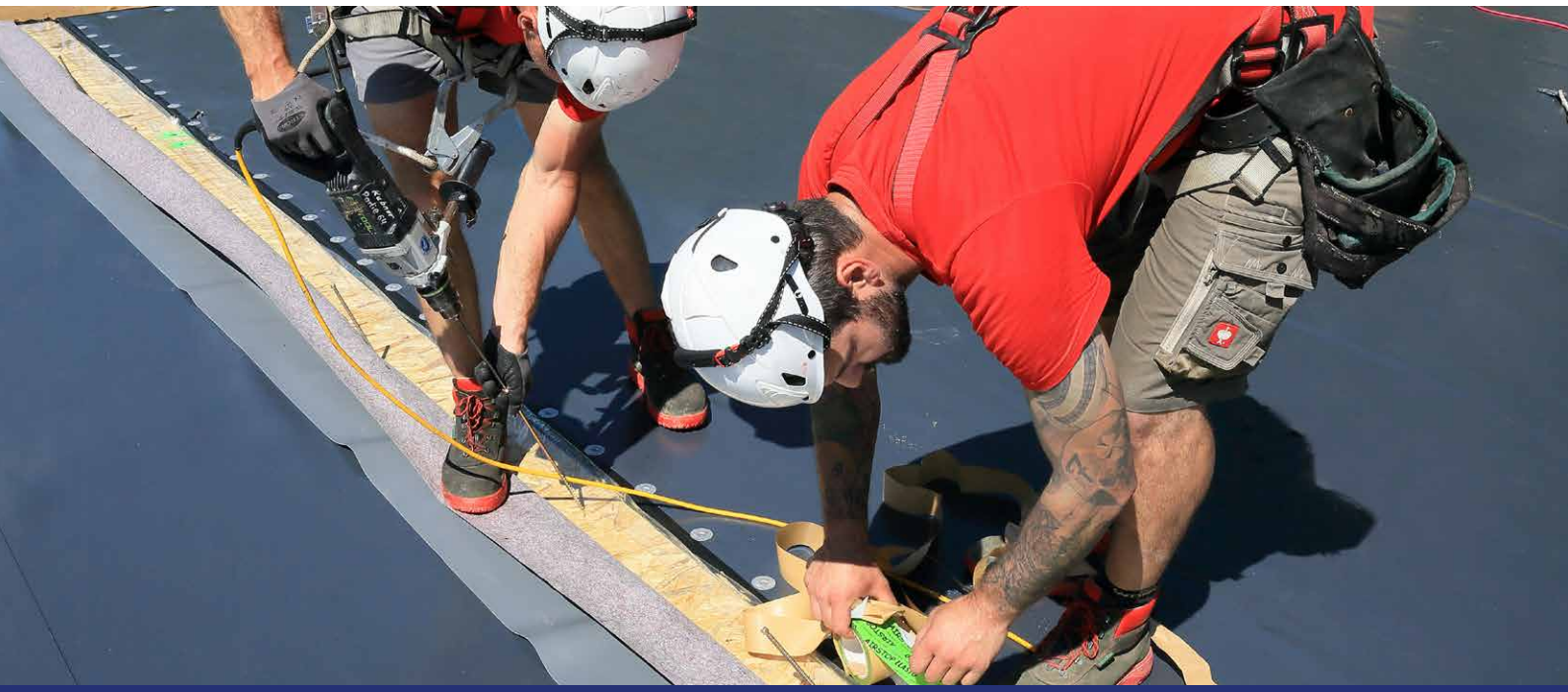
Application of self-tapping and self-drilling Schmid timber construction screws

Schmid timber construction screws are self-drilling and self-tapping screws that can be used to connect or reinforce timber construction elements and timber-based material elements, as well as connecting these structural elements with metal assemblies. Schmid timber construction screws are used in accordance with the installation instructions, installation conditions and design regulations in accordance with EN 1991-1-1:2014 and European Technical Approval ETA-12/0373:2025. The latter contains several additional design notes and suggestions for special applications, e.g. screws for the reinforcing of timber, fastening thermal insulation to rafters, bending beams and columns under flexible jointing and more. Their application in agreement with European building regulations and standards is the responsibility of professionals and designers.

Instructions for use

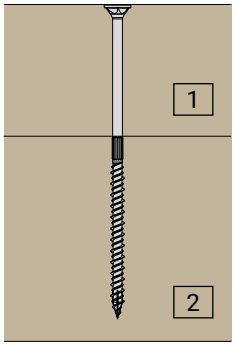
All Schmid timber construction screwscan be driven into timber and timber based products without pre-drilling or in pre-drilled holes. For long screws or screws for connections in edge or end areas, a positioning hole with a length of approx. 5*d* can lead to greater precision. Positioning holes are not considered pre-drilled holes. Ensuring equal loading of all screws in a connection is essential. In general, all connections, especially metal-timber connections, require the screws to be screwed in evenly and continuously. A torque controlled application may be necessary. Thereby, the insertion moment must be less than the characteristic torsional strength of the screws, for corresponding values, see ETA-12/0373. In timber construction, insertion moments typically reach of 70% to 80% of the characteristic torsional strength are applied. The following table shows the torque settings that can be applied to the screwdriver for each screw size. These values are provided as guidelines and recommendations.

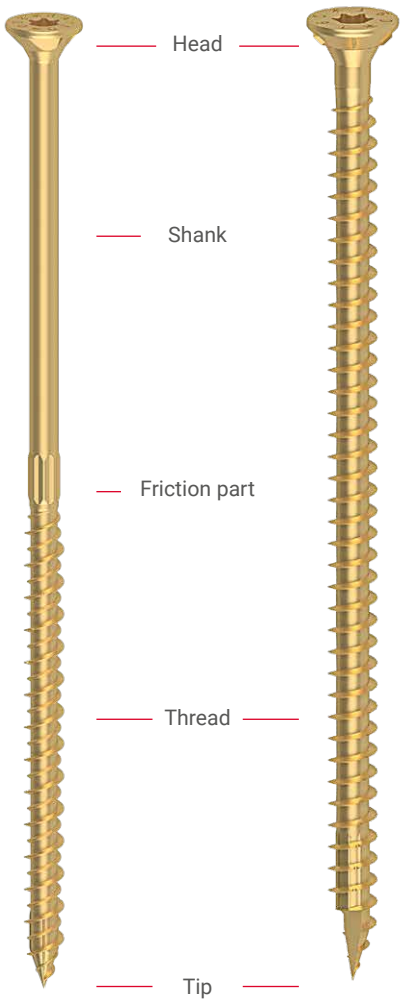
d	approximate torque
6 mm	8 Nm
8 mm	20 Nm
10 mm	40 Nm
12 mm	50 Nm
16 mm	140 Nm



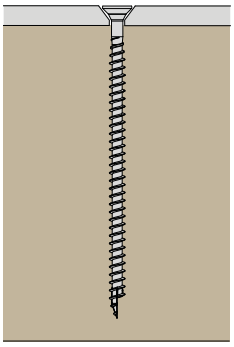
Partially threaded vs. fully threaded screws

Partially threaded screws
Partially threaded screws enable a stable connection of two components. The thread must be completely in the lower component (2). Partially threaded screws pull the upper component (1) onto the lower component (2) during the installation process.
In case of axial loading the head pull-through and thread pull-out (withdrawal) shall be considered.





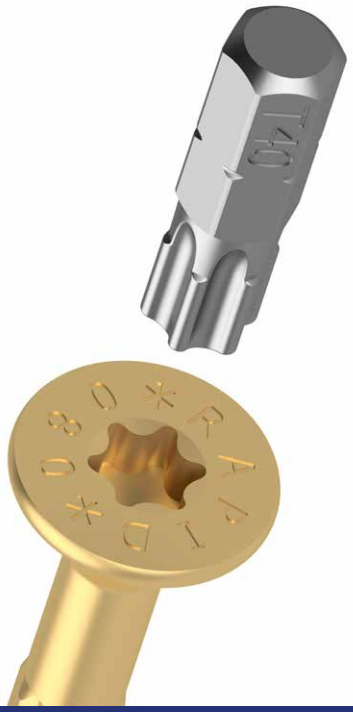
Fully threaded screws
Fully threaded screws are used for versatile connection types. In structural metal-to-timber or timber-to-timber connections the screws are applied perpendicular to the surface or inclined, designated as active fasteners. To reinforce timber element capacity the screws are applied as passive fastener to increase tension or compression perpendicular to grain resistance at transverse connections, openings and more.



T-drive

The T-drive is screwed on with standard T-bits (or TX bits). The T-drive is the standard commercial designation for a hexalobular internal driving feature. Thanks to the six-star profile, it can distribute high torques evenly over the six sides of the drive and transmit them without additional contact pressure. Further advantages of the T-drive compared to the cross recess, for example, are:

> Longer service life (this applies to both the bit and the drive in the screw)
> More precise screwing possible (even at low speeds)
> Lower probability of slipping
> Automatic screwdriving systems can be used



RAPID® and StarDrive GPR screws

Head style

90° countersunk head with milling pockets (CS)

> milling pockets reduce tearing and splitting in the wood
> countersinks fully into the timber
> fits well into metal countersinks without damaging their surface

90° countersunk head with milling ribs (CS)

> the ribs ensure that the head sinks optimally into the timber
> splitting and splitting of the timber is significantly reduced
> can be used in metal-wood connections

washer head (WH)

> highest permissible head pull-through values allow high force transmission and ensure stable and strong connections
> no additional washers required, resulting in faster and more cost-effective processing

SuperSenkFix head (SSF)

> innovative combination of countersunk head and washer
> clean and flush countersinking in connections with high head pull-through values
> ideal for visible screw connections
> due to the shoulder under the low flat head, perfectly suited for metal-timber connections

Dual head

> the external hexagon enables high power transmission, even when used with impact/pulse screwdrivers (avoid abrupt screwdriving)
> using the T-drive saves time when working with different screws
> The shoulder under the head ensures an optimal fit in the metal.

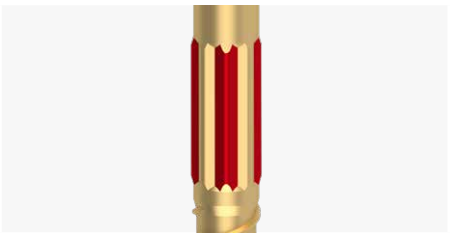
cylinder head (CL)

> the small head allows for very deep countersinking in timber (use a long bit) – good for visible connections or as reinforcements
> minimises timber splintering
> not suitable for metal to timber connections

Photo © Timberframing, Frans Masereel Centrum

Special features

compressor friction part

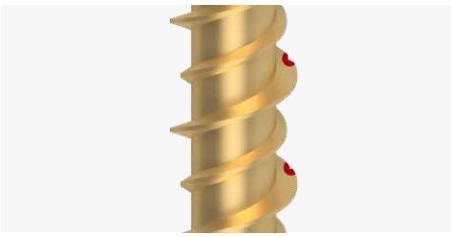


> the straight friction part compresses the timber so that the smooth shaft is exposed and does not rub
> reduction in insertion torque saves energy and time

friction part (milling)

> the friction part reduces the turning-in resistance by milling out the timber in the shaft area
> reduction of the insertion torque

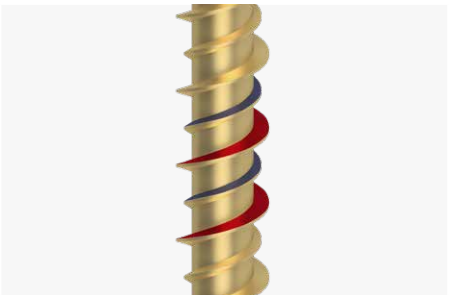
cutting groove



> all thread types are equipped with a ridged core
> this cuts the grain and thus reduces the insertion torque

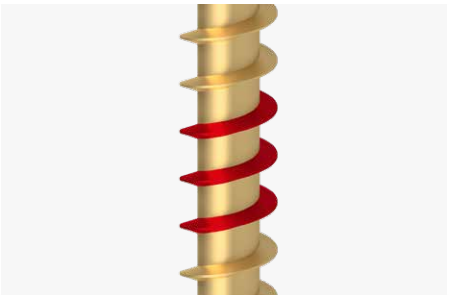
Thread

HiLo thread



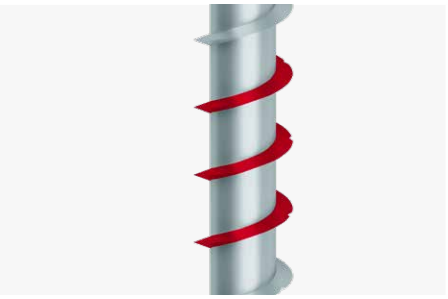
> Double thread with high and low flanks
> the very high thread pitch enables very fast screwing and saves time – compared to conventional wood construction screws

single thread (EG)



> Constant low insertion torques
> excellent pull-out values and high tensile strength
> these highest structural properties even under compressive stress, are ideal for reinforcements.

coarse thread (GG)



> quick screw connection due to high thread pitch
> good tightening values

RAPID® and StarDrive GPR screws

Tips

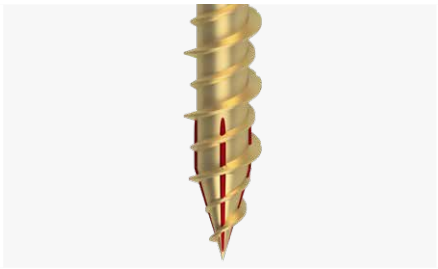
All tip types of Schmid timber construction screws are patented, and all of these tips are also self-drilling and self-tapping. This means that the timber does not need to be pre-drilled, but pre-drilling is permitted and does not affect the performance of the screws.

The exceptions are timber types with a high risk of splitting, such as Douglas fir, and densities above 500 kg/m³, for which we recommend pre-drilling. You will find more detailed information on this topic on page 16 (minimum distances).

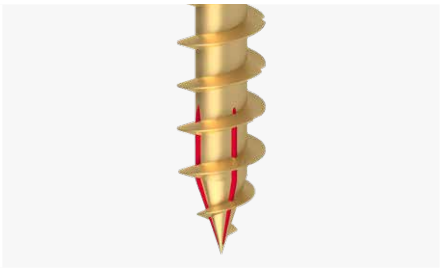
The different tips were developed to reduce the biting time and the screwing torque as well as to minimise the splitting effect.

Compared to conventional timber construction screws, they have a significantly lower tendency to split and offer less resistance when screwing in.

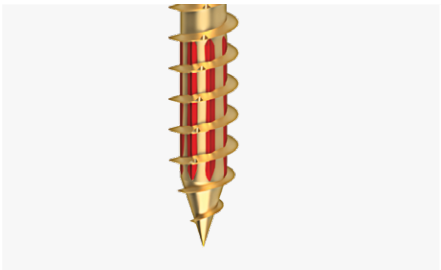
tip with ridged core and HiLo thread
(compressor option 2)



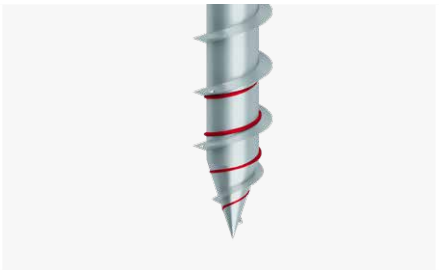
tip with ridged core and single thread
(compressor option 2)



full tip with compressor and single thread
(compressor option 1)



follower thread tip



half-tip: When using half-tip screws (HSP), the smaller distances can be applied as 'pre-drilled'. (See minimum distances from page 16).
No slippage of the screw during screwing into the wood; the screw remains in the desired screw line.

half tip (HSP) with compressor and single thread
(compressor option 1)

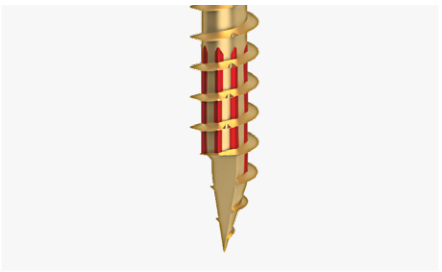


Photo © Steffen Holzbau Fotograf Thomas Urbany

Corrosion resistance & intended application

Depending on their designation, the screws are provided with different levels of corrosion resistance. The type of coating for each screw type can be found on the individual product pages (tables with technical values). All wood construction screws are also provided with an anti-friction coating to reduce the insertion torque. All coatings listed here are also free of Cr(VI). Corrosion resistance is verified by the salt spray test in accordance with EN ISO 9227. In this test, the samples are placed in a test chamber under standard conditions and sprayed with a salt solution (typically a sodium chloride solution). The test is limited by a predetermined test duration, which ranges from a few hours to several thousand hours. At the end of the test period, the corrosion phenomena on the test specimens are evaluated as white and red rust. The following shows how long the coatings protect the screws from the standardised corrosive salt atmosphere without them rusting red at the head:

YELLWIN 500+
Colour: **yellow**
Corrosion-resistant: **approx. 500 h**

REDWIN
Colour: **pink**
Corrosion-resistant: **approx. 50 h**

BLUE GALVANISED
Colour: **blue**
Corrosion-resistant: **approx. 50 h**

ZNNI 1000+ *
Colour: **grau**
Corrosion-resistant: **approx. 1000 h**

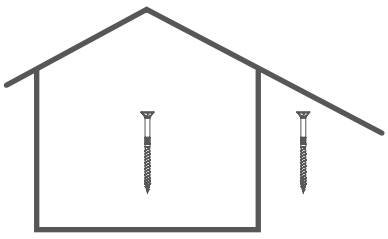
ZNNI 1500+ *
Colour: **grau**
Corrosion-resistant: **approx. 1500 h**

BLUEWIN
Colour: **blue**
Corrosion-resistant: **approx. 50 h**

BLUEWIN 700+
Colour: **blue**
Corrosion-resistant: **approx. 700 h**

INTENDED APPLICATION – WHERE CAN RAPID® AND STARDRIVE GPR SCREWS BE USED?

All our carbon steel screws can be used in service classes 1 and 2. This means they are suitable for use in dry indoor areas and covered outdoor areas. In addition, care must be taken to ensure that the timber used has a moisture content of less than 16%. For use class 3, i.e. for outdoor use without a cover, we recommend stainless steel screws such as the StarDrive GPR A2.



Attention: It is important to ensure dry conditions for all materials – such as timber and screws – even during the installation, including transport and storage at construction site. They have to be protected from excessive moisture.

Screw production

FROM WIRE TO SCREW

The timber constructions screws are made from special carbon steel wire. The wire is wound onto spools and then drawn to the desired diameter. In a heading machine, the wire material is cut into blanks of the desired length and then cold-formed, shaping them into the basic screw head configuration. After cold heading, the bolts undergo thread rolling to finalize the screw's geometry.

HEAT TREATMENT

The screws undergo a special heat treatment process to ensure high performance. This allows them to withstand high tensile loads while remaining very ductile and tough. Screws made by Schmid Schrauben can be bent by more than 45° without cracking or breaking.

COATINGS

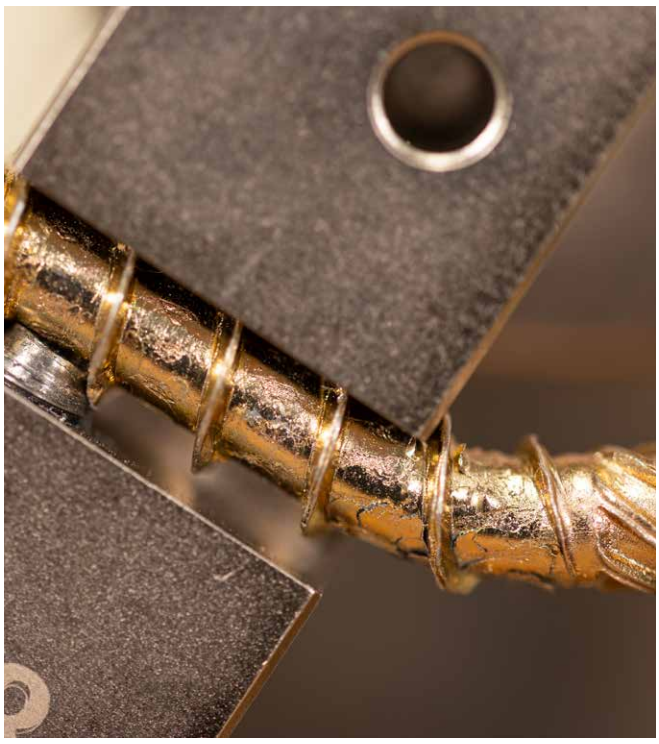
After the heat treatment, the screws are sent to electroplating, where different coatings (e.g. YellWin, BlueWin) can be applied. Using an electroplating process, they are galvanised in different layer thicknesses and then the color (eg. yellow, blue) is passivated or thick-film passivated. Each screw is finished with a sliding coating to ensure low-friction screwing.

HYDROGEN EMBRITTLEMENT

Thanks to years of experience, we have developed stable processes for forming, hardening and coating. Together with our partners, we always take care to avoid hydrogen embrittlement in all processes, especially during heat treatment and electroplating. We are also involved in several projects in collaboration with renowned universities to develop and establish suitable standards for preventing hydrogen embrittlement.

QUALITY CONTROL

All screws are continuously tested during the production process. Among other things, their geometry is measured, their mechanical properties are checked after hardening, and their coating is inspected after electroplating. The screws are only packaged and prepared for shipment once they have passed all tests.



Applications

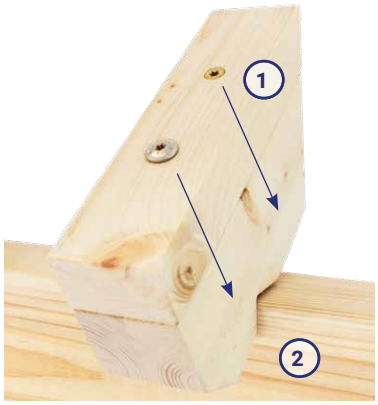
Partially threaded screws

DOUBLING RAFTERS (1)

The doubling to reinforce the rafter is usually carried out on the top or side of the rafter. The countersunk head is used here, which can be effortlessly recessed.

RAFTERS (2)

Partial thread screws, eg. RAPID® WH, transfer the wind suction load and shear forces to the substructure through the screw heads.



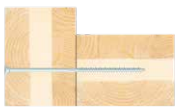
METAL PLATES AND SHAPED SHEET METAL PARTS

RAPID® Dual - and RAPID® SSF screws are optimal for metal plates and shaped sheet metal parts. These screws have an underhead shoulder which allows them to be optimally centred and to fit perfectly in the metal.

CLT WALLS AND FLOORS

RAPID® and StarDrive GPR screws are approved according to ETA-12/0373 for application generally in side and end grain (0° and 90°), as well as for in wide face and narrow face of Cross-Laminated-Timber (CLT). Therefore, Schmid timber construction screws, especially the RAPID® SuperSenkFix, are ideal for connecting wall and floor CLT panels.

Corner and wall screw connections are pulled tightly together and securely screwed with RAPID® SSF.



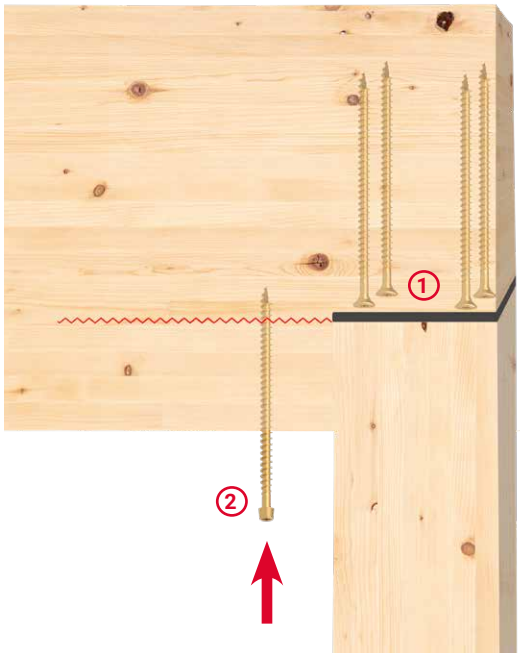
Photos © Baumturm Ruegen, Die Erlebnis Akademie AG

Applications

Fully threaded screws

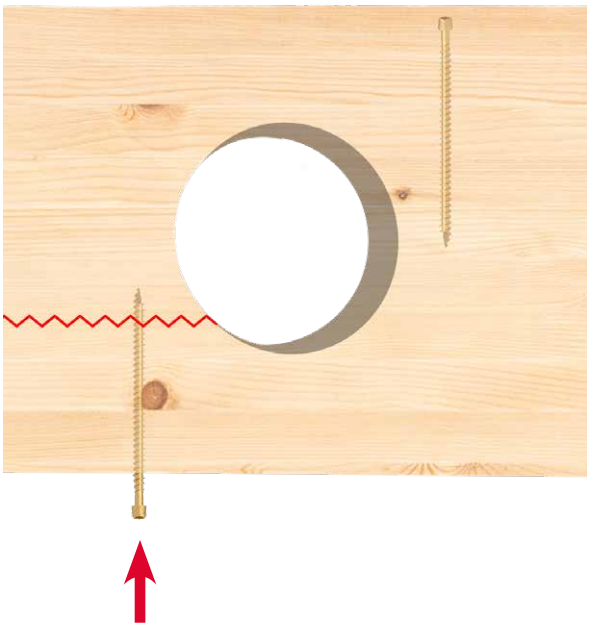
BEARING REINFORCEMENT WITH STEEL PLATE AND FULLTHREAD SCREWS (1)

RAPID® FT 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® FT will be used to reinforce and secure the beam to prevent splitting along the red line area.



REINFORCEMENT OF OPENINGS WITH LONG FULLTHREAD SCREWS

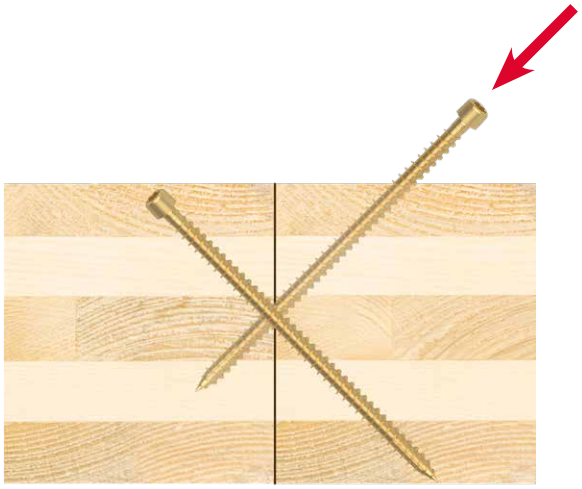
The area marked in red indicates the risk of cracking. Aiming the same thread length above and below this mark increases the beam resistance.
The advantage of RAPID® FT screws with cylinder head is, that with using a long bit the screw heads can be sunken for an optimal positioning.

Photo © Skypark, Steffen Holzbaul, photographer: Thomas Urbany

CROSS LAMINATED TIMBER (IN PLANE JOINT)

RAPID® FT CL are used to create a shear-resistant screwing pattern for cross laminated timber panels.

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



CONNECTIONS AT THE BASE POINT OF THE SUPPORT

RAPID® FT with a countersunk head are best suited for this application. Shear forces and wind suction are effectively transferred. The RAPID® screws offers a high degree of security with 500 hours of corrosion resistance, more available under request.

Info: In areas exposed to weather (wet service condition > 19%), stainless steel screws should be used in accordance with the timber structure design code. It is the designer responsibility to investigate the extent of the corrosion protection requirements.

Spacing and distance

LATERALLY or COMBINED loaded (side and end grain)						
		pre-drilled	not pre-drilled			
			$\rho_k \le 420$ kg/m³	420 kg/m³ < $\rho_k \le$ 500 kg/m³	RAPID® FT with HSP $\rho_k \le 500$ kg/m³	RAPID® Hardwood and RAPID® $\rho_k \le 730$ kg/m³
AXIAL SPACING PARALLEL TO THE GRAIN						
Load parallel to the grain: α = 0°	a_1	5*d*	12*d* (10*d*) [3]	15*d*	5*d*	15*d*
Load perpendicular to the grain: α = 90°	a_1	4*d*	5*d*	7*d*	4*d*	7*d*
AXIAL SPACING PERPENDICULAR TO THE GRAIN						
Load parallel to the grain: α = 0°	a_2	3*d*	5*d*	7*d*	3*d*	7*d*
Load perpendicular to the grain: α = 90°	a_2	4*d*			4*d*	
END DISTANCE						
Loaded	$a_{3,t}$	12*d*	15*d*	20*d*	12*d*	20*d*
Unloaded	$a_{3,c}$	7*d*	10*d*/15*d* [1]	15*d*	7*d*	15*d*
EDGE DISTANCE						
Loaded	$a_{4,t}$	7*d* (5*d*) [3]	10*d* (7*d*) [3]	12*d* (9*d*) [3]	7*d*	12*d*
Unloaded	$a_{4,c}$	3*d*	5*d*/3*d* [2]	7*d*	3*d*	7*d*
SPACING BETWEEN SCREWS IN SCREW CROSS						
	a_{cross}	1,5*d*				

[1] 15*d* for $t < 5d$ and $d \ge 8$ mm
[2] 3*d* if $a_3 \ge 25d$ and $a_1 \ge 25d$
[3] The value in () applies to $d < 5$ mm

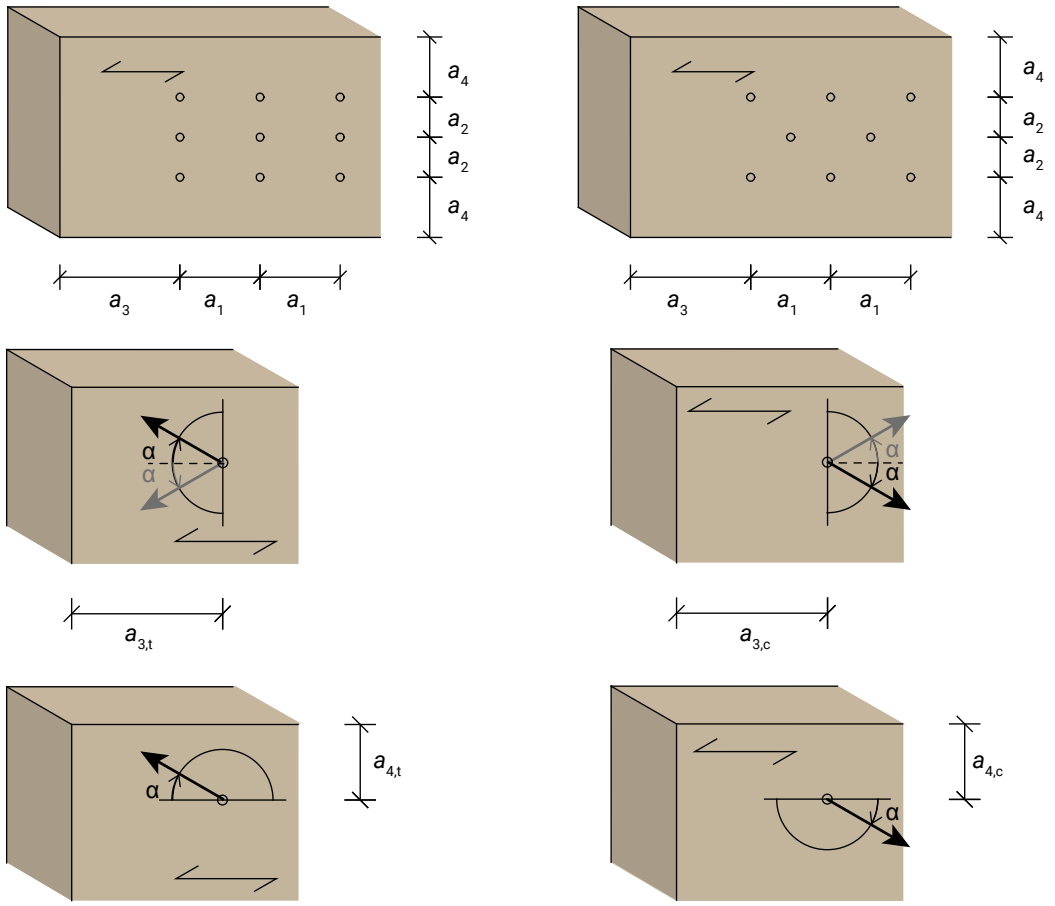
MINIMUM THICKNESS *t* for structural members for laterally loaded screws					
Ø *d*	mm	< 8	8	10	12
thickness *t*	mm	24	30	40	80

HARDWOOD Maximum thickness or penetration depth of RAPID® screws without pre-drilling into a hardwood component (e.g. LVL beech) with $\rho_k \le 730$ kg/m³									
		RAPID® FT (full thread) with HSP			RAPID® (partial thread)				RAPID® Hardwood
Ø *d*	mm	8	10	12	5	6	8	10	8
Maximum penetration depth	mm	200	390	360	45	50	100	90	400

AXIALLY loaded (side and end grain)					
		$\rho_k \le 500$ kg/m³ Screws with $d \le 8$ mm or screws with HSP tip			$d > 8$ mm
AXIAL SPACING PARALLEL TO THE GRAIN	a_1	5*d*			7*d*
AXIAL SPACING PERPENDICULAR TO THE GRAIN	a_2	5*d*	3*d* if $a_1 \cdot a_2 \ge 21d^2$	2,5*d* if $a_1 \cdot a_2 \ge 25d^2$	5*d*
END DISTANCE[1] unloaded	$a_{1,CG}$	5*d*			10*d*
EDGE DISTANCE[1] unloaded	$a_{2,CG}$	4*d*			4*d*
SPACING BETWEEN SCREWS IN SCREW CROSS	a_{cross}	1.5*d*			
MINIMUM TIMBER THICKNESS	*t*	12*d*			

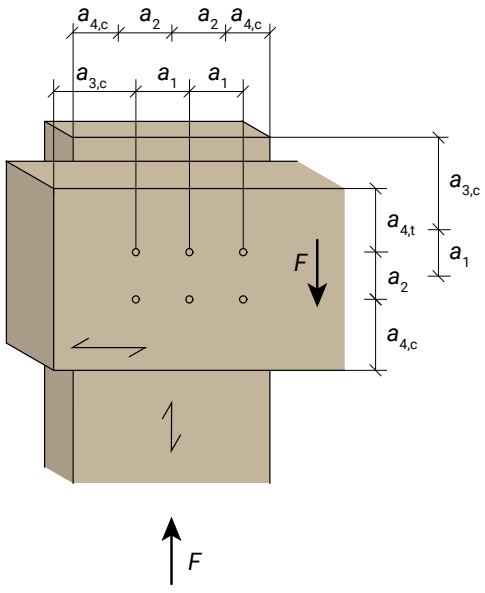
[1] from the centre of gravity of the screw thread in the component

SCREW SPACING, EDGE AND END DISTANCE OF LATERALLY LOADED SCREWS



- > If the minimum timber thickness is not complied with, pre-drilling is generally required.
- > Pre-drilling diameter: for softwood with d_i (-0.5/+1.0), for hardwood and LVL beech with d_i (-0/+0.5).
- > Timber prone to splitting (e.g. Douglas fir, silver fir) must be pre-drilled or increased minimum thicknesses must be used in accordance with EN1995-1-1.
- > Positioning, guide and orientation holes are considered NOT PRE-DRILLED.
- > The minimum penetration length of the screws is 4*d*, in end grain 20*d*
- > For metal-timber connections, the minimum spacing may be multiplied by 0.7

α = Angle between load and grain direction
ε = Angle between screw axis and grain direction
d_i = inner thread diameter
d = outer thread diameter

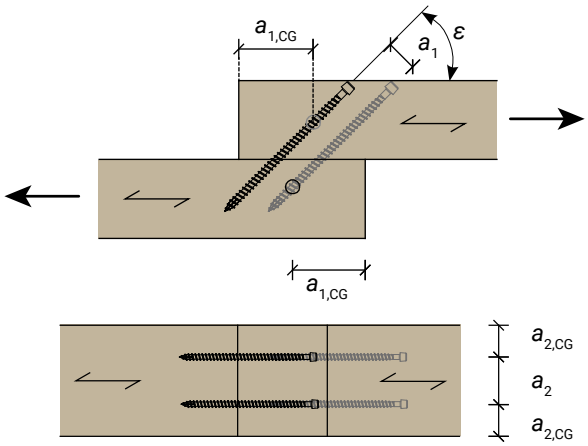


APPLICATIONS WITH AXIALLY LOADED SCREWS

Screw spacing, edge and end distance for inclined screws and crossed screw pairs (mainly axial stress)

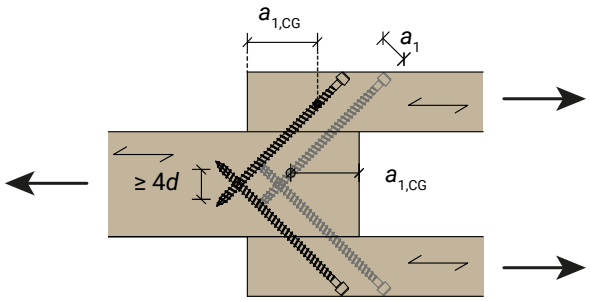
CONNECTIONS WITH INCLINED SCREWS

The distance is measured from the centre of gravity of the threaded part in the respective component.



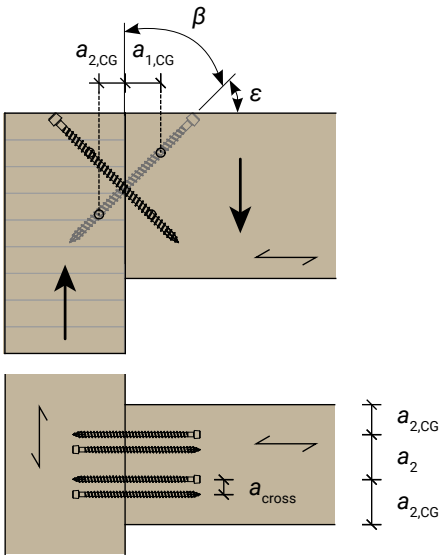
TENSION JOINT WITH INCLINED SCREWS LOADED IN TENSION

The screws must overlap by at least 4*d* in the middle section to prevent transverse tensile failure of the middle component. The distance is measured from the centre of gravity of the threaded part in the respective component.



CONNECTION OF MAIN AND SECONDARY BEAMS

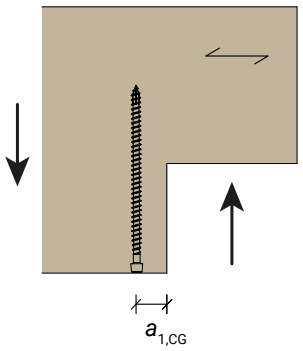
With 4 crossed screws (2 screw crosses). The intersection point of the screws should be on the axis of the secondary beam.



4 crossed screws
(2 screw crosses)

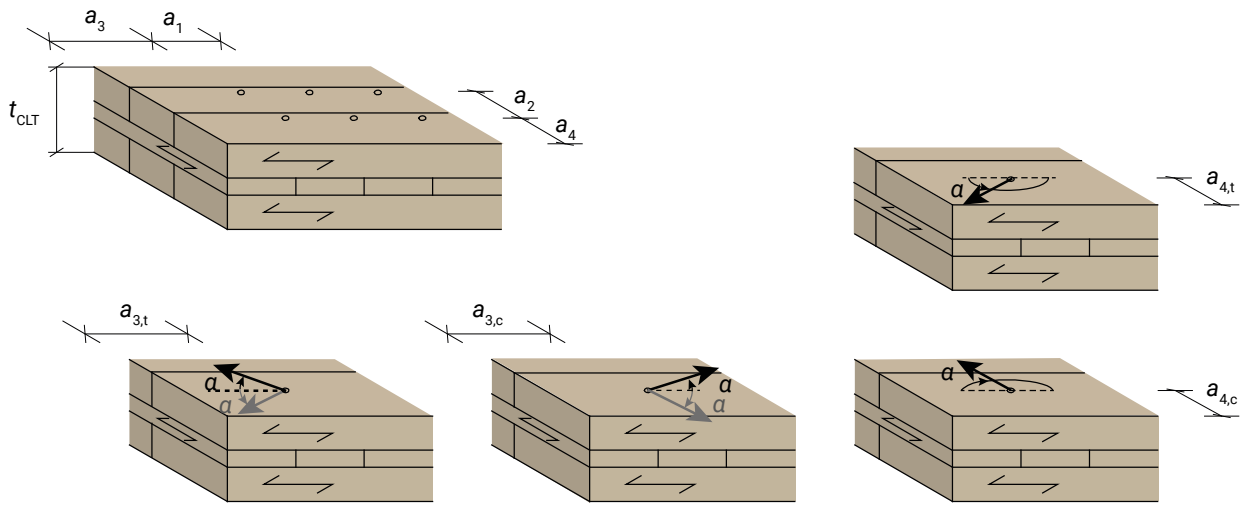
NOTCH

Tension reinforcement with one or more axially loaded screws in a row perpendicular to the grain direction.



Minimum distances in CLT

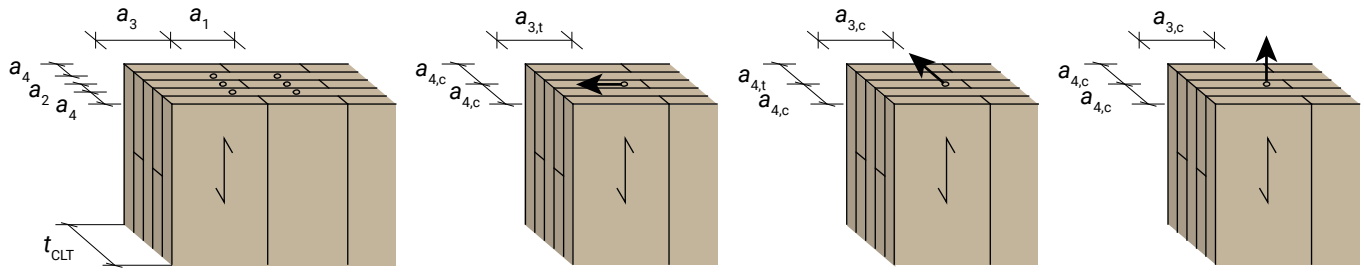
SCREW SPACING, EDGE AND END DISTANCES IN THE WIDE FACE OF CLT



	SPACING BETWEEN TWO SCREWS related to the grain direction of the top layer		END DISTANCE related to the grain direction of the top layer		EDGE DISTANCE related to the grain direction of the top layer	
			loaded	unloaded	loaded	unloaded
	a_1	a_2	$a_{3,t}$	$a_{3,c}$	$a_{4,t}$	$a_{4,c}$
axially and/or laterally loaded	4*d*	2,5*d*	6*d*	6*d*	6*d*	2,5*d*

The minimum thickness t_{CLT} of the CLT element is 10*d*, the minimum penetration depth in the wide face of CLT is 4*d*.

SCREW SPACING, EDGE AND END DISTANCES ON THE NARROW FACE OF CLT



	SPACING BETWEEN TWO SCREWS		END DISTANCE		EDGE DISTANCE	
	in plane	perpendicular to plane	loaded in plane	unloaded	loaded	unloaded
	a_1	a_2	$a_{3,t}$	$a_{3,c}$	$a_{4,t}$	$a_{4,c}$
axially and/or laterally loaded	10*d*	3*d*	12*d*	7*d*	5*d*	3*d*

The minimum thickness t_{CLT} of the CLT element is 10*d*, the minimum penetration depth in the narrow face of CLT is 10*d*.

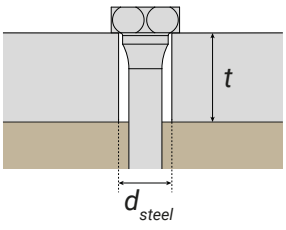
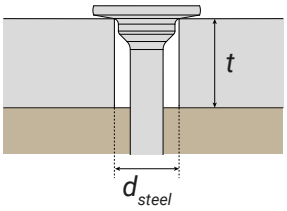
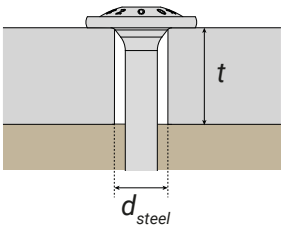
Metal to timber connections

acc. to ETA-12/0373:2025

Characteristic values for calculating steel-timber connections can be found in the tables in this brochure or determined in accordance with Eurocode 5 and ETA-12/0373.
According to EC5 and ETA-12/0373, the following is defined:

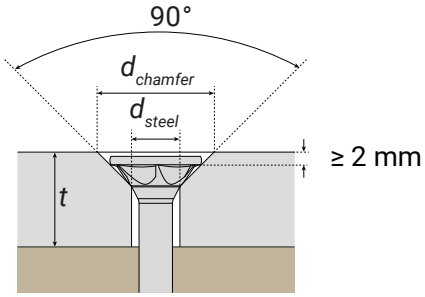
THIN STEEL PLATE: plate thickness $t \leq 0.5d$
THICK STEEL PLATE: plate thickness $t \geq d$ withwith the tolerance on hole diameters being less than 0,1d, or plate thickness t ≥ d with dual head, SSF head and WH head (also classified as thick steel plate even if the hole diameter tolerance is not complied with)

The load-bearing capacity of the steel elements must be tested separately in accordance with the relevant standards. RAPID® Dual, RAPID® SSF and StarDrive GPR PS have been specially developed for use in metal-timber connections. The shoulder under the head automatically centres the screw when screwing it in and ensures a perfect fit. It is recommended to drill a cylindrical hole with a diameter of d_{steel} $^{+1.0}$ in the metal (see tables below).

	RAPID® Dual / T-Lift	RAPID® SSF	RAPID® WH / StarDrive GPR WH
			
d	d_{steel}	d_{steel}	d_{steel}
6 mm	–	8.5 mm	6 mm
8 mm	8 mm	10.5 mm	8 mm
10 mm	10 mm	13.5 mm	10 mm
12 mm	12 mm	-	-
16 mm	16 mm	-	-

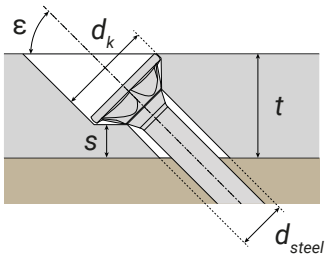
90° countersunk drillings provide the countersunk head with a sufficiently large contact surface on the chamfer. The screw centres itself automatically when screwed in.

RAPID® CS / StarDrive GPR CS
cylindrical hole in metal $d_{steel} \geq d$
diameter of the chamfer $d_{chamfer}$



d	min. $d_{chamfer}$	d_{steel}
6 mm	15 mm	6 mm
8 mm	19 mm	8 mm
10 mm	23 mm	10 mm
12 mm	25 mm	12 mm

RAPID® CS / StarDrive GPR CS
cylindrical hole in metal $d_{steel} \geq d$
diameter of the chamfer $d_{chamfer} > d_k$



d	d_k	d_{steel}
6 mm	12 mm	6 mm
8 mm	15 mm	8 mm
10 mm	18,5 mm	10 mm
12 mm	21 mm	12 mm

$s \geq 3$ mm for $\varepsilon > 45°$ | $s \geq 2$ mm for $30° \leq \varepsilon \leq 45°$
45° inclined drillings are for metals $t \geq 10$ mm suitable.

General calculation information

> The information is based on ETA-12/0373:2025 and EN 1995-1-1:2014 (Eurocode 5).
> The screw geometry and mechanical values are taken from ETA-12/0373.
> The specified characteristic resistances apply only to the load directions and grain orientation specified in the illustrations and/or tables.
> The rope effect according to ETA-12/0373 was taken into account when calculating the shear resistances $F_{v,Rk}$.
> A connection consists of at least two screws. The specified characteristic resistances $F_{v,Rk}$ apply only to one screw or one screw cross. When calculating the load-bearing capacity of several screws or several screw crosses in a connection, the group effect must be taken into account with the effective number of fasteners n_{ef} in accordance with Eurocode 5 or ETA-12/0373, $n_{ef} * F_{Rk}$.
> The design value of the load-bearing capacity F_{Rd} is calculated with the characteristic resistance F_{Rk}, the modification factor for the duration of load application and moisture content k_{mod}, and the partial safety factor γ_M in accordance with Eurocode 5 or national standards as follows:

$$F_{Rd} = \frac{F_{Rk} * k_{mod}}{\gamma_m}$$

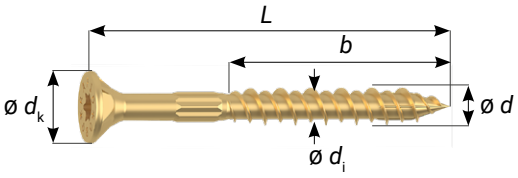
> For main-secondary beam connections, the main beam must have sufficient torsional strength and be mounted on a fork support. The specified values apply only to vertical loads.
> Any tensile stresses perpendicular to grain and/or other possible brittle failure mechanisms must be verified separately.
> Unless specified otherwise, the values in the tables refer to C24 (ρ_k = 350 kg/m³).
> The values and information in this document are intended as planning aids.
> Projects may only be carried out by authorised specialists.

Photo © Graf-Holztechnik, photographer Benjamin Wald

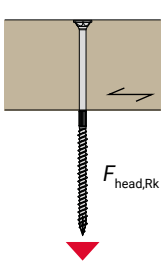
Photo © Graf-Holztechnik, photographer Benjamin Wald

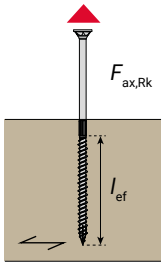
4.0 | 4.5 mm RAPID® CS

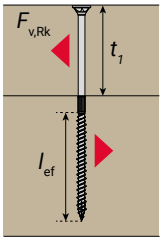
T-drive, countersunk head, milling pockets, with/without friction part (compressing), HiLo thread, ridged core, YellWin 500+ coating

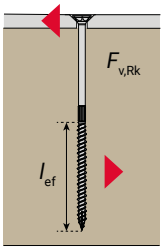


CHARACTERISTICS AND VALUES FOR C24							
d	d_k	drive	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	-	mm	N/mm²	N/mm²	kN	Nmm
ø 4.0	8.0	T20	2.45	14.3	17.1	5.0	3 100
ø 4.5	9.0	T20	2.75	13.3	17.6	7.0	4 200







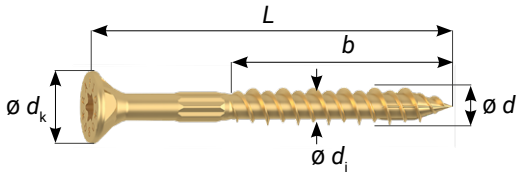


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
4.0*	30	20	1.09	1.14	-	-	-	0.79	0.95	1.27	1.43
4.0*	35	20	1.09	1.14	-	-	-	0.94	1.13	1.40	1.51
4.0*	40	25	1.09	1.43	-	-	-	1.09	1.22	1.47	1.58
4.0	45	25	1.09	1.43	-	-	-	1.15	1.22	1.47	1.58
4.0	50	30	1.09	1.72	-	-	-	1.22	1.29	1.54	1.65
4.0	60	35	1.09	2.00	25	1.06	1.12	1.29	1.36	1.61	1.72
4.0	70	35	1.09	2.00	25	1.06	1.12	1.29	1.36	1.61	1.72
4.5*	30	20	1.43	1.20	-	-	-	0.84	1.01	1.39	1.57
4.5*	35	20	1.43	1.20	-	-	-	1.00	1.20	1.53	1.74
4.5*	40	25	1.43	1.50	-	-	-	1.17	1.40	1.73	1.85
4.5*	45	25	1.43	1.50	-	-	-	1.33	1.42	1.73	1.85
4.5*	50	30	1.43	1.80	-	-	-	1.40	1.50	1.80	1.93
4.5*	60	40	1.43	2.39	-	-	-	1.55	1.65	1.95	2.08
4.5	70	40	1.43	2.39	30	1.31	1.38	1.55	1.65	1.95	2.08
4.5	80	40	1.43	2.39	30	1.31	1.38	1.55	1.65	1.95	2.08

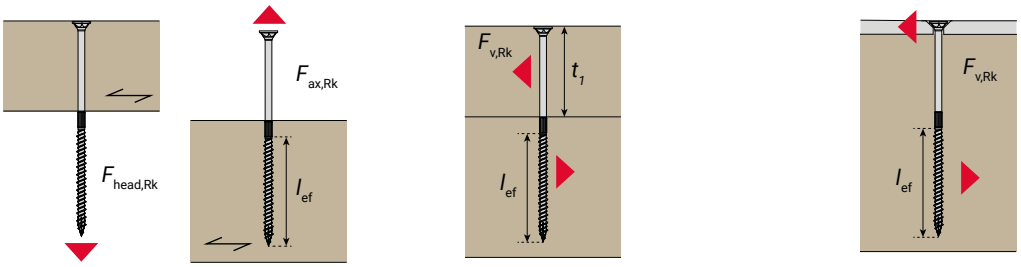
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

5.0 mm RAPID® CS

T-drive (T25 / carpenter's line T20), countersunk head, milling pockets, with/without friction part (compressing), HiLo thread, ridged core, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 5.0	10.0	3.25	13.6	14.6	8.8	5 900

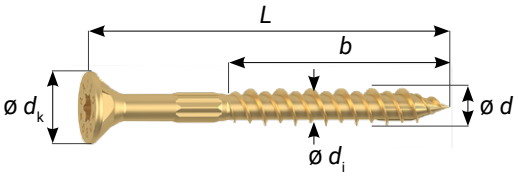


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
5.0*	30	20	1.46	1.36	-	-	-	0.89	1.06	1.57	1.76
5.0*	35	20	1.46	1.36	-	-	-	1.06	1.28	1.71	1.93
5.0*	40	25	1.46	1.70	-	-	-	1.24	1.49	1.94	2.20
5.0*	50	30	1.46	2.04	-	-	-	1.59	1.80	2.17	2.33
5.0*	60	40	1.46	2.72	-	-	-	1.86	1.97	2.34	2.50
5.0	70	40	1.46	2.72	30	1.49	1.60	1.86	1.97	2.34	2.50
5.0	80	50	1.46	3.40	30	1.49	1.60	2.03	2.14	2.51	2.67
5.0	90	50	1.46	3.40	40	1.54	1.62	2.03	2.14	2.51	2.67
5.0	100	60	1.46	4.08	40	1.54	1.62	2.20	2.31	2.68	2.84
5.0	110	60	1.46	4.08	40	1.54	1.62	2.20	2.31	2.68	2.84
5.0	120	60	1.46	4.08	40	1.54	1.62	2.20	2.31	2.68	2.84

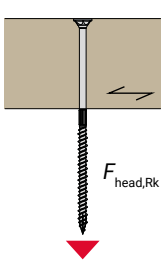
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

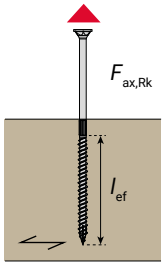
6.0 mm RAPID® CS

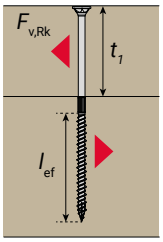
T-drive (T30), countersunk head, milling pockets, with/without friction part (compressing), HiLo thread, ridged core, YellWin 500+ coating

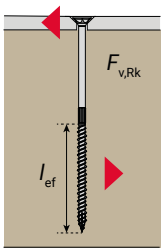


CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 6.0	12.0	4.00	13.0	14.6	13.1	10 700







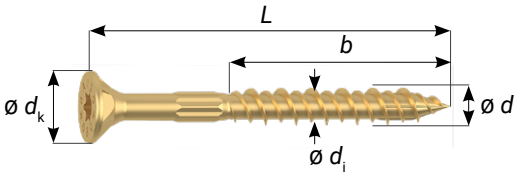


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
6.0*	50	30	2.10	2.34	-	-	-	1.77	2.12	2.75	3.12
6.0*	60	40	2.10	3.12	-	-	-	2.17	2.61	3.17	3.39
6.0	70	40	2.10	3.12	30	1.93	2.06	2.47	2.63	3.17	3.39
6.0	80	50	2.10	3.90	30	1.93	2.06	2.66	2.82	3.36	3.59
6.0	90	50	2.10	3.90	40	2.20	2.33	2.66	2.82	3.36	3.59
6.0	100	60	2.10	4.68	40	2.20	2.33	2.86	3.02	3.56	3.78
6.0	110	60	2.10	4.68	50	2.21	2.33	2.86	3.02	3.56	3.78
6.0	120	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	130	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	140	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	150	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	160	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	180	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	200	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	220	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	240	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	260	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	280	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98
6.0	300	70	2.10	5.46	50	2.21	2.33	3.05	3.21	3.75	3.98

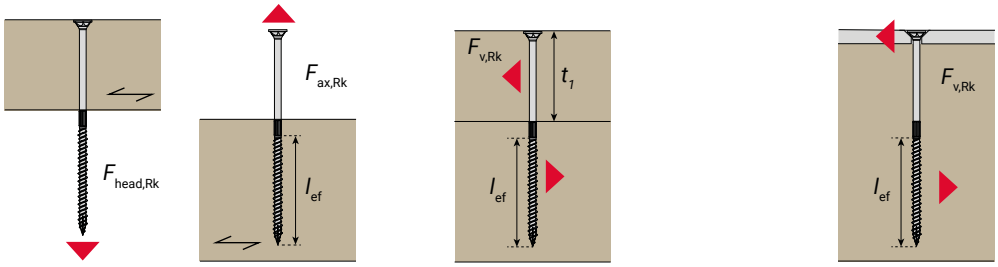
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

8.0 mm RAPID® CS

T-drive (T40), countersunk head, milling pockets, friction part (compressing), HiLo thread, ridged core, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 8.0	15.0	5.35	10.9	12.4	23.3	22 600

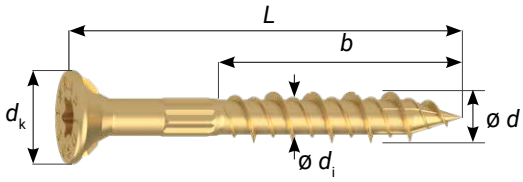


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
8.0	80	50	2.79	4.36	30	2.69	2.86	3.54	4.06	4.93	5.29
8.0	90	50	2.79	4.36	40	2.97	3.18	3.80	4.06	4.93	5.29
8.0	100	60	2.79	5.23	40	2.97	3.18	4.02	4.28	5.14	5.51
8.0	120	80	2.79	6.98	40	2.97	3.18	4.46	4.71	5.58	5.95
8.0	140	80	2.79	6.98	60	3.41	3.60	4.46	4.71	5.58	5.95
8.0	160	80	2.79	6.98	60	3.41	3.60	4.46	4.71	5.58	5.95
8.0	180	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	200	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	220	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	240	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	260	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	280	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	300	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	320	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	340	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	360	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	380	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	400	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	420	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	440	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	460	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	480	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38
8.0	500	100	2.79	8.72	60	3.41	3.60	4.89	5.15	6.02	6.38

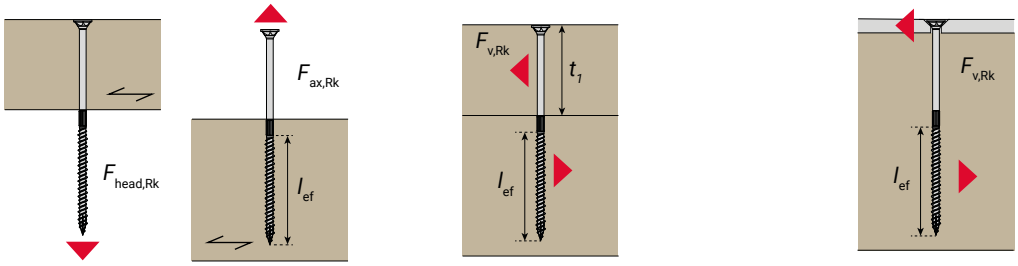
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

10.0 mm RAPID® CS

T-drive (T50), countersunk head, milling ribs, friction part (compressing), HiLo thread, ridged core, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 10.0	18.5	6.80	11.0	12.2	35.0	33 600

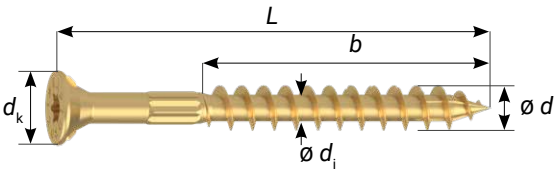


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
10.0	80	50	4.18	5.50	-	-	-	4.03	4.83	6.21	6.91
10.0	100	60	4.18	6.60	40	3.86	4.12	5.18	5.57	6.71	7.19
10.0	120	80	4.18	8.80	40	3.86	4.12	5.78	6.12	7.26	7.74
10.0	140	80	4.18	8.80	60	4.62	4.87	5.78	6.12	7.26	7.74
10.0	160	80	4.18	8.80	60	4.62	4.87	5.78	6.12	7.26	7.74
10.0	180	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	200	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	220	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	240	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	260	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	280	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	300	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	320	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	340	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	360	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	380	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	400	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	420	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	440	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	460	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	480	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29
10.0	500	100	4.18	11.00	60	4.62	4.87	6.33	6.67	7.81	8.29

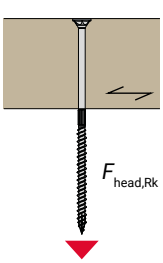
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20; General information p. 21;

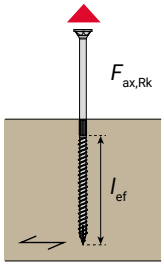
12.0 mm RAPID® CS

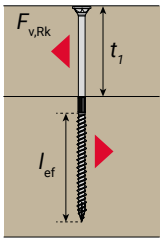
T-drive (T50), countersunk head, milling ribs, with/without friction part (compressing), single thread, ridged core, YellWin 500+ coating

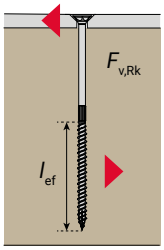


CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 12.0	21.0	7.00	11.2	10.3	42.0	46 900







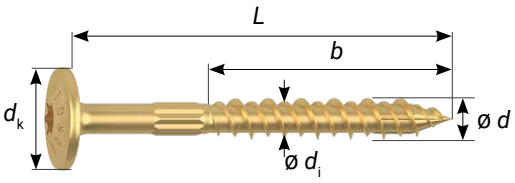


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
12.0*	100	60	4.54	8.06	-	-	-	5.75	6.90	8.38	8.99
12.0*	120	80	4.54	10.75	-	-	-	7.06	7.62	9.06	9.66
12.0	140	80	4.54	10.75	-	-	-	7.19	7.62	9.06	9.66
12.0	160	80	4.54	10.75	80	5.64	5.96	7.19	7.62	9.06	9.66
12.0	180	100	4.54	13.44	80	5.64	5.96	7.86	8.29	9.73	10.34
12.0	200	100	4.54	13.44	80	5.64	5.96	7.86	8.29	9.73	10.34
12.0	220	100	4.54	13.44	80	5.64	5.96	7.86	8.29	9.73	10.34
12.0	240	100	4.54	13.44	80	5.64	5.96	7.86	8.29	9.73	10.34
12.0	260	100	4.54	13.44	80	5.64	5.96	7.86	8.29	9.73	10.34
12.0	280	100	4.54	13.44	80	5.64	5.96	7.86	8.29	9.73	10.34
12.0	300	120	4.54	16.13	80	5.64	5.96	8.53	8.96	10.40	11.01
12.0	320	120	4.54	16.13	80	5.64	5.96	8.53	8.96	10.40	11.01
12.0	340	120	4.54	16.13	80	5.64	5.96	8.53	8.96	10.40	11.01
12.0	360	120	4.54	16.13	80	5.64	5.96	8.53	8.96	10.40	11.01
12.0	380	120	4.54	16.13	80	5.64	5.96	8.53	8.96	10.40	11.01
12.0	400	120	4.54	16.13	80	5.64	5.96	8.53	8.96	10.40	11.01

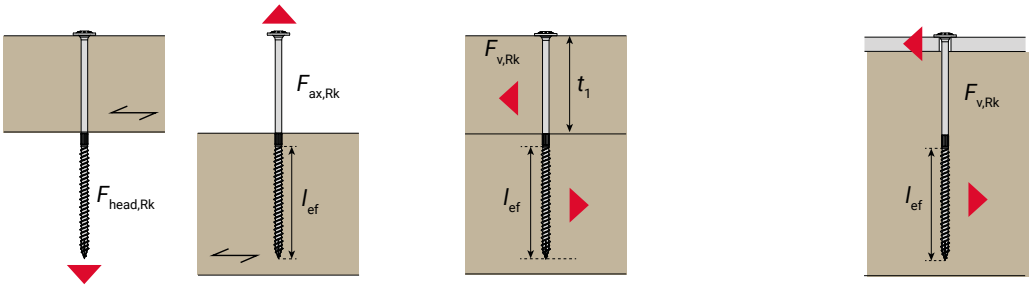
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

6.0 mm RAPID® WH

T-drive (T30), washer head, with/without friction part (compressing), HiLo thread, ridged core, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 6.0	14.0	4.00	13.0	16.7	13.1	10 700

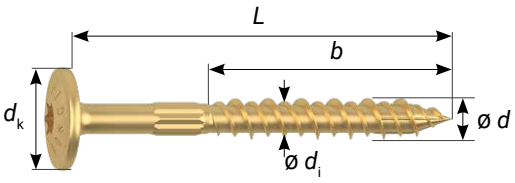


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
6.0*	60	40	3.27	3.12	-	-	-	2.17	2.61	3.17	3.39
6.0	80	50	3.27	3.90	30	2.22	2.35	2.66	2.82	3.36	3.59
6.0	100	60	3.27	4.68	40	2.49	2.63	2.86	3.02	3.56	3.78
6.0	120	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	140	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	160	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	180	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	200	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	220	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	240	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	260	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	280	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98
6.0	300	70	3.27	5.46	50	2.51	2.63	3.05	3.21	3.75	3.98

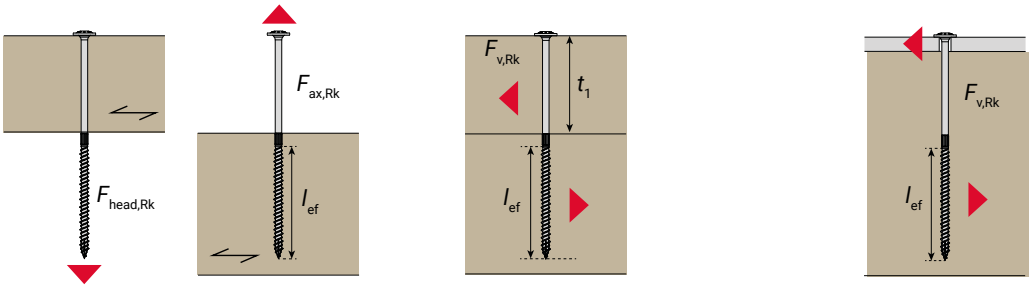
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

8.0 mm RAPID® WH

T-drive (T40), washer head, friction part (compressing), HiLo thread, ridged core, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 8.0	20.0	5.35	10.9	17.6	23.3	22 600

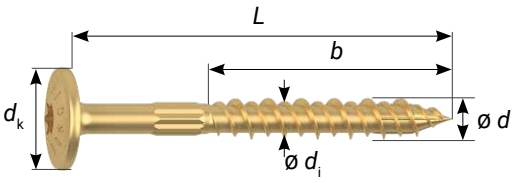


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
8.0	80	50	7.04	4.36	30	3.08	3.25	3.54	4.06	4.93	5.29
8.0	100	60	7.04	5.23	40	3.58	3.80	4.02	4.28	5.14	5.51
8.0	120	80	7.04	6.98	40	4.02	4.23	4.46	4.71	5.58	5.95
8.0	140	80	7.04	6.98	60	4.46	4.65	4.46	4.71	5.58	5.95
8.0	160	80	7.04	6.98	60	4.46	4.65	4.46	4.71	5.58	5.95
8.0	180	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	200	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	220	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	240	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	260	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	280	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	300	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	320	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	340	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	360	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	380	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	400	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	450	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38
8.0	500	100	7.04	8.72	60	4.47	4.67	4.89	5.15	6.02	6.38

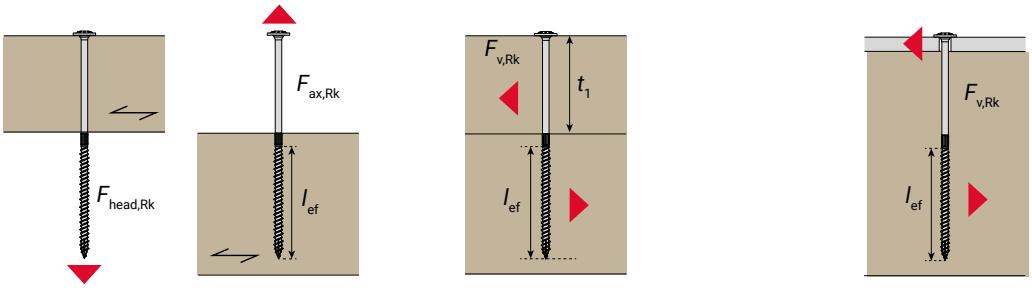
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

10.0 mm RAPID® WH

T-drive (T50), washer head, friction part (compressing), HiLo thread, ridged core, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 10.0	25.0	6.80	11.0	15.2	35.0	33 600

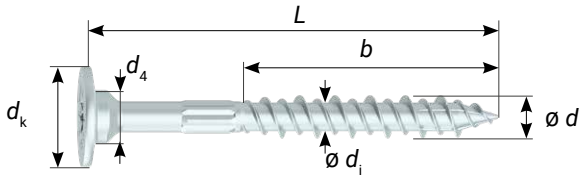


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
10.0	100	60	9.50	6.60	40	4.47	4.72	5.18	5.57	6.71	7.19
10.0	120	80	9.50	8.80	40	5.02	5.27	5.78	6.12	7.26	7.74
10.0	140	80	9.50	8.80	60	5.78	6.03	5.78	6.12	7.26	7.74
10.0	160	80	9.50	8.80	60	5.78	6.03	5.78	6.12	7.26	7.74
10.0	180	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	200	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	220	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	240	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	260	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	280	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	300	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	320	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	340	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	360	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	380	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	400	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	450	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29
10.0	500	100	9.50	11.00	60	5.95	6.21	6.33	6.67	7.81	8.29

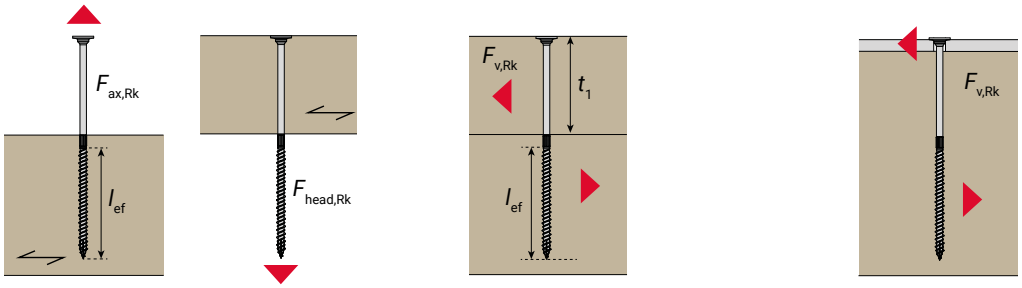
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

6.0 mm RAPID® SSF

T-drive (T30), SuperSenkFix-head, shoulder under head, friction part (compressing), HiLo thread, ridged core, BlueWin 700+ coating



CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_4	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 6.0	13.0	8.0	4.00	13.0	19.7	13.1	10 700

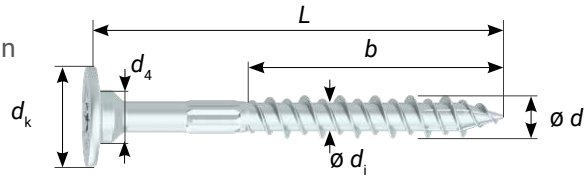


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
6.0	80	50	3.33	3.90	30	2.23	2.37	2.66	2.82	3.36	3.59
6.0	100	60	3.33	4.68	40	2.51	2.64	2.86	3.02	3.56	3.78
6.0	120	70	3.33	5.46	50	2.52	2.64	3.05	3.21	3.75	3.98
6.0	140	70	3.33	5.46	50	2.52	2.64	3.05	3.21	3.75	3.98
6.0	160	70	3.33	5.46	50	2.52	2.64	3.05	3.21	3.75	3.98
6.0	180	70	3.33	5.46	50	2.52	2.64	3.05	3.21	3.75	3.98
6.0	200	70	3.33	5.46	50	2.52	2.64	3.05	3.21	3.75	3.98

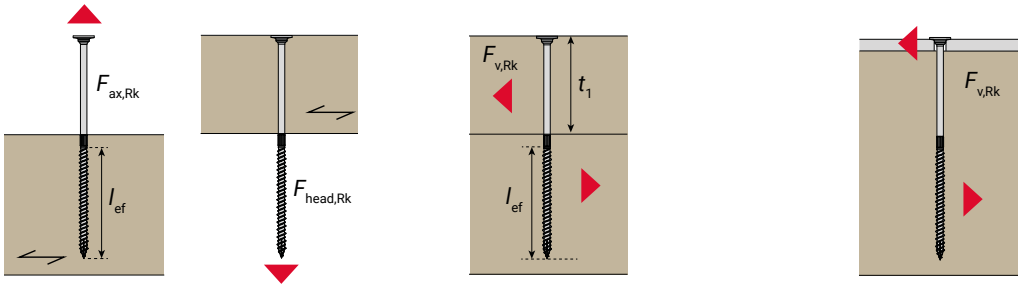
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

8.0 mm RAPID® SSF

T-drive (T40), SuperSenkFix-head, shoulder under head, friction part (compressing), HiLo thread, ridged core, BlueWin 700+ coating



CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_4	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 8.0	19.0	10.0	5.35	10.9	22.9	23.3	22 600

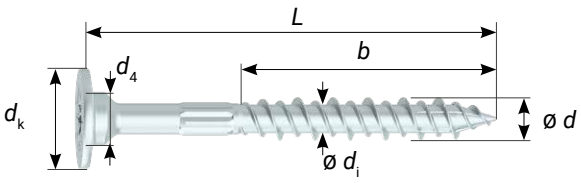


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
8.0	80	50	8.27	4.36	30	3.08	3.25	3.54	4.06	4.93	5.29
8.0	100	60	8.27	5.23	40	3.58	3.80	4.02	4.28	5.14	5.51
8.0	120	80	8.27	6.98	40	4.02	4.23	4.46	4.71	5.58	5.95
8.0	140	80	8.27	6.98	60	4.46	4.65	4.46	4.71	5.58	5.95
8.0	160	80	8.27	6.98	60	4.46	4.65	4.46	4.71	5.58	5.95
8.0	180	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	200	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	220	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	240	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	260	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	280	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	300	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	320	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	340	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	360	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	380	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38
8.0	400	100	8.27	8.72	60	4.78	4.97	4.89	5.15	6.02	6.38

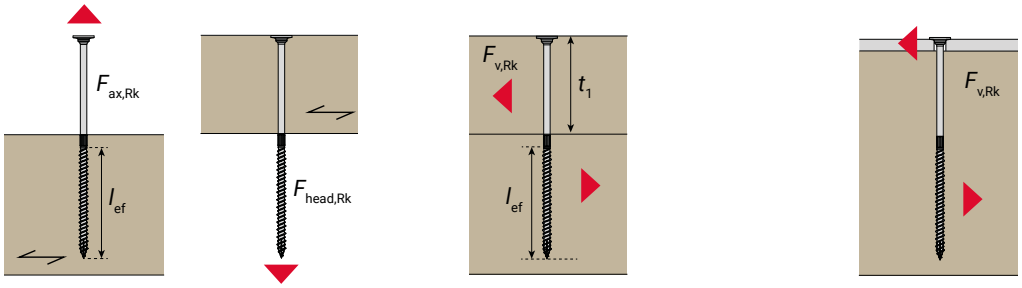
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20; General information p. 21;

10.0 mm RAPID® SSF

T-drive (T50), SuperSenkFix-head, shoulder under head, friction part (compressing), HiLo thread, ridged core, BlueWin 700+ coating



CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_4	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 10.0	24.0	13.0	6.80	11.0	12.3	35.0	33 600

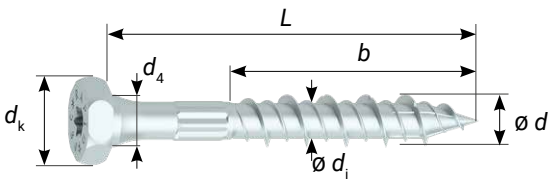


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
10.0	120	80	7.08	8.80	40	4.59	4.84	5.78	6.12	7.26	7.74
10.0	140	80	7.08	8.80	60	5.35	5.60	5.78	6.12	7.26	7.74
10.0	160	80	7.08	8.80	60	5.35	5.60	5.78	6.12	7.26	7.74
10.0	180	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29
10.0	200	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29
10.0	220	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29
10.0	240	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29
10.0	260	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29
10.0	280	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29
10.0	300	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29
10.0	350	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29
10.0	400	100	7.08	11.00	60	5.35	5.60	6.33	6.67	7.81	8.29

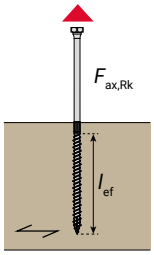
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

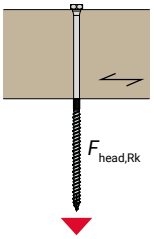
8.0 mm RAPID® Dual

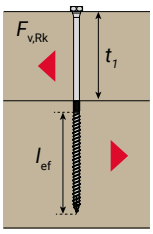
T-drive (T30) and hexagon (SW12), Dualhead, shoulder under head, with/without friction part (compressing), HiLo thread, ridged core, BlueWin coating

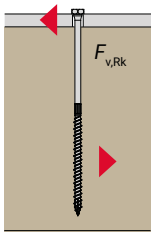


CHARACTERISTICS AND VALUES FOR C24							
d	SW = d_k	d_4	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 8.0	12.0	8.0	5.35	10.9	16.5	23.3	22 600







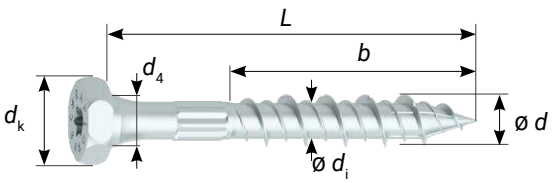


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
8.0*	50	30	2.38	2.62	-	-	-	2.07	2.48	3.52	3.95
8.0*	60	40	2.38	3.49	-	-	-	2.56	3.07	4.12	4.65
8.0*	70	40	2.38	3.49	30	2.41	2.70	3.05	3.66	4.54	5.07
8.0	80	50	2.38	4.36	30	2.58	2.76	3.54	4.06	4.93	5.29
8.0	100	60	2.38	5.23	40	2.87	3.08	4.02	4.28	5.14	5.51
8.0	120	80	2.38	6.98	40	2.87	3.08	4.46	4.71	5.58	5.95
8.0	140	80	2.38	6.98	60	3.31	3.50	4.46	4.71	5.58	5.95
8.0	160	80	2.38	6.98	60	3.31	3.50	4.46	4.71	5.58	5.95
8.0	180	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	200	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	220	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	240	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	260	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	280	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	300	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	320	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	340	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	360	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	380	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38
8.0	400	100	2.38	8.72	60	3.31	3.50	4.89	5.15	6.02	6.38

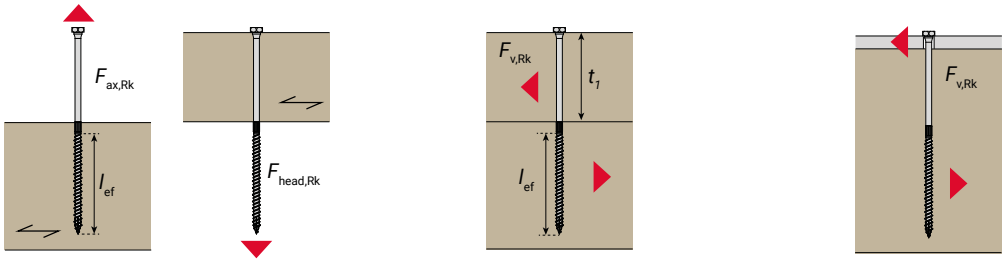
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

10.0 mm RAPID® Dual

T-drive (T40) and hexagon (SW15), Dualhead, shoulder under head, with/without friction part (compressing), HiLo thread, ridged core, BlueWin coating



CHARACTERISTICS AND VALUES FOR C24							
d	SW = d_k	d_4	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 10.0	15.0	10.0	6.80	11.0	16.7	35.0	33 600

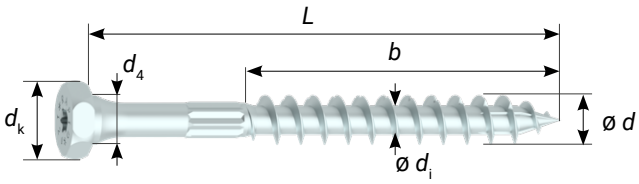


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
10.0*	60	40	3.76	4.40	-	-	-	2.88	3.45	4.99	5.59
10.0*	70	40	3.76	4.40	-	-	-	3.45	4.14	5.44	6.16
10.0	80	50	3.76	5.50	-	-	-	4.03	4.83	6.21	6.91
10.0	100	60	3.76	6.60	40	3.76	4.01	5.18	5.57	6.71	7.19
10.0	120	80	3.76	8.80	40	3.76	4.01	5.78	6.12	7.26	7.74
10.0	140	80	3.76	8.80	60	4.51	4.77	5.78	6.12	7.26	7.74
10.0	160	80	3.76	8.80	60	4.51	4.77	5.78	6.12	7.26	7.74
10.0	180	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29
10.0	200	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29
10.0	220	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29
10.0	240	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29
10.0	260	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29
10.0	280	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29
10.0	300	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29
10.0	350	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29
10.0	400	100	3.76	11.00	60	4.51	4.77	6.33	6.67	7.81	8.29

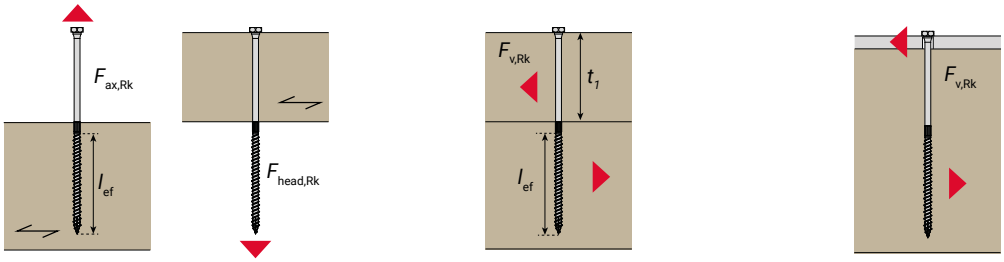
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

12.0 mm RAPID® Dual

T-drive (T40) and hexagon (SW17), Dualhead, shoulder under head, with/without friction part (compressing), single thread, ridged core, BlueWin coating



CHARACTERISTICS AND VALUES FOR C24							
d	SW = d_k	d_4	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 12.0	17.0	12.0	7.00	11.2	17.1	42.0	46 900

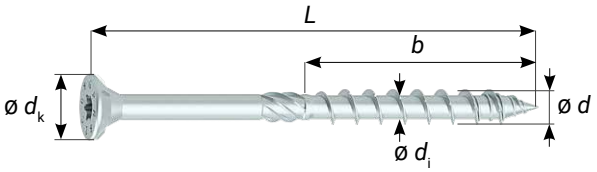


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
12.0*	80	50	4.94	6.72	-	-	-	4.45	5.33	7.23	8.16
12.0*	100	60	4.94	8.06	-	-	-	5.75	6.90	8.38	8.99
12.0*	120	80	4.94	10.75	-	-	-	7.06	7.62	9.06	9.66
12.0	140	80	4.94	10.75	-	-	-	7.19	7.62	9.06	9.66
12.0	160	80	4.94	10.75	80	5.74	6.06	7.19	7.62	9.06	9.66
12.0	180	100	4.94	13.44	80	5.74	6.06	7.86	8.29	9.73	10.34
12.0	200	100	4.94	13.44	80	5.74	6.06	7.86	8.29	9.73	10.34
12.0	220	100	4.94	13.44	80	5.74	6.06	7.86	8.29	9.73	10.34
12.0	240	100	4.94	13.44	80	5.74	6.06	7.86	8.29	9.73	10.34
12.0	260	100	4.94	13.44	80	5.74	6.06	7.86	8.29	9.73	10.34
12.0	280	100	4.94	13.44	80	5.74	6.06	7.86	8.29	9.73	10.34
12.0	300	120	4.94	16.13	80	5.74	6.06	8.53	8.96	10.40	11.01
12.0	350	120	4.94	16.13	80	5.74	6.06	8.53	8.96	10.40	11.01
12.0	400	120	4.94	16.13	80	5.74	6.06	8.53	8.96	10.40	11.01

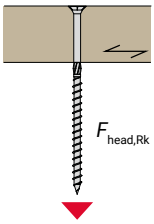
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

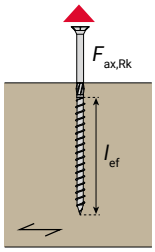
4.0 | 4.5 | 5.0 mm StarDrive GPR CS

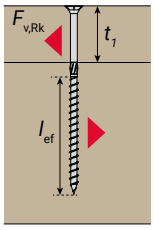
T-drive, countersunk head, milling ribs, with/without friction part (milling), coarse thread, follower thread tip, blue galvanised

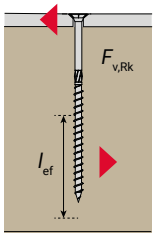


CHARACTERISTICS AND VALUES FOR C24							
d	d_k	drive	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	-	mm	N/mm²	N/mm²	kN	Nmm
ø 4.0	8.0	T20	2.50	14.8	17.1	5.0	3.200
ø 4.5	9.0	T20	2.70	13.8	17.6	5.8	4.900
ø 5.0	10.0	T25	3.25	12.8	14.6	8.5	6.500







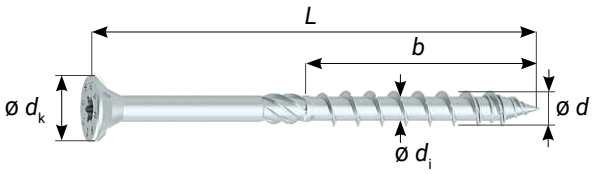


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
4.0*	30	24	1.09	1.42	-	-	-	0.79	0.95	1.34	1.50
4.0*	35	24	1.09	1.42	-	-	-	0.94	1.13	1.47	1.60
4.0*	40	30	1.09	1.78	-	-	-	1.09	1.31	1.58	1.68
4.0	50	30	1.09	1.78	-	-	-	1.24	1.32	1.58	1.68
4.0	60	35	1.09	2.07	25	1.06	1.13	1.32	1.40	1.65	1.76
4.0	70	35	1.09	2.07	25	1.06	1.13	1.32	1.40	1.65	1.76
4.5	40	24	1.43	1.49	-	-	-	1.17	1.40	1.77	1.97
4.5	45	24	1.43	1.49	-	-	-	1.33	1.50	1.83	1.97
4.5	50	29	1.43	1.80	-	-	-	1.48	1.58	1.91	2.05
4.5	60	29	1.43	1.80	30	1.38	1.46	1.48	1.58	1.91	2.05
4.5	70	39	1.43	2.42	30	1.38	1.46	1.64	1.74	2.07	2.20
4.5	80	39	1.43	2.42	30	1.38	1.46	1.64	1.74	2.07	2.20
5.0	50	30	1.46	1.92	-	-	-	1.59	1.83	2.22	2.39
5.0	60	30	1.46	1.92	30	1.47	1.62	1.71	1.83	2.22	2.39
5.0	70	37	1.46	2.37	30	1.51	1.62	1.83	1.94	2.34	2.50
5.0	80	37	1.46	2.37	35	1.60	1.69	1.83	1.94	2.34	2.50
5.0	90	55	1.46	3.52	35	1.60	1.69	2.11	2.23	2.62	2.79
5.0	100	55	1.46	3.52	35	1.60	1.69	2.11	2.23	2.62	2.79
5.0	110	55	1.46	3.52	35	1.60	1.69	2.11	2.23	2.62	2.79
5.0	120	55	1.46	3.52	35	1.60	1.69	2.11	2.23	2.62	2.79

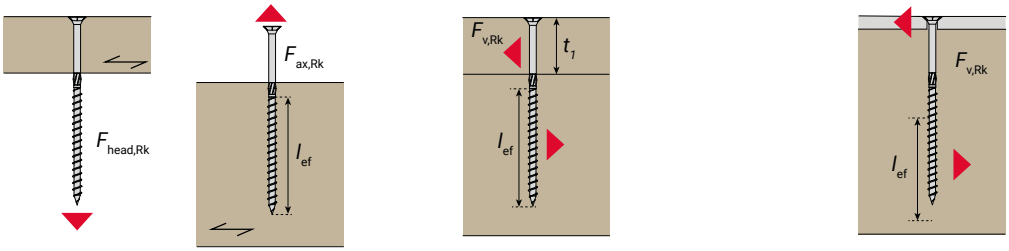
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

6.0 mm StarDrive GPR CS

T-drive (T30), countersunk head, milling ribs, friction part (milling), coarse thread, follower thread tip, blue galvanised



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 6.0	12.0	3.95	13.5	14.6	12.4	10 100

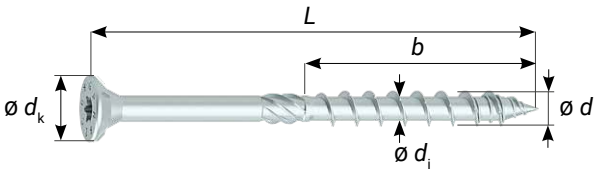


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
6.0	60	36	2.10	2.92	24	1.77	1.88	2.17	2.52	3.05	3.27
6.0	70	36	2.10	2.92	30	1.91	2.04	2.37	2.52	3.05	3.27
6.0	80	48	2.10	3.89	30	1.91	2.04	2.61	2.77	3.29	3.51
6.0	90	48	2.10	3.89	40	2.16	2.28	2.61	2.77	3.29	3.51
6.0	100	48	2.10	3.89	40	2.16	2.28	2.61	2.77	3.29	3.51
6.0	110	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	120	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	130	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	140	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	150	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	160	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	180	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	200	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	220	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	240	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	260	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	280	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84
6.0	300	64	2.10	5.18	40	2.16	2.28	2.94	3.09	3.61	3.84

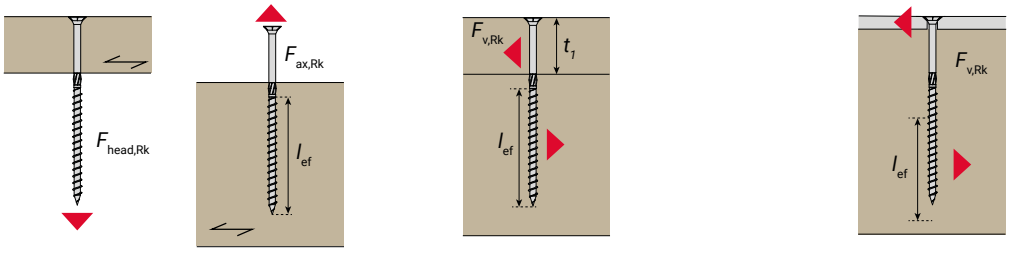
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

8.0 mm StarDrive GPR CS

T-drive (T40), countersunk head, milling ribs, friction part (milling), coarse thread, follower thread tip, blue galvanised



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 8.0	15.0	5.30	13.1	12.4	22.0	21 000

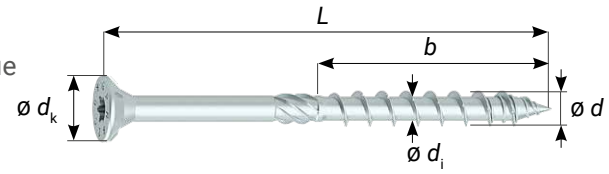


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
8.0	80	54	2.79	5.66	-	-	-	3.54	4.25	5.11	5.46
8.0	100	54	2.79	5.66	45	3.10	3.33	4.03	4.28	5.11	5.46
8.0	120	54	2.79	5.66	55	3.31	3.50	4.03	4.28	5.11	5.46
8.0	140	84	2.79	8.80	55	3.31	3.50	4.82	5.06	5.90	6.25
8.0	160	84	2.79	8.80	55	3.31	3.50	4.82	5.06	5.90	6.25
8.0	180	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	200	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	220	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	240	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	260	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	280	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	300	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	320	100	2.79	10.48	55	3.31	3.50	6.32	5.48	6.32	6.67
8.0	340	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	360	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	380	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67
8.0	400	100	2.79	10.48	55	3.31	3.50	5.23	5.48	6.32	6.67

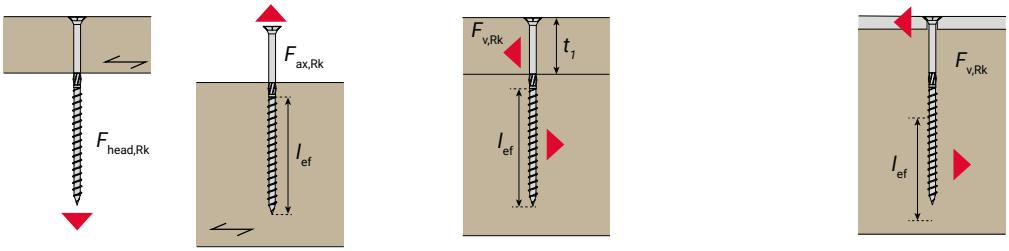
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

10.0 mm StarDrive GPR CS

T-drive (T40), countersunk head, milling ribs, with/without friction part (milling), coarse thread, follower thread tip, blue galvanised



CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 10.0	18.5	6.20	12.5	12.2	32.0	33 000

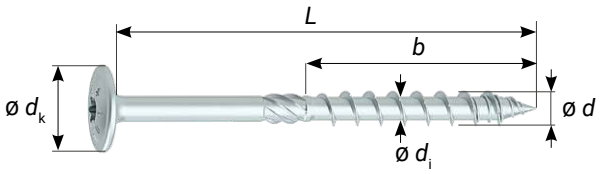


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
10.0*	80	60	4.18	7.50	-	-	-	4.03	4.83	6.70	7.36
10.0	100	60	4.18	7.50	45	4.02	4.31	5.18	5.76	6.89	7.36
10.0	120	60	4.18	7.50	55	4.41	4.75	5.42	5.76	6.89	7.36
10.0	140	60	4.18	12.50	55	4.41	4.75	5.42	5.76	6.89	7.36
10.0	160	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	180	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	200	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	220	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	240	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	260	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	280	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	300	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	320	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	340	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	360	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	380	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61
10.0	400	100	4.18	12.50	60	4.59	4.84	6.67	7.01	8.14	8.61

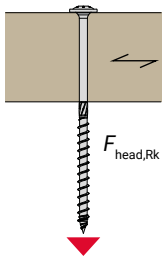
* Without friction part
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

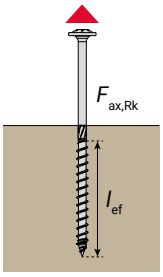
6.0 mm StarDrive GPR WH

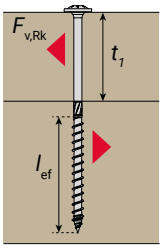
T-drive (T30), washer head, friction part (milling), coarse thread, follower thread tip, blue galvanised

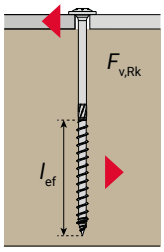


CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 6.0	14.0	3.95	13.5	16.7	12.4	10 100







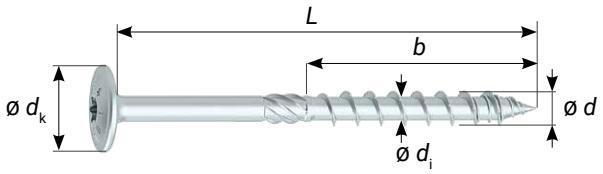


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
6.0	60	36	3.27	2.92	24	1.97	2.08	2.17	2.52	3.05	3.27
6.0	80	48	3.27	3.89	30	2.20	2.33	2.61	2.77	3.29	3.51
6.0	100	48	3.27	3.89	40	2.46	2.57	2.61	2.77	3.29	3.51
6.0	120	64	3.27	5.18	40	2.46	2.57	2.94	3.09	3.61	3.84
6.0	140	64	3.27	5.18	40	2.46	2.57	2.94	3.09	3.61	3.84
6.0	160	64	3.27	5.18	40	2.46	2.57	2.94	3.09	3.61	3.84
6.0	180	64	3.27	5.18	40	2.46	2.57	2.94	3.09	3.61	3.84
6.0	200	64	3.27	5.18	40	2.46	2.57	2.94	3.09	3.61	3.84

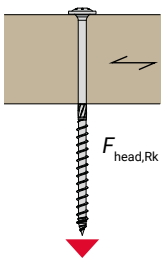
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

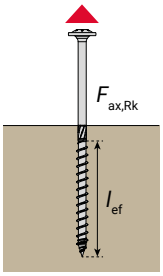
8.0 mm StarDrive GPR WH

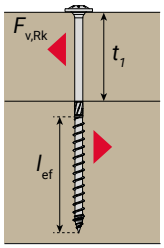
T-drive (T40), washer head, friction part (milling), coarse thread, follower thread tip, blue galvanised

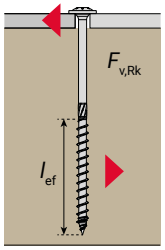


CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 8.0	20.0	5.30	13.1	17.6	22.0	21 000







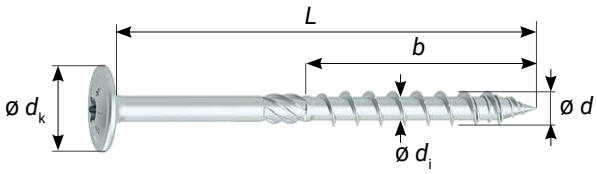


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
8.0	80	54	7.04	5.66	-	-	-	3.54	4.25	5.11	5.46
8.0	100	54	7.04	5.66	45	3.82	4.05	4.03	4.28	5.11	5.46
8.0	120	54	7.04	5.66	55	4.03	4.22	4.03	4.28	5.11	5.46
8.0	140	84	7.04	8.80	55	4.37	4.56	4.82	5.06	5.90	6.25
8.0	160	84	7.04	8.80	55	4.37	4.56	4.82	5.06	5.90	6.25
8.0	180	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	200	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	220	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	240	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	260	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	280	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	300	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	320	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	340	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	360	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	380	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67
8.0	400	100	7.04	10.48	55	4.37	4.56	5.23	5.48	6.32	6.67

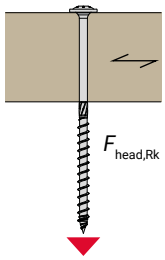
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

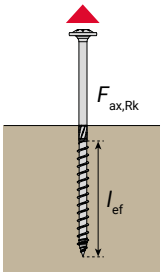
10.0 mm StarDrive GPR WH

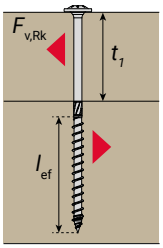
T-drive (T50), washer head, friction part (milling), coarse thread, follower thread tip, blue galvanised

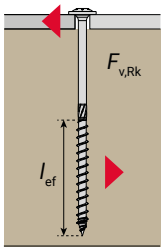


CHARACTERISTICS AND VALUES FOR C24						
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 10.0	25.0	6.20	12.5	15.2	32.0	33 000









			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
10.0	100	60	9.50	7.50	40	4.68	4.93	5.18	5.76	6.89	7.36
10.0	120	60	9.50	7.50	60	5.42	5.67	5.42	5.76	6.89	7.36
10.0	140	60	9.50	7.50	60	5.42	5.67	5.42	5.76	6.89	7.36
10.0	160	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	180	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	200	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	220	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	240	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	260	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	280	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	300	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	320	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	340	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	360	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	380	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61
10.0	400	100	9.50	12.50	60	5.92	6.17	6.67	7.01	8.14	8.61

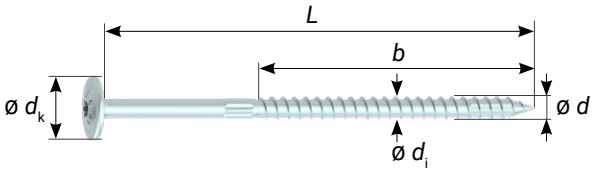
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
General information p. 21;

8.0 mm RAPID® Hardwood

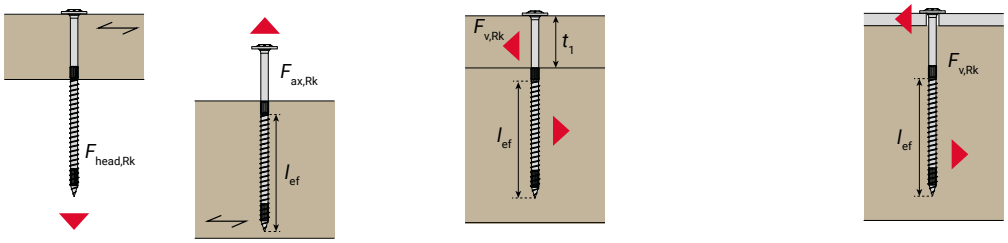
RAPID® Hardwood is the first timber construction screw approved for use in **all hardwoods without pre-drilling**. The screw connection is approved for use in side and end grain (90° to 0°) as well as in the side and narrow face of laminated veneer lumber LVL beech (BauBuche). For BauBuche GL75 beams (ETA-14/0354:2025)[9], the embedment strength in the narrow face must be reduced by 80%.
The unique RAPID® Hardwood allows full loading regardless of whether pre-drilling is carried out or not. However, pre-drilling reduces the insertion moment by 2/3 and the screw spacing can be significantly reduced (pre-drilling diameter: ø 6.0 to 6.5 mm). Pre-drilling is required for hardwood thicknesses or penetration depths of more than 400 mm (see also page 16).

RAPID® Hardwood WH

T-drive (T40), washer head, friction part (compressing), single thread, compressor tip, BlueWin 700+ coating



	CHARACTERISTICS AND VALUES						
	d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
LVL beech ρ_k = 730 kg/m³	ø 8.0	22.0	6.10	49.2	60.8	32.8	42 800
C24 ρ_k = 350 kg/m³				13.1	20.4		

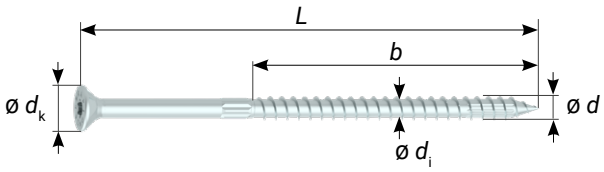


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
LVL beech [9] (ρ_k = 730 kg/m³)											
8.0	160	100	29.43	32.80	60	11.38	11.72	12.48	13.48	15.02	15.67
C24 (ρ_k = 350 kg/m³)											
8.0	160	100	9.87	10.48	60	5.75	6.07	6.35	6.71	7.90	8.40

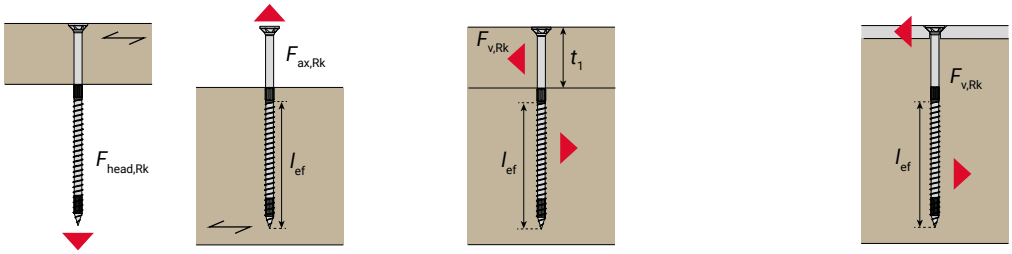
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section on metal to timber connections on p. 20;
[9] All shear resistances $F_{v,Rk}$ for LVL beech are calculated for screw connections in the edge face;
General information p. 21;

RAPID® Hardwood CS

T-drive (T40), countersunk head, milling pockets, friction part (compressing), single thread, compressor tip, BlueWin 700+ coating



	EIGENSCHAFTEN UND WERTE						
	d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
LVL beech ρ_k = 730 kg/m³	ø 8.0	15.0	6.10	49.2	46.0	32.8	42 800
C24 ρ_k = 350 kg/m³				13.1	12.4		

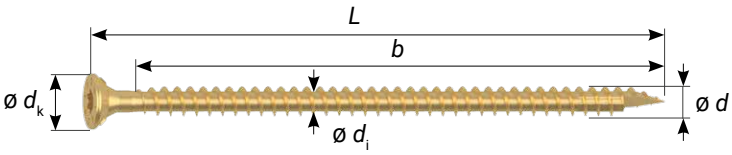


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°						
			HEAD PULL-THROUGH	WITHDRAWAL	TIMBER-TO-TIMBER			METAL-TO-TIMBER			
ø d	L	b	$F_{head,Rk}$	$F_{ax,Rk}$	t_1	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	mm	kN	kN	kN	kN	kN	kN
LVL beech [9] (ρ_k = 730 kg/m³)											
8.0	80	60	10.35	23.62	-	-	-	5.91	7.10	12.72	13.37
8.0	100	80	10.35	31.49	-	-	-	7.56	9.07	15.02	15.67
8.0	120	100	10.35	32.80	-	-	-	9.20	11.04	15.02	15.67
8.0	160	100	10.35	32.80	55	7.32	7.75	12.48	13.48	15.02	15.67
8.0	200	100	10.35	32.80	55	7.32	7.75	13.02	13.48	15.02	15.67
8.0	240	100	10.35	32.80	55	7.32	7.75	13.02	13.48	15.02	15.67
8.0	280	100	10.35	32.80	55	7.32	7.75	13.02	13.48	15.02	15.67
8.0	320	100	10.35	32.80	55	7.32	7.75	13.02	13.48	15.02	15.67
8.0	440	100	10.35	32.80	55	7.32	7.75	13.02	13.48	15.02	15.67
C24 (ρ_k = 350 kg/m³)											
8.0	80	60	2.79	6.29	-		-	3.54	4.25	6.06	6.79
8.0	100	80	2.79	8.38	-		-	4.53	5.43	7.37	7.88
8.0	120	100	2.79	10.48	-		-	5.51	6.61	7.90	8.40
8.0	160	100	2.79	10.48	60	3.98	4.30	6.35	6.71	7.90	8.40
8.0	200	100	2.79	10.48	75	4.43	4.70	6.35	6.71	7.90	8.40
8.0	240	100	2.79	10.48	75	4.43	4.70	6.35	6.71	7.90	8.40
8.0	280	100	2.79	10.48	75	4.43	4.70	6.35	6.71	7.90	8.40
8.0	320	100	2.79	10.48	75	4.43	4.70	6.35	6.71	7.90	8.40
8.0	440	100	2.79	10.48	75	4.43	4.70	6.35	6.71	7.90	8.40

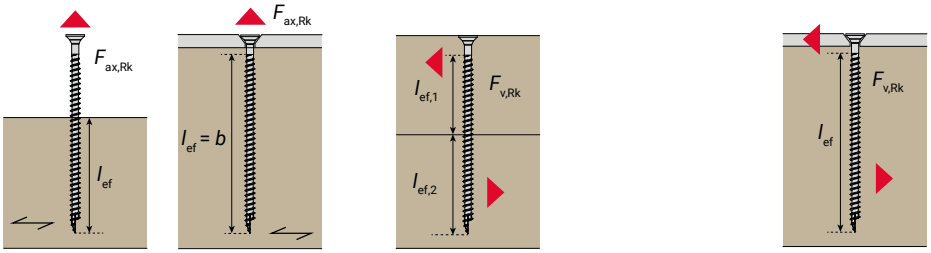
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section on metal to timber connections on p. 20;
[9] All shear resistances $F_{v,Rk}$ for LVL beech are calculated for screw connections in the edge face;
General information p. 21;

8.0 mm RAPID® FT CS

T-drive (T40), countersunk head, milling ribs, single thread, half-tip (HSP) with compressor, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	f_{head}	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 8.0	15.0	5.10	13.1	12.4	24.1	20 300	12.2

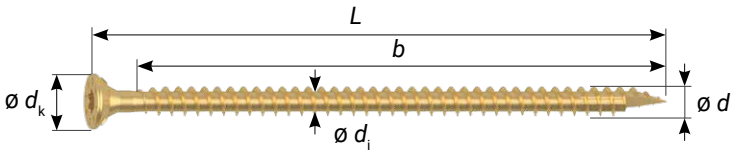


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°					
			TIMBER-TO-TIMBER	METAL-TO-TIMBER	TIMBER-TO-TIMBER		METAL-TO-TIMBER			
			$l_{ef} = b/2$	$l_{ef} = b$	$l_{ef} = b/2$		$l_{ef} = b$			
ø d	**L**	**b**	$F_{ax,Rk}$	$F_{ax,Rk}$	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	kN	kN	kN	kN	kN	kN
8.0	120	110	5.76	11.53	4.01	4.19	5.45	5.70	6.52	6.86
8.0	140	130	6.81	13.62	4.27	4.46	5.98	6.22	7.04	7.39
8.0	160	150	7.86	15.72	4.54	4.72	6.50	6.75	7.56	7.91
8.0	180	170	8.91	17.82	4.80	4.98	7.02	7.27	8.09	8.44
8.0	200	190	9.96	19.91	5.06	5.24	8.60	8.84	9.66	10.01
8.0	220	210	11.00	22.01	5.32	5.50	8.60	8.84	9.66	10.01
8.0	240	230	12.05	24.10	5.58	5.77	8.60	8.84	9.66	10.01
8.0	260	250	13.10	24.10	5.85	6.03	8.60	8.84	9.66	10.01
8.0	280	270	14.15	24.10	6.11	6.29	8.60	8.84	9.66	10.01
8.0	300	290	15.20	24.10	6.37	6.55	8.60	8.84	9.66	10.01
8.0	325	315	16.51	24.10	6.70	6.88	8.60	8.84	9.66	10.01
8.0	350	340	17.82	24.10	7.02	7.21	8.60	8.84	9.66	10.01
8.0	375	365	19.13	24.10	7.35	7.54	8.60	8.84	9.66	10.01
8.0	400	390	20.44	24.10	7.39	7.57	8.60	8.84	9.66	10.01
8.0	450	427	22.37	24.10	7.39	7.57	8.60	8.84	9.66	10.01
8.0	500	477	24.10	24.10	7.39	7.57	8.60	8.84	9.66	10.01
8.0	600	577	24.10	24.10	7.39	7.57	8.60	8.84	9.66	10.01

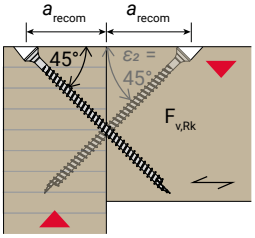
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
[5] Entire screw length in timber;
General information p. 21;

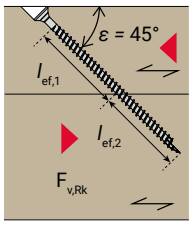
8.0 mm RAPID® FT CS

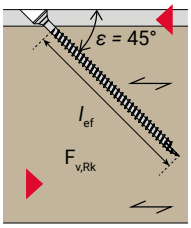
T-drive (T40), countersunk head, milling ribs, single thread, half-tip (HSP) with compressor, YellWin 500+ coating

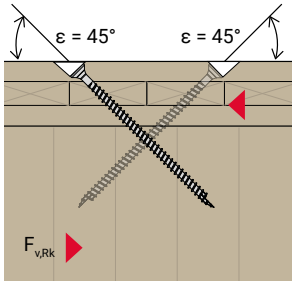


CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	f_{head}	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 8.0	15.0	5.10	13.1	12.4	24.1	20 300	12.2







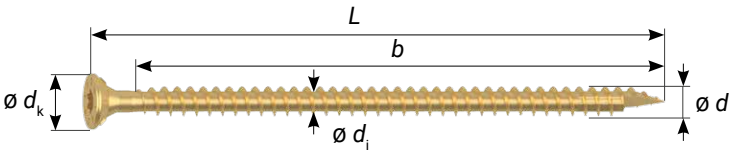


			SCREW CROSS [6] [7] ε = 45°				SHEAR ε = 45°		SCREW CROSS [7] [8]
			TIMBER-TO-TIMBER				TIMBER-TO-TIMBER	METAL-TO-TIMBER	CLT FLOOR/WALL
			$l_{ef} = b/2$				$l_{ef} = b/2$	$l_{ef} = b$	$l_{ef} = b/2$
ø d	**L**	**b**	a_{recom}	$F_{v,X1,Rk}$	$F_{v,X2,Rk}$	$F_{v,X3,Rk}$	$F_{v,Rk}$	$F_{v,Rk}$	$F_{v,X1,Rk}$
mm	mm	mm	mm	kN	kN	kN	kN	kN	kN
8.0	120	110	-	-	-	-	5.09	10.19	-
8.0	140	130	-	-	-	-	6.02	12.04	-
8.0	160	150	-	-	-	-	6.95	13.89	-
8.0	180	170	-	-	-	-	7.87	15.75	-
8.0	200	190	-	-	-	-	8.80	17.60	-
8.0	220	210	-	-	-	-	9.73	19.45	-
8.0	240	230	88	16.58	29.84	44.76	10.65	21.30	-
8.0	260	250	95	17.32	31.17	46.76	11.58	21.30	17.32
8.0	280	270	103	18.06	32.51	48.76	12.51	21.30	18.06
8.0	300	290	110	18.80	33.84	50.76	13.43	21.30	18.80
8.0	325	315	118	19.73	35.51	53.26	14.59	21.30	19.73
8.0	350	340	127	20.65	37.18	55.76	15.75	21.30	20.65
8.0	375	365	136	21.58	38.84	58.26	16.91	21.30	21.58
8.0	400	390	145	22.51	40.51	60.77	18.06	21.30	22.51
8.0	450	427	167	23.88	42.98	64.47	19.78	21.30	23.88
8.0	500	477	185	25.10	45.17	67.76	21.30	21.30	25.10
8.0	600	577	220	25.10	45.17	67.76	21.30	21.30	25.10

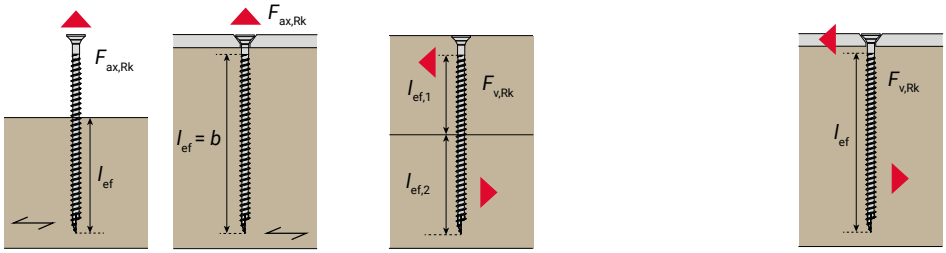
[5] Entire screw length in timber;
[6] a_{recom} ... recommended distance for the intersection point at l_{ef} = b/2, in compliance with minimum distances;
[7] Shear resistance: $F_{v,X1,Rk}$ for one screw cross consisting of two screws or $F_{v,X2,Rk}$ for two screw crosses and $F_{v,X3,Rk}$ for three screw crosses;
[8] Screw cross connection of a CLT floor with a CLT wall, specified for a reference density of ρ_k = 350 kg/m³;
General information p. 21;

10.0 mm RAPID® FT CS

T-drive (T50), countersunk head, milling ribs, single thread, half-tip (HSP) with compressor, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 10.0	18.5	6.30	12.5	12.2	40.0	36 700	18.9

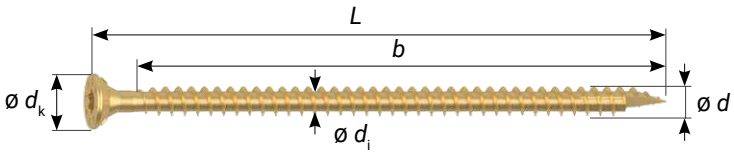


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°					
			TIMBER-TO-TIMBER	METAL-TO-TIMBER	TIMBER-TO-TIMBER		METAL-TO-TIMBER			
			$l_{ef} = b/2$	$l_{ef} = b$	$l_{ef} = b/2$		$l_{ef} = b$			
ø d	**L**	**b**	$F_{ax,Rk}$	$F_{ax,Rk}$	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	kN	kN	kN	kN	kN	kN
10.0	120	108	6.75	13.50	5.08	5.56	6.33	7.47	8.66	9.16
10.0	160	148	9.25	18.50	6.05	6.32	8.36	8.72	9.91	10.41
10.0	180	168	10.50	21.00	6.36	6.63	8.99	9.34	10.53	11.04
10.0	200	188	11.75	23.50	6.67	6.94	9.61	9.97	11.16	11.66
10.0	220	208	13.00	26.00	6.99	7.25	10.24	10.59	11.78	12.29
10.0	240	228	14.25	28.50	7.30	7.57	10.86	11.22	12.41	12.91
10.0	260	248	15.50	31.00	7.61	7.88	11.49	11.84	13.03	13.54
10.0	280	268	16.75	33.50	7.92	8.19	13.74	14.09	15.28	15.79
10.0	300	288	18.00	36.00	8.24	8.50	13.74	14.09	15.28	15.79
10.0	325	301	18.81	37.63	8.44	8.71	13.74	14.09	15.28	15.79
10.0	350	326	20.38	40.00	8.83	9.10	13.74	14.09	15.28	15.79
10.0	375	351	21.94	40.00	9.22	9.49	13.74	14.09	15.28	15.79
10.0	400	376	23.50	40.00	9.61	9.88	13.74	14.09	15.28	15.79
10.0	450	426	26.63	40.00	10.39	10.66	13.74	14.09	15.28	15.79
10.0	500	476	29.75	40.00	11.17	11.44	13.74	14.09	15.28	15.79
10.0	600	576	36.00	40.00	11.74	12.00	13.74	14.09	15.28	15.79
10.0	700	676	40.00	40.00	11.74	12.00	13.74	14.09	15.28	15.79
10.0	800	776	40.00	40.00	11.74	12.00	13.74	14.09	15.28	15.79
10.0	1000	976	40.00	40.00	11.74	12.00	13.74	14.09	15.28	15.79

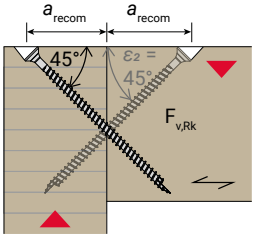
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
[5] Entire screw length in timber;
General information p. 21;

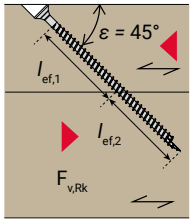
10.0 mm RAPID® FT CS

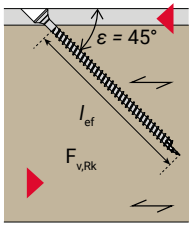
T-drive (T50), countersunk head, milling ribs, single thread, half-tip (HSP) with compressor, YellWin 500+ coating

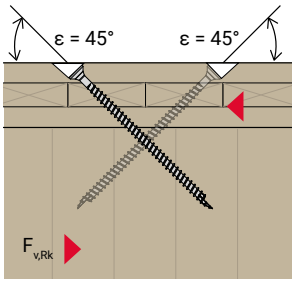


CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 10.0	18.5	6.30	12.5	12.2	40.0	36 700	18.9







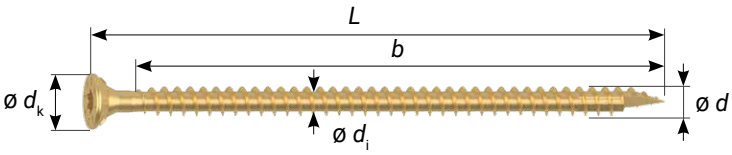


			SCREW CROSS [6] [7] ε = 45°				SHEAR ε = 45°		SCREW CROSS [7] [8]
			TIMBER-TO-TIMBER				TIMBER-TO-TIMBER	METAL-TO-TIMBER	CLT FLOOR/WALL
			$l_{ef} = b/2$				$l_{ef} = b/2$	$l_{ef} = b$	$l_{ef} = b/2$
ø d	**L**	**b**	a_{recom}	$F_{v,X1,Rk}$	$F_{v,X2,Rk}$	$F_{v,X3,Rk}$	$F_{v,Rk}$	$F_{v,Rk}$	$F_{v,X1,Rk}$
mm	mm	mm	mm	kN	kN	kN	kN	kN	kN
10.0	120	108	-	-	-	-	5.97	11.93	-
10.0	160	148	-	-	-	-	8.18	16.35	-
10.0	180	168	-	-	-	-	9.28	18.56	-
10.0	200	188	-	-	-	-	10.39	20.77	-
10.0	220	208	-	-	-	-	11.49	22.98	-
10.0	240	228	-	-	-	-	12.60	25.19	-
10.0	260	248	-	-	-	-	13.70	27.40	-
10.0	280	268	-	-	-	-	14.81	29.61	23.69
10.0	300	288	110	25.26	45.46	68.19	15.91	31.82	25.26
10.0	325	301	123	25.83	46.49	69.74	16.63	33.26	25.83
10.0	350	326	132	26.93	48.48	72.72	18.01	35.36	26.93
10.0	375	351	141	28.04	50.47	75.71	19.39	35.36	28.04
10.0	400	376	150	29.14	52.46	78.69	20.77	35.36	29.14
10.0	450	426	168	31.35	56.44	84.66	23.53	35.36	31.35
10.0	500	476	185	33.56	60.41	90.62	26.30	35.36	33.56
10.0	600	576	221	37.98	68.37	102.55	31.82	35.36	37.98
10.0	700	676	256	40.81	73.46	110.19	35.36	35.36	-
10.0	800	776	291	40.81	73.46	110.19	35.36	35.36	-
10.0	1000	976	362	40.81	73.46	110.19	35.36	35.36	-

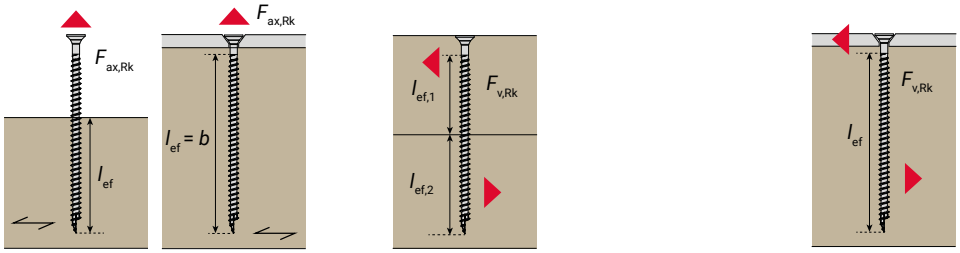
[5] Entire screw length in timber;
[6] a_{recom} ... recommended distance for the intersection point at l_{ef} = b/2, in compliance with minimum distances;
[7] Shear resistance: $F_{v,X1,Rk}$ for one screw cross consisting of two screws or $F_{v,X2,Rk}$ for two screw crosses and $F_{v,X3,Rk}$ for three screw crosses;
[8] Screw cross connection of a CLT floor with a CLT wall, specified for a reference density of ρ_k = 350 kg/m³;
General information p. 21;

12.0 mm RAPID® FT CS

T-drive (T50), countersunk head, milling ribs, single thread, half-tip (HSP) with compressor, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 12.0	21.0	7.00	11.2	10.3	46.7	48 500	23.6

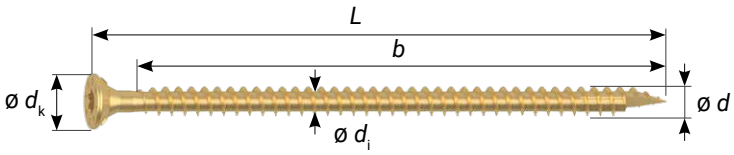


			AXIAL ε = α = 90° [1]		SHEAR ε = 90°					
			TIMBER-TO-TIMBER	METAL-TO-TIMBER	TIMBER-TO-TIMBER		METAL-TO-TIMBER			
			$l_{ef} = b/2$	$l_{ef} = b$	$l_{ef} = b/2$		$l_{ef} = b$			
ø d	**L**	**b**	$F_{ax,Rk}$	$F_{ax,Rk}$	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	kN	kN	kN	kN	kN	kN
12.0	200	180	12.10	24.19	7.60	7.93	10.63	11.06	12.52	13.14
12.0	220	200	13.44	26.88	7.94	8.27	11.30	11.74	13.20	13.81
12.0	240	220	14.78	29.57	8.27	8.60	11.97	12.41	13.87	14.49
12.0	260	240	16.13	32.26	8.61	8.94	12.64	13.08	14.54	15.16
12.0	280	260	17.47	34.94	8.95	9.27	13.31	13.75	15.21	15.83
12.0	300	280	18.82	37.63	9.28	9.61	16.25	16.69	18.15	18.77
12.0	350	330	22.18	44.35	10.12	10.45	16.25	16.69	18.15	18.77
12.0	400	380	25.54	46.70	10.96	11.29	16.25	16.69	18.15	18.77
12.0	500	480	32.26	46.70	12.64	12.97	16.25	16.69	18.15	18.77
12.0	600	580	38.98	46.70	13.92	14.25	16.25	16.69	18.15	18.77
12.0	700	680	45.70	46.70	13.92	14.25	16.25	16.69	18.15	18.77
12.0	800	780	46.70	46.70	13.92	14.25	16.25	16.69	18.15	18.77
12.0	1000	980	46.70	46.70	13.92	14.25	16.25	16.69	18.15	18.77

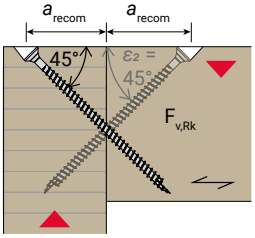
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
[5] Entire screw length in timber;
General information p. 21;

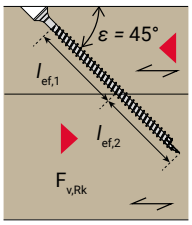
12.0 mm RAPID® FT CS

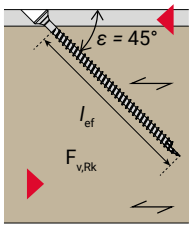
T-drive (T50), countersunk head, milling ribs, single thread, half-tip (HSP) with compressor, YellWin 500+ coating

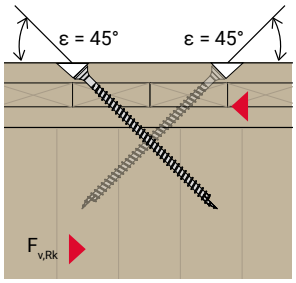


CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 12.0	21.0	7.00	11.2	10.3	46.7	48 500	23.6







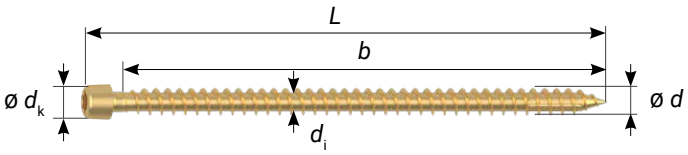


			SCREW CROSS [6] [7] ε = 45°				SHEAR ε = 45°		SCREW CROSS [7] [8]
			TIMBER-TO-TIMBER				TIMBER-TO-TIMBER	METAL-TO-TIMBER	CLT FLOOR/WALL
			$l_{ef} = b/2$				$l_{ef} = b/2$	$l_{ef} = b$	$l_{ef} = b/2$
ø d	**L**	**b**	a_{recom}	$F_{v,X1,Rk}$	$F_{v,X2,Rk}$	$F_{v,X3,Rk}$	$F_{v,Rk}$	$F_{v,Rk}$	$F_{v,X1,Rk}$
mm	mm	mm	mm	kN	kN	kN	kN	kN	kN
12.0	200	180	-	-	-	-	10.69	21.38	-
12.0	220	200	-	-	-	-	11.88	23.76	-
12.0	240	220	-	-	-	-	13.07	26.13	-
12.0	260	240	-	-	-	-	14.26	28.51	-
12.0	280	260	-	-	-	-	15.44	30.89	-
12.0	300	280	-	-	-	-	16.63	33.26	-
12.0	350	330	-	-	-	-	19.60	39.20	31.36
12.0	400	380	148	33.79	60.82	91.23	22.57	41.28	33.79
12.0	500	480	184	38.54	69.37	104.06	28.51	41.28	38.54
12.0	600	580	219	43.29	77.92	116.89	34.45	41.28	43.29
12.0	700	680	255	48.04	86.48	129.72	40.39	41.28	-
12.0	800	780	290	48.75	87.76	131.63	41.28	41.28	-
12.0	1000	980	361	48.75	87.76	131.63	41.28	41.28	-

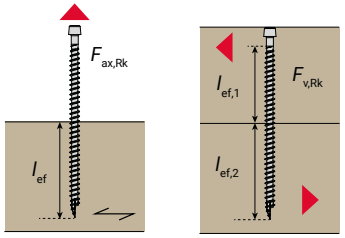
[5] Entire screw length in timber;
[6] a_{recom} ... recommended distance for the intersection point at l_{ef} = b/2, in compliance with minimum distances;
[7] Shear resistance: $F_{v,X1,Rk}$ for one screw cross consisting of two screws or $F_{v,X2,Rk}$ for two screw crosses and $F_{v,X3,Rk}$ for three screw crosses;
[8] Screw cross connection of a CLT floor with a CLT wall, specified for a reference density of ρ_k = 350 kg/m³;
General information p. 21;

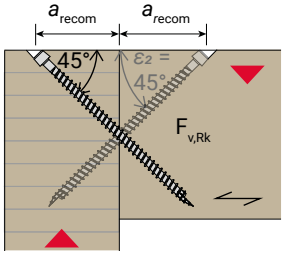
6.0 mm RAPID® FT CL

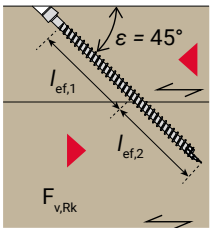
T-drive (T30), cylinder head, single thread, compressor, full tip, YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	f_{head}	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 6.0	8.2	3.80	13.5	-	12.5	10 000	12.2





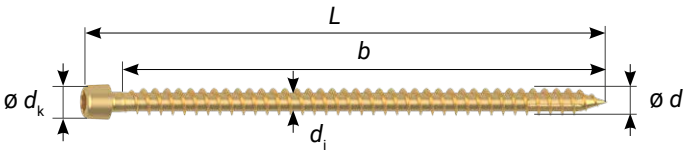


	AXIAL ε = α = 90° [1]	SHEAR ε = 90°	SCREW CROSS [6] [7] ε = 45°				SHEAR ε = 45°
	TIMBER-TO-TIMBER	TIMBER-TO-TIMBER	TIMBER-TO-TIMBER				TIMBER-TO-TIMBER
	$l_{ef} = b/2$	$l_{ef} = b/2$	$l_{ef} = b/2$				$l_{ef} = b/2$
ø d	L	b	$F_{ax,Rk}$	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	a_{recom}	$F_{v,X1,Rk}$	$F_{v,X2,Rk}$	$F_{v,X3,Rk}$	$F_{v,Rk}$
mm	mm	mm	kN	kN	kN	mm	kN	kN	kN	kN
6.0	80	70	2.84	2.22	2.45	-	-	-	-	2.51
6.0	100	90	3.65	2.54	2.66	-	-	-	-	3.22
6.0	120	110	4.46	2.74	2.86	-	-	-	-	3.94
6.0	140	130	5.27	2.95	3.06	-	-	-	-	4.65
6.0	160	150	6.08	3.15	3.27	-	-	-	-	5.37
6.0	180	170	6.89	3.35	3.47	67	9.25	16.64	24.97	6.09
6.0	200	190	7.70	3.55	3.67	74	9.82	17.67	26.51	6.80

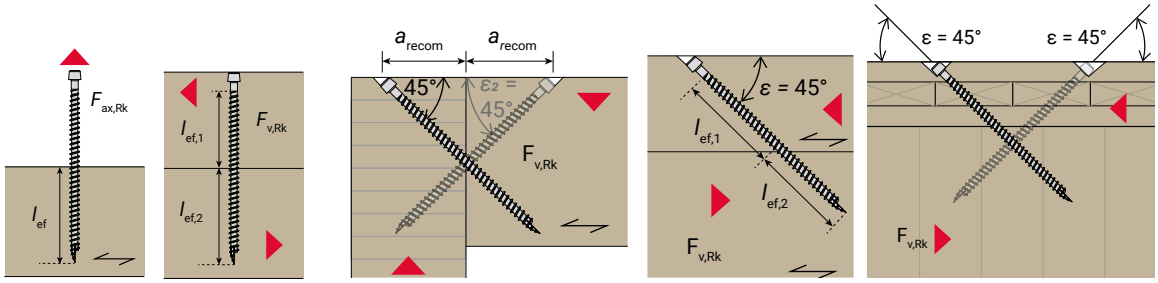
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[5] Entire screw length in the timber;
[6] a_{recom} ... recommended distance for the intersection point at l_{ef} = b/2 in compliance with minimum distances;
[7] Shear resistance $F_{v,X1,Rk}$ for one screw cross consisting of two screws or $F_{v,X2,Rk}$ for two screw crosses and $F_{v,X3,Rk}$ for three screw crosses;
[8] Screw cross connection of a CLT floor with a CLT wall, specified for a reference density of ρ_k = 350 kg/m³;
General information p. 21;

8.0 mm RAPID® FT CL

T-drive (T40), cylinder head, single thread, compressor, full tip, from 450 mm with half tip (HSP), YellWin 500+ coating



CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	f_{head}	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 8.0	10.2	5.10	13.1	-	24.1	20 300	12.2

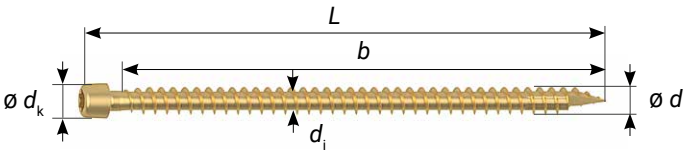


	AXIAL ε = α = 90° [1]	SHEAR ε = 90°	SCREW CROSS [6] [7] ε = 45°				SHEAR ε = 45°	SCREW CROSS [7] [8]
	TIMBER-TO-TIMBER	TIMBER-TO-TIMBER	TIMBER-TO-TIMBER				TIMBER-TO-TIMBER	CLT FLOOR/WALL
	$l_{ef} = b/2$	$l_{ef} = b/2$	$l_{ef} = b/2$				$l_{ef} = b/2$	$l_{ef} = b/2$
ø d	L	b	$F_{ax,Rk}$	$F_{v,Rk}$ [2]	$F_{v,Rk}$ [3] α = 0°	a_{recom}	$F_{v,X1,Rk}$	$F_{v,X2,Rk}$	$F_{v,X3,Rk}$	$F_{v,Rk}$	$F_{v,X1,Rk}$
mm	mm	mm	kN	kN	kN	mm	kN	kN	kN	kN	kN
8.0	120	110	5.76	4.01	4.19	-	-	-	-	5.09	-
8.0	140	130	6.81	4.27	4.46	-	-	-	-	6.02	-
8.0	160	150	7.86	4.54	4.72	-	-	-	-	6.95	-
8.0	180	170	8.91	4.80	4.98	-	-	-	-	7.87	-
8.0	200	190	9.96	5.06	5.24	-	-	-	-	8.80	-
8.0	220	210	11.00	5.32	5.50	-	-	-	-	9.73	-
8.0	240	230	12.05	5.58	5.77	88	16.58	29.84	44.76	10.65	-
8.0	260	250	13.10	5.85	6.03	95	17.32	31.17	46.76	11.58	9.26
8.0	280	270	14.15	6.11	6.29	103	18.06	32.51	48.76	12.51	10.00
8.0	300	290	15.20	6.37	6.55	110	18.80	33.84	50.76	13.43	10.75
8.0	325	315	16.51	6.70	6.88	118	19.73	35.51	53.26	14.59	11.67
8.0	350	340	17.82	7.02	7.21	127	20.65	37.18	55.76	15.75	12.60
8.0	375	365	19.13	7.35	7.54	136	21.58	38.84	58.26	16.91	13.52
8.0	400	390	20.44	7.39	7.57	145	22.51	40.51	60.77	18.06	14.45
8.0*	450	427	22.37	7.39	7.57	167	23.88	42.98	64.47	19.78	15.82
8.0*	500	477	24.10	7.39	7.57	185	25.10	45.17	67.76	21.30	17.04
8.0*	600	577	24.10	7.39	7.57	220	25.10	45.17	67.76	21.30	17.04

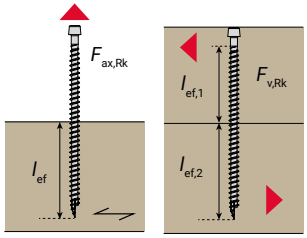
* With half tip
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[5] Entire screw length in the timber;
[6] a_{recom} ... recommended distance for the intersection point at $l_{ef} = b/2$ in compliance with minimum distances;
[7] Shear resistance $F_{v,X1,Rk}$ for one screw cross consisting of two screws or $F_{v,X2,Rk}$ for two screw crosses and $F_{v,X3,Rk}$ for three screw crosses;
[8] Screw cross connection of a CLT floor with a CLT wall, specified for a reference density of ρ_k = 350 kg/m³;
General information p. 21;

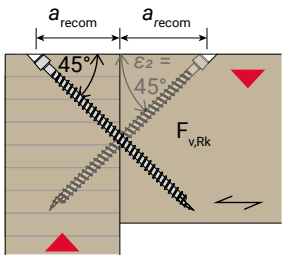
10.0 mm RAPID® FT CL

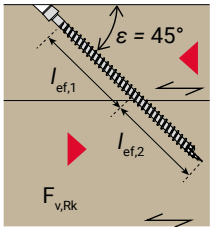
T-drive (T30), cylinder head, single thread, half-tip (HSP) with compressor, YellWin 500+ coating

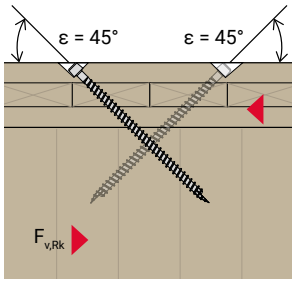


CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_i	$f_{ax,k,90}$	f_{head}	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 10.0	13.4	6.30	12.5	-	40.0	36 700	18.9







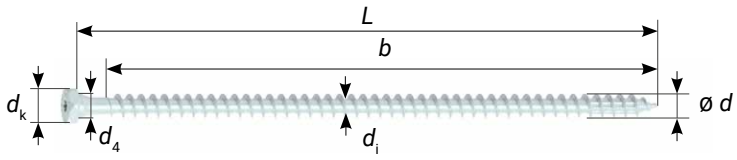


			AXIAL ε = α = 90° [1]	SHEAR ε = 90°		SCREW CROSS [6] [7] ε = 45°				SHEAR ε = 45°	SCREW CROSS [7] [8]
			TIMBER-TO-TIMBER	TIMBER-TO-TIMBER		TIMBER-TO-TIMBER				TIMBER-TO-TIMBER	CLT FLOOR/WALL
			$l_{ef} = b/2$	$l_{ef} = b/2$		$l_{ef} = b/2$				$l_{ef} = b/2$	$l_{ef} = b/2$
ø d	L	b	$F_{ax,Rk}$	$F_{v,Rk}$ [2]	$F_{v,Rk}$ [3] α = 0°	a_{recom}	$F_{v,X1,Rk}$	$F_{v,X2,Rk}$	$F_{v,X3,Rk}$	$F_{v,Rk}$	$F_{v,X1,Rk}$
mm	mm	mm	kN	kN	kN	mm	kN	kN	kN	kN	kN
10.0	200	188	11.75	6.67	6.94	-	-	-	-	10.39	-
10.0	240	228	14.25	7.30	7.57	-	-	-	-	12.60	-
10.0	260	248	15.50	7.61	7.88	-	-	-	-	13.70	-
10.0	280	268	16.75	7.92	8.19	-	-	-	-	14.81	11.84
10.0	300	288	18.00	8.24	8.50	110	25.26	45.46	68.19	15.91	12.73
10.0	325	301	18.81	8.44	8.71	123	25.83	46.49	69.74	16.63	13.30
10.0	350	326	20.38	8.83	9.10	132	26.93	48.48	72.72	18.01	14.41
10.0	375	351	21.94	9.22	9.49	141	28.04	50.47	75.71	19.39	15.51
10.0	400	376	23.50	9.61	9.88	150	29.14	52.46	78.69	20.77	16.62
10.0	450	426	26.63	10.39	10.66	168	31.35	56.44	84.66	23.53	18.83
10.0	500	476	29.75	11.17	11.44	185	33.56	60.41	90.62	26.30	21.04
10.0	600	576	36.00	11.74	12.00	221	37.98	68.37	102.55	31.82	25.46
10.0	700	676	40.00	11.74	12.00	256	40.81	73.46	110.19	35.36	-
10.0	800	776	40.00	11.74	12.00	291	40.81	73.46	110.19	35.36	-
10.0	1000	976	40.00	11.74	12.00	362	40.81	73.46	110.19	35.36	-

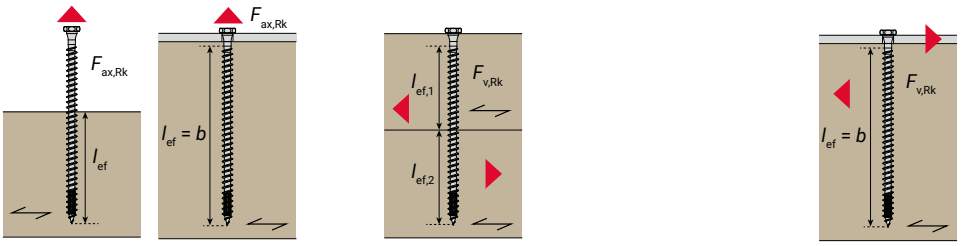
[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[5] Entire screw length in the timber;
[6] a_{recom} ... recommended distance for the intersection point at $l_{ef} = b/2$ in compliance with minimum distances;
[7] Shear resistance $F_{v,X1,Rk}$ for one screw cross consisting of two screws or $F_{v,X2,Rk}$ for two screw crosses and $F_{v,X3,Rk}$ for three screw crosses;
[8] Screw cross connection of a CLT floor with a CLT wall, specified for a reference density of ρ_k = 350 kg/m³;
General information p. 21;

12.0 | 16.0 mm RAPID® T-Lift

T-drive and hexagonal drive, Dual head, shoulder under head, single thread, compressor, full tip, BlueWin coating, Ø 12 mm ICC-ES certified



CHARACTERISTICS AND VALUES FOR C24									
d	SW = d_k	drive	d_4	d_i	$f_{ax,k,90}$	f_{head}	$F_{tens,k}$	$M_{y,k}$	$N_{pl,k} \cdot \kappa_c$ [5]
[mm]	[mm]	-	[mm]	[mm]	[N/mm²]	[N/mm²]	[kN]	[Nmm]	[kN]
ø 12.0	17.0	T40	12.0	7.00	11.2	17.1	45.0	48 500	23.6
ø 16.0	24.0	T50	16.0	10.70	11.0	11.0	88.6	112 900	56.7



			AXIAL ε = α = 90° [1]		SHEAR ε = 90°					
			TIMBER-TO-TIMBER	METAL-TO-TIMBER	TIMBER-TO-TIMBER		METAL-TO-TIMBER			
			$l_{ef} = b/2$	$l_{ef} = b$	$l_{ef} = b/2$		$l_{ef} = b$			
ø d	**L**	**b**	$F_{ax,Rk}$	$F_{ax,Rk}$	$F_{v,Rk}$ [2] α = 90°	$F_{v,Rk}$ [3] α = 0°	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2] [4] α = 90°	$F_{v,Rk,thick}$ [3] [4] α = 0°
mm	mm	mm	kN	kN	kN	kN	kN	kN	kN	kN
12.0	60	48	-	6.45	-	-	3.14	3.77	6.21	6.87
12.0	80	68	-	9.14	-	-	4.45	5.33	7.87	8.79
12.0	100	85	-	11.42	-	-	5.75	6.90	9.33	9.95
12.0	120	105	7.06	14.11	-	-	7.06	8.47	10.00	10.62
12.0	140	125	8.40	16.80	-	-	8.37	9.22	10.68	11.29
12.0	160	145	9.74	19.49	-	-	9.45	9.89	11.35	11.97
12.0	180	165	11.09	22.18	7.35	7.68	10.12	10.56	12.02	12.64
12.0	220	205	13.78	27.55	8.02	8.35	11.47	11.90	13.36	13.98
12.0	300	285	19.15	38.30	9.37	9.69	15.83	16.27	17.73	18.34
12.0	380	365	24.53	45.00	10.71	11.04	15.83	16.27	17.73	18.34
16.0	180	155	13.64	27.28	-	-	13.11	15.28	17.75	18.79
16.0	240	215	18.92	37.84	12.46	13.01	17.19	17.92	20.39	21.43
16.0	280	255	22.44	44.88	13.34	13.89	18.95	19.68	22.15	23.19
16.0	320	295	25.96	51.92	14.22	14.77	20.71	21.44	23.91	24.95
16.0	400	375	33.00	66.00	15.98	16.53	24.23	24.96	27.43	28.47
16.0	600	575	50.60	88.60	20.38	20.93	29.88	30.61	33.08	34.12

[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid forlateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20;
[5] Entire screw length in timber;
General information p. 21;

12.0 | 16.0 mm RAPID® T-Lift

1.3 t & 2.5 t lifting system

Areas of application

> Used in structural timber construction as a lifting system for lifting prefabricated roof, wall and ceiling elements, in timber panel construction for the prefabricated house industry, solid timber panels such as cross-laminated timber and similar.
> The RAPID® T-Lift screw is suitable for cross-laminated timber, solid timber and other softwood-based timber materials without pre-drilling. Pre-drilling is always required in hardwoods (characterised by ρ_k > 500 kg/m³).
> Can be used for axial pull (solely axial loading of the screw) and diagonal pull (combined loading of the screw).

Instructions for use

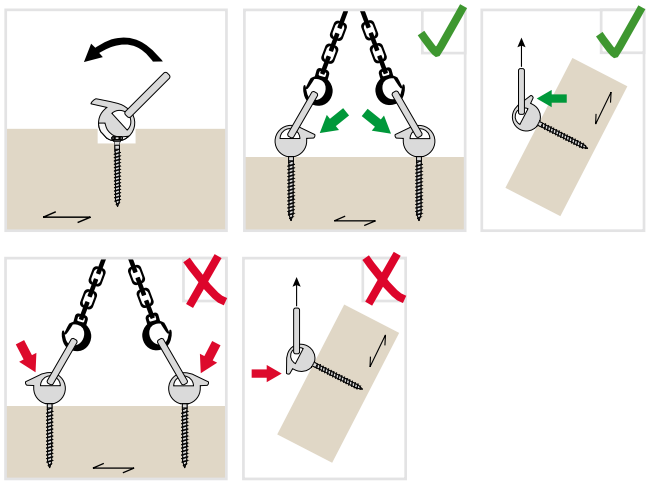
Load system 1,3 t	Load system 2,5 t
RAPID® T-Lift HOOK (spherical head anchor) **1,3 t** self-tapping **RAPID® T-Lift** screw **Ø 12 mm** × length *L* acc. ETA-12/0373	**RAPID® T-Lift HOOK** (spherical head anchor) **2,5 t** self-tapping **RAPID® T-Lift** screw **Ø 16 mm** × length *L* acc. ETA-12/0373

> The weight of the components to be lifted must be known precisely and must not exceed the calculated load capacity.
> The load must be lifted taking into account the permissible suspension angles.

Photo © Steffen Holzbau photographer Thomas Urbany

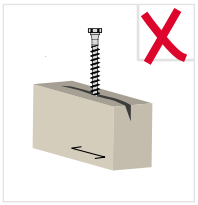
Correctly engaging the RAPID® T-Lift HOOK:

The lug on the sphere must point inwards or upwards.

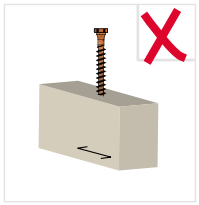


Safety instructions

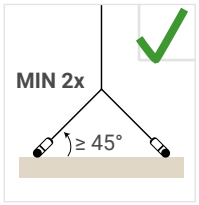
> The RAPID® T-Lift screw may only be inserted in once but can be loaded several times in this position. Repeated lifting in the factory until installation on the construction site is permitted.
> Used screws must be left in the component or disposed of.
> Bar-shaped components (beams) must be lifted with at least two RAPID® T-Lift screws. For plate-shaped components, at least three RAPID® T-Lift screws must be used.
> The RAPID® T-Lift HOOK must be checked for damage before each use.
> The RAPID® T-Lift HOOK must be inspected at least once a year by a competent person (e.g. safety officer) from the user company. The degree of wear and damage must be assessed during this inspection.
> Modifications and repairs, especially welding on the RAPID® T-Lift HOOK, are not permitted.
> Ensure dry storage! As soon as signs of corrosion are visible on the RAPID® T-Lift screw or the RAPID® T-Lift HOOK, they must no longer be used and must be disposed of.

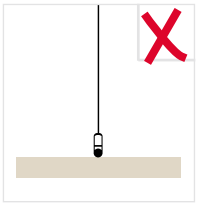


Do not screw into cracks / watch out for crack formation

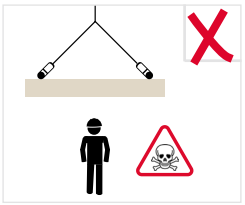


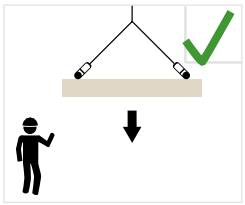
Do not use corroded screws





At least 2 lifting points





Do not stand in the immediate danger zone beneath the suspended load – danger to life

Operating instructions, lifting load tables and further information can be found at:
www.schmid-screw.com

8.0 mm RAPID® Top-2-Roof

Details

T-drive (T40), cylinder head, underhead thread, friction part (milling), coarse thread, follower thread tip, BlueWin coating

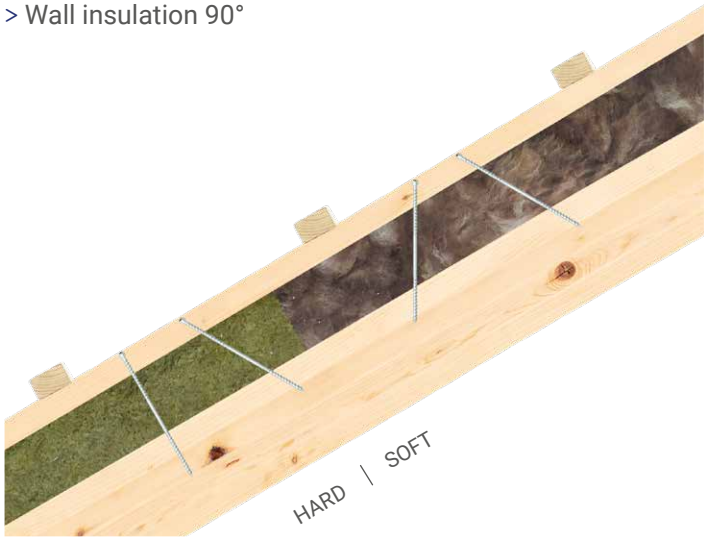
ETA-12/0373

Application

> Approved for hard and soft (non-compressible) insulation materials
> Especially for roof insulation: absorption of shear and compressive forces
> The absorption of compressive forces means that the insulation material is pressed much less into the substrate, which improves the insulation performance
> The second threaded part below the screw head ensures that the counter batten is optimally fixed in place

Roof and exterior wall insulation

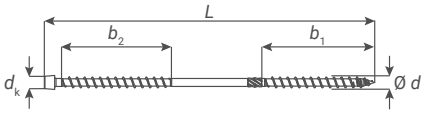
> Verification of counter battens including screw connections
> Gable and pent roofs
> Wall insulation 90°



Dimensioning software

> Simple, intuitive operation – the EXCEL spreadsheet programme does not require any special software knowledge. Significantly reduced calculation time.
> Screw types and predefined insulation materials can be selected or individually expanded to include your own insulation materials.
> The software takes national regulations into account and is available in German, English, French and Italian.

MORE INFOS



dimension					drive
Ø d [mm]	L [mm]	b_1 [mm]	b_2 [mm]	d_k [mm]	
8.0	240	84	80	10.2	T40
8.0	260	100	80	10.2	T40
8.0	280	100	80	10.2	T40
8.0	300	100	80	10.2	T40
8.0	320	100	80	10.2	T40
8.0	340	100	80	10.2	T40
8.0	360	100	80	10.2	T40
8.0	400	100	80	10.2	T40
8.0	450	100	80	10.2	T40
8.0	480	100	80	10.2	T40
8.0	520	100	80	10.2	T40

8,0 mm RAPID® T-Con

Details

T-drive (T40) and hexagon drive (SW12), Dual head, friction part (milling), coarse thread, follower thread tip, RedWin coating

ETA-18/0829

Advantages of the timber-concrete composite system

> Increased load-bearing capacity with low installation height
> Especially in old building renovations, the existing ceiling can continue to be used – more economical, sustainable and cost-effective

Compared to pure timber ceilings

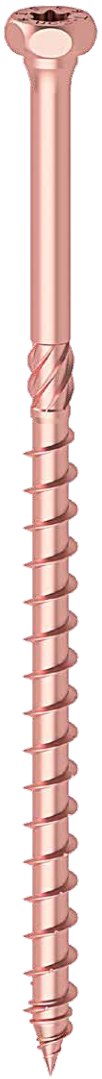
> Higher ultimate limit state and stiffness
> Fire prevention: The risk of transferring fire is greatly reduced
> Concrete ceiling panels reduce vibrations and improve noise insulation

Compared to purely concrete ceilings

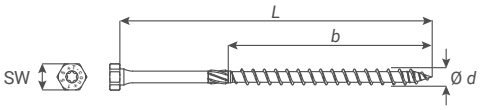
> Better environmental balance: 2/3 of timber is built in
> Lower dead load

Dimensioning software

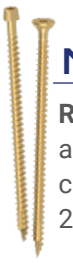
> The dimensioning software for wood-concrete composite systems is available in the following languages: German, English, French, Italian and Czech
> From 50 mm concrete thickness (DE: 70 mm)
> Concrete cracked/uncracked
> Screw connection 30°/45°/90° or crosswise 45° and 135° and support 90° and 135°
> The gusset concrete weight is factored into the dowel beam cross section



RAPID® T-Con				
Dimension			drive	
Ø *d* [mm]	*L* [mm]	*b* [mm]		
8.0	155	100	SW 12	T40
8.0	205	130	SW 12	T40



MORE INFOS

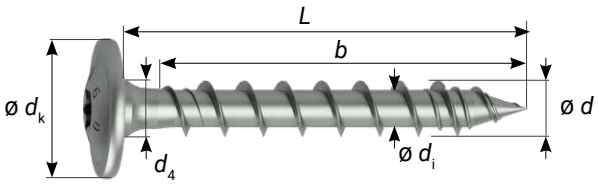


NEW

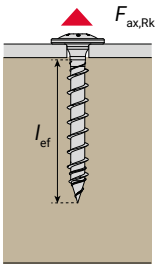
RAPID® FT ø 8 mm and **ø 10 mm** approved for timber-concrete composite system from a length of 240 mm, ETA-18/0829:2025

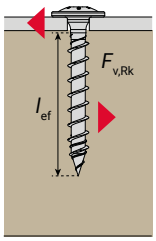
8.0 mm StarDrive GPR PS

post screw, T-drive (T40), washer head, shoulder under head, coarse thread, follower thread tip, ZnNi 1000+ coating

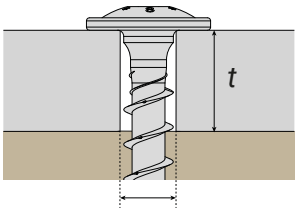


CHARACTERISTICS AND VALUES FOR C24							
d	d_k	d_4	d_i	$f_{ax,k,90}$	$f_{head,k}$	$F_{tens,k}$	$M_{y,k}$
mm	mm	mm	mm	N/mm²	N/mm²	kN	Nmm
ø 8.0	20.0	8.0	5.30	13.1	17.6	22.0	21.000





			AXIAL ε = α = 90° [1]	SHEAR ε = 90°			
			WITHDRAWAL	METAL-TO-TIMBER			
ø d	L	b	$F_{ax,Rk}$	$F_{v,Rk,thin}$ [2] α = 90°	$F_{v,Rk,thin}$ [3] α = 0°	$F_{v,Rk,thick}$ [2) 4)] α = 90°	$F_{v,Rk,thick}$ [3) 4)] α = 0°
mm	mm	mm	kN	kN	kN	kN	kN
8.0	40	32	3.35	1.57	1.89	3.33	3.67
8.0	50	42	4.40	2.07	2.48	3.92	4.35
8.0	60	52	5.45	2.56	3.07	4.57	5.10



d_{steel} = 8 mm

Metal-to-timber connections

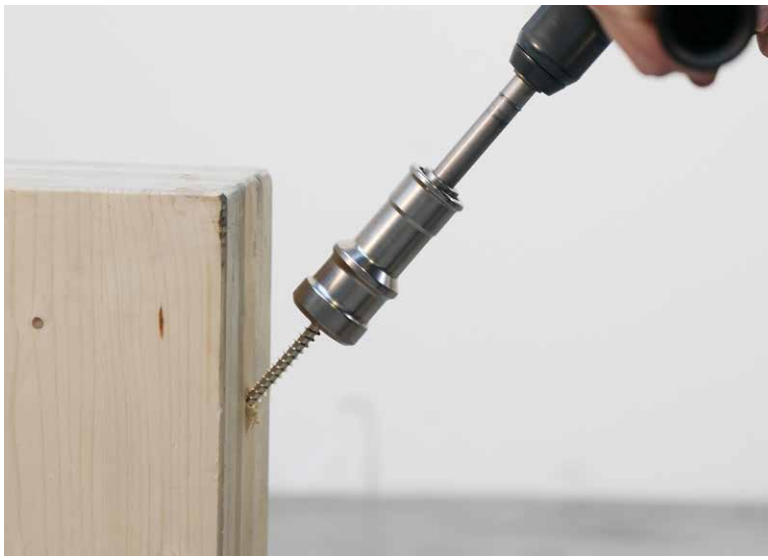
The StarDrive GPR PS was specially designed for metal-to-timber connections. The underhead shoulder guarantees a perfect fit in the metal. Further information on metal-to-timber connections: p. 20.

The Zinc-Nickel 1000+ coating is the ideal complement to hot-dip galvanised metal parts and is also suitable for use in demanding conditions.

[1] Values for an screw-axis to grain angle of 30° ≤ ε ≤ 90°;
[2] Valid for lateral load with a load direction perpendicular to grain α = 90° in at least one of the two timber components;
[3] Valid for lateral load with a load direction parallel to grain α = 0° in all timber components;
[4] Observe the requirements for thick steel plate in accordance with EN 1995-1-1, see also section metal to timber connections p. 20; General information p. 21;

RAPID® Secure: screw-in tool

The RAPID® Secure screw-in tool represents a completely novel technology for secure screw fittings in timber construction.
This solution enables long timber construction screws and hardwood screws to be screwed securely and quickly with all screwdrivers (13 mm drill chuck) without a problem.
The screw head is held securely in place and is firmly connected with the RAPID® Secure. There is no way for the bit to slip off and no need to press down. With the RAPID® Secure screw-in tool, screwing with timber construction screws is extra secure and simple. The tool can be used with conventional screwdrivers and gives your workers security even in inconvenient screwing positions.



BENEFITS FROM USING THE RAPID® SECURE:

> Increased work safety for employees
> After being locked into place, the screw cannot be loosened and fits tightly on the bit - no pressing down while screwing in and less wear - bit holds for much longer
> Easier to screw in difficult and dangerous work positions and situations

USE RAPID® SECURE WITH RAPID® AND STARDRIVE GPR SCREWS	
RAPID® SECURE L, T 40	ø 8 mm RAPID®/GPR CS ø 8 mm RAPID® FT CL ø 10 mm RAPID® Dual ø 8 mm RAPID® T-Con
RAPID® SECURE L, special bit T50	10 mm RAPID® FT CL
RAPID® SECURE XL, T 40	ø 8 mm RAPID®/GPR WH ø 8 mm RAPID® SSF ø 12 mm RAPID® Dual ø 12 mm RAPID® T-Lift
RAPID® SECURE XL, T 50	ø 10 mm RAPID®/GPR CS ø 12 mm RAPID®/GPR CS ø 10 mm RAPID® SSF

VIDEO

MORE INFOS

Idaho Central Credit Union Arena

The 4,000-seat arena now forms the new home for the Vandals' varsity basketball teams and serves as a central venue for school and community events. Timber plays a defining role in the architecture, giving the space both warmth and structural clarity.

One of the project's distinctive features is the efficient timber–steel portal frame, spanning 120 feet to maintain clear views from the secondary seating above the practice rink. To minimise work at height, the entire frame was pre-assembled on site into three large components. Designing the thrust connection between beam and column required complex timber engineering to transfer over 450,000 lbs of compression.

Across the main arena, king-post trusses span more than 150 feet. Installing these heavy elements with a crane positioned in the bowl was a significant challenge. A parametric model of the trusses was created, using genetic algorithms to optimise the structural form while meeting key aesthetic goals. This improved efficiency, reduced the weight of the prefabricated pieces, and helped maintain the project budget.

Given the high forces acting on the beams and supports, high-quality RAPID® FT screws were used throughout to ensure structural performance and reliability.

Photos © Structure Craft

Facts & Figures:

Customer:
University of Idaho

Architect:
Opsis Architecture, USA

Location:
Moscow, ID, USA

Structural Engineer & Builder:
Structure Craft, Canada

Completion:
2021

Lookout tower on the Pyramidenkogel

At 100 metres in height, the Pyramidenkogel tower is the world's tallest timber observation structure, a landmark made possible through the collaboration of Rubner Holzbau Ober-Grafendorf and Schmid Schrauben Hainfeld.
The tower comprises 500 m³ of glulam and 1,000 m² of cross-laminated timber. Its distinctive silhouette is created by sixteen solid larch glulam columns, arranged elliptically and rising in a gentle spiral to form the tower's characteristic twist.
The structure extends across ten levels, topped by two open-air platforms that offer a full 360° panorama. The uppermost point is the skybox, enclosed with broad panoramic glazing. Visitors may reach this level by staircase or lift, or choose the 120-metre slide that carries them back down to the first floor.
Assembly was carried out by Rubner Holzbau. Rapid construction was achieved through precise prefabrication at the Obergrafendorf facility, supported by the use of screws from Schmid Schrauben Hainfeld. This high level of prefabrication ensured swift progress on site and delivered clear cost advantages.

Photos © Rubner Holzbau

Facts & Figures:

Customer:
Pyramidenkogel Infrastruktur GmbH & Co KG

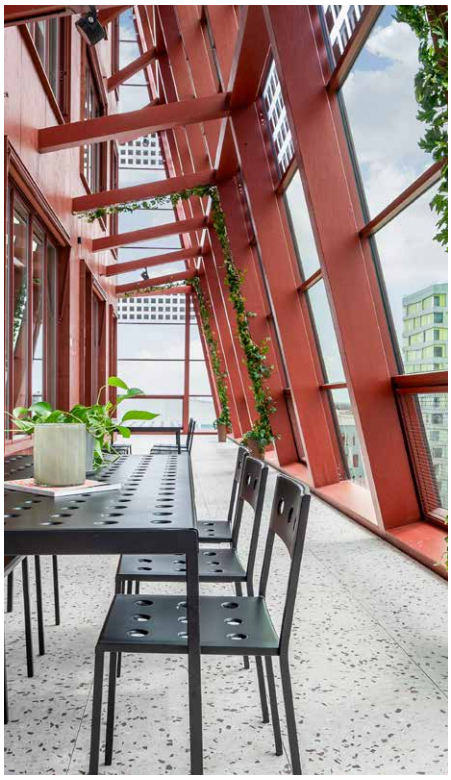
Architect:
Klaura, Kaden + Partner, Austria

Location:
Austria, Carinthia

Structural engineer and builder:
Rubner Holzbau, Austria

Completion:
2013

Fyrtornet



Fyrtornet is an innovative office building in Malmö's Hyllie district and forms a central part of the "Embassy of Sharing" development. Set for completion in 2024, it will become Sweden's tallest timber building with eleven floors, combining a sustainable design approach with solar and geothermal energy. With a clear focus on circular economy principles and the goals of Agenda 2030, Fyrtornet provides flexible workspaces, a library, green terraces and highly efficient building systems.
Timber plays a defining role in the project. The structure uses 1,640 m³ of cross-laminated timber and 1,030 m³ of glulam. Project planning, structural design, detailing and prefabrication were carried out by Binderholz and b_project.
Using timber not only ensures structural stability but also reduces the building's overall CO_2 footprint. Prefabricated elements helped shorten construction time considerably.
RAPID® screws, chosen for their high technical performance, including excellent load-bearing capacity and minimal edge distances, contributed significantly to the successful realisation of the building.

Binderholz, Photos © Granitor

Facts & Figures:

Customer:
Granitor Projects AB

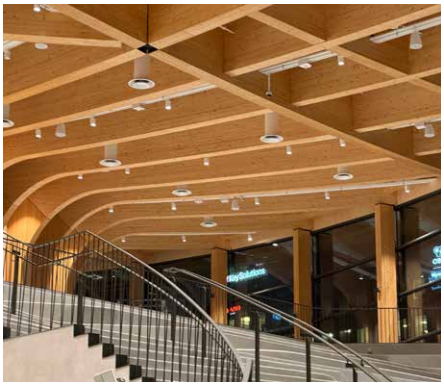
Architect:
Wingårdhs, Sweden

Location:
Sweden

Holzbau:
Binderholz, Austria

Completion:
2024

World of Volvo



The World of Volvo in Gothenburg is a pioneering timber construction that combines technical refinement with a distinctive architectural identity. Developed by WIEHAG, a long-standing partner of Schmid Schrauben Hainfeld, together with leading architects and engineers, the building achieves a balanced synthesis of form, structure and functionality.

A defining feature is the impressive timber structure, which delivers both its striking appearance and the high levels of load-bearing capacity and safety required. The precise planning and realisation of this complex system were supported by Ramboll, whose engineering expertise enabled the accurate design of the curved and intersecting timber elements.

For this landmark project, WIEHAG supplied around 6,000 m³ of glulam, including 3,600 m³ for columns and beams and 2,400 m³ for roof and ceiling components. The largest beams reach lengths of up to 34 m, contributing to the expansive, open interior spaces.

Alongside the exhibition areas, the World of Volvo also accommodates event spaces and culinary offerings, creating a versatile environment for visitors. RAPID® screws ensured the structural performance required for the demanding timber connections throughout the building.

Photos © WIEHAG Holding GmbH

Facts & Figures:

Customer:
AB Volvo and Volvo Cars

Architect:
Henning Larsen

Location:
Schweden

Holzdachkonstruktion und -technik:
WIEHAG GmbH

Completion:
2023

Responsibility for the future

OUR MISSION

At Schmid Schrauben Hainfeld, we combine high-quality products with sustainable production. We are actively committed to initiatives that improve our sustainability and take responsibility for climate protection – with the aim of significantly reducing our CO_2 emissions and securing a sustainable future.

SUSTAINABLE PROCUREMENT

A product is only as sustainable as its components. Our supplier code of conduct ensures ecological, social and ethical standards. We rely on 'green steel' – 99% of our suppliers are based in Europe, 68% of them in Austria.

EMISSIONS ANALYSIS & EMISSIONS REDUCTION

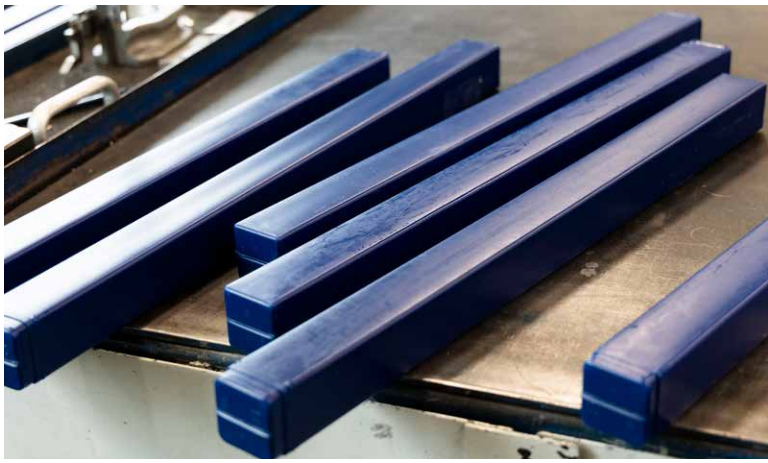
We analyse our CO2 emissions to identify the main sources and reduce them in a targeted manner. Through energy efficiency, 100% electricity from renewable sources and our 700 kWp photovoltaic system, we optimise energy consumption in production and in the office.

RESOURCE EFFICIENCY

We promote recycling, reuse and water conservation in our processes. Compensation basins reduce cooling water requirements by up to 300 m³ per day, heat pumps use waste heat from furnaces for heating, and our reverse osmosis system reduces detergent requirements by 6 tonnes per year. We are continuously converting our vehicle fleet to electric cars.

SUSTAINABLE PACKAGING

Over 95% of our product and transport packaging is made of cardboard – even the filling material comes from recycled cardboard. For our extra-long RAPID® FT screws, we use reusable plastic sleeves, which are recycled and reused thanks to a take-back cooperation with our customers.



BIODIVERSITY

We promote biodiversity in our courtyard by planting native species, providing nesting sites and avoiding the use of pesticides. Invasive neophytes are removed at an early stage, green areas are rarely mowed and parking areas are designed to be as natural as possible with grass pavers.

Environmental Product Declaration

Our first EPD (Environmental Product Declaration) was published in 2024. An EPD is a standardised and transparent document that provides comprehensive information about the environmental impact of a product throughout its entire life cycle, from raw material extraction and manufacturing to use and disposal.

An EPD enables planning and architecture firms as well as construction companies to make informed decisions based on reliable and verified data in order to realise more environmentally friendly projects.

EPD Hub

> Transparency and credibility: Detailed environmental information allows users to know exactly what impact the product has on the environment.
> Optimisation of the ecological footprint: EPD data helps users to assess and minimise the ecological footprint of their construction projects.
> Access to sustainable building certificates: Building certifications such as LEED or DGNB often require EPDs for the materials used.
> Competitive advantage: Construction companies that use EPD-certified products can clearly differentiate themselves in the market and benefit from subsidy programmes for sustainable construction.

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EXPERIENCE
We have been specialists in the manufacture of timber construction screws for over 180 years.

SUSTAINABILITY
We take care of our environment and manufacture according to ISO 14001 and ISO 50001.

EPD HUB
The environmental impact of our screws is documented throughout their entire life cycle.

CUSTOMISED SOLUTIONS
We manufacture screws exactly according to your wishes.

SPECIAL HARDENING
Our screws are viscoplastic and bendable by at least 45° - elastic and highstrength.

SERVICE ORIENTATION
Whether with calculations, expertise or experience - we are there for our customers.

STATICS
Our screws have above-average mechanical values for pull-out and head pull-through.

SAFETY
Our screws are approved according to ETA 12/0373 and ICC-ESR-4549.

HIGHEST QUALITY
We manufacture according to ISO 9001 and are externally monitored by Holzforschung Austria.

Photo © WIEHAG photographer James Silverman

Schmid Schrauben Hainfeld GmbH
Landstal 10 | A-3170 Hainfeld | T +43 (0)2764 2652 | E info@schrauben.at