Technical Information - Timber Construction

Bulk Density Wood	Needle Wood	Glued Laminated Timber
290	C 14	
330	C 20	
350	C 24	
365		Gl24c
380	C 30	
385		Gl24h
390		Gl28c
400	C 35	Gl32c
425		Gl28h
440		Gl32h

ρk = Mass (kg) : Volume m^3

C = Coniferous tree

GL = Glue lam timber

The aim of the innovative SIHGA® developments is to increase the efficiency of building with wood through modern mechanical fastenings. The load-bearing capacity and deformation behaviour of the fastenings have a critical impact on building designs.
The unique quality of wood as a building material requires the greatest attention to connections and fastenings. For a simple overview of the strength classes of the various woods, please see the above table for the raw density rk with the allocated designations.

Category of exposure time	Order of magnitude	Examples	Use category 1 + 2 k_{mod}
Permanent	Longer than 10 years	Tare weight	0.6
Long	6 months to 10 years	Stored material in factories	0.7
Mean	1 week to 6 months	Payloads in residential buildings, snow > 1,000 masl	0.8
Short	Shorter than 1 week	Snow ≤ 1,000 masl	0.9
Very short	Shorter than 1 minute	Impact and earthquakes	1.1

As a result of the new standard Eurocode 5 and the introduced evidence concept with help from partial safety factors, wood construction is confronted with various values and calculation formulas. On one hand, the effects are increased with certain partial safety factors, and on the other hand the load-bearing capacity (or resistance) of the material and fastenings are reduced with other partial safety factors.
For this, SIHGA® offers pre-calculation for the respective load in various raw densities and wood qualities.

The characteristic values shown in the SIHGA® tables must be further calculated using the following equation:

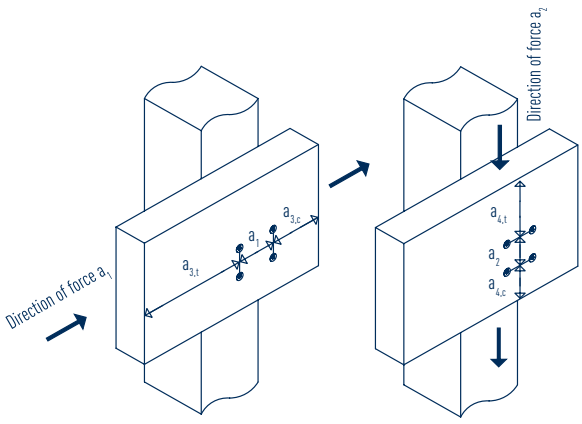
R_d Calculation or design value

k_{mod} Modification factor, influence of the load exposure period and usage class

γ_M Partial safety factors for construction material properties (EC 5 recommends γ_M = 1.3 for connections)

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

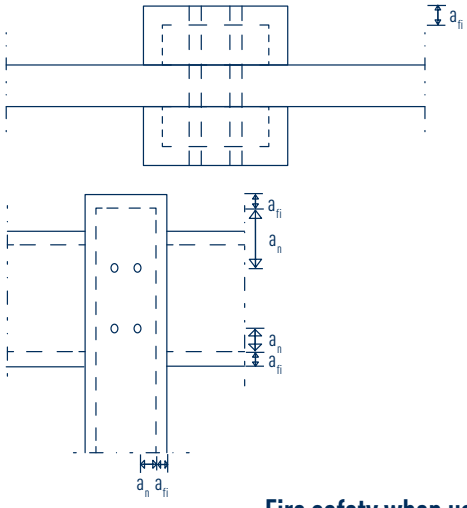
Edge and Axial Distances



Edge and Axial Distances		Not Pre-Drilled	Pre-Drilled/ Drill Bit
Distance a		[mm]	[mm]
a_1	parallel to the grain	12 d	5 d
$a_{3,t}$	stressed end-cut timber	15 d	12 d
$a_{3,c}$	unstressed end-cut timber	10 d	7 d
a_2	perpendicular to the grain	5 d	4 d
$a_{4,t}$	stressed edge	10 d	7 d
$a_{4,c}$	unstressed edge	5 d	3 d

d... Screw diameter

Fire Protection

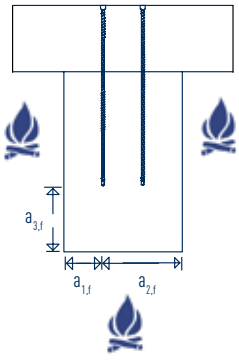


Fire protection for constructive screw connections

In the Event of a Fire	Screws on Shearing		Screws on Pull Out[2]		
	BSH	Solid Wood			
	a_{fi} [mm]	a_{fi} [mm]	$a_{1,f}$ [mm]	$a_{2,f}$ [mm]	$a_{3,f}$ [mm]
R 30	16	18	29	69	49
R 60	48[1]	54[1]	53	93	73

[1] protected with a glued wooden dowel
[2] protected against direct fire stress
Minimum distances at normal temperature do not lose their validity
Calculation according to EN 1995-1-2
a_n...edge and centre distances at normal temperature
— Burnout cross section

Fire safety when using HobaFix® HF



	Secondary Beam				Main Beam	
	R 30		R 60		R 30	R 60
HobaFix® HF	Width [mm]	Height [mm] [1]	Width [mm]	Height [mm] [1]	Height [mm] [1]	Height [mm] [1]
70	88	126,5	136	150,5	98	124
100	108	159	156	183	128	154
135	108	192	156	216	163	189
170	108	228	156	252	198	224
200	128	261	176	285	228	254
240	128	301	176	325	268	294

[1] flush installation on the upper edge and three-sided strip
Calculation according to EN 1995-1-2
Shear load is to be validated separately

Stressing of Anchors on Shear Force

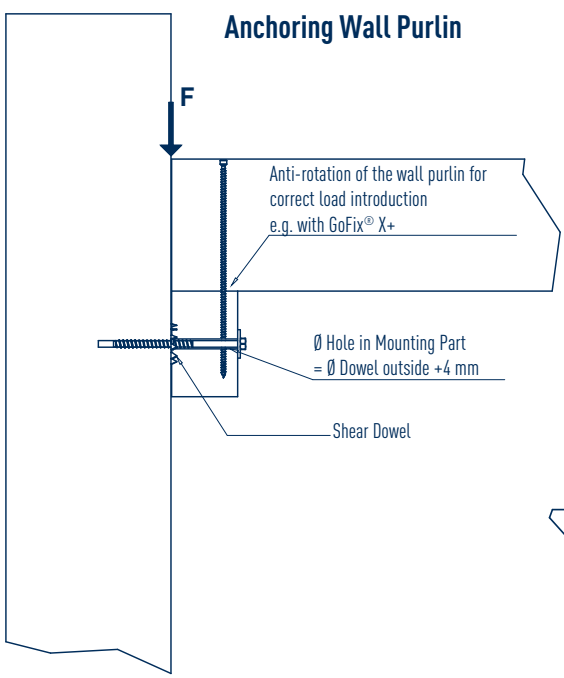
For anchorages of timber beams in concrete or masonry subjected to shear force, EN 1992-4:2018 stipulates that a lever arm must be considered. This means that the anchor is not only stressed by shearing but also by bending. This component is usually decisive and results in the anchor having only a fraction of its actual shear resistance.

In order to utilise the full shear force bearing capacity of the anchor, it is possible to insert a single-sided shear dowel type C, whose nominal diameter is equal to the nominal diameter of the anchor, between the fixture and the concrete, so that the entire shear force is introduced into the anchor via the shear dowel. This applies to anchors of all types and manufacturers, whether glued, screwed or driven in.

For the correct load introduction in the shear joint, sufficient stiffness or anti-twist protection is necessary.

Furthermore, the attachment part must have a sufficiently large hole to ensure that the hole soffit of the disc anchor lies securely on the anchor.

Anchoring Wall Purlin



Anchoring Sleeper Wood