Load tables for a transport anchor system
with Würth *ASSY*® 4 Combi self-tapping screws
d = 12 mm as defined under ETA-11/0190:2018

Threaded length lg = 60 mm

Transport anchor system with the ASSY 4 Combi self-tapping screw and DEHA universal coupling, load group 1-1.3

General information

The load tables are nonbinding design aids. The load values must be reduced for shorter screw-in depths and threaded lengths.

The specifications in the European Technical Approval and in the expertise must be observed. The load bearing capacity of the transport system depends on many factors, e.g. hoist, fastening type, and properties of the transported element.

The DEHA universal coupling, load group 1-1.3, or the BGW ball head lifter can be used as the load bearing equipment. The operating instructions issued by the manufacturers must be observed. When subjected to inclined loads, the wood can be provided with a cutout that serves to reroute the horizontal components of the force directly into the wood. The screws can be driven into both undrilled and drilled wood components. In the latter case, the diameter of the drilled hole must correspond to the specifications in the ETA.

The wood components must be at least 80 mm thick.

The minimum distances of the screws, specifically from the edges of the wood, must be observed.
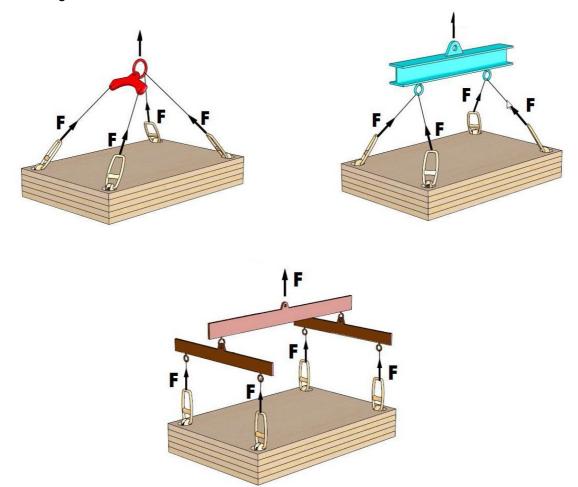
These loads, however, can swing when suspended from a crane. It is recommended to multiply the forces acting on the transport anchor system by the specified dynamic coefficients φ .

Recommended coefficients φ

Lifting device	Lifting speed	Dynamic coefficient φ
Stationary crane, rotary crane Rail crane	< 90 m/min	1.10
Stationary crane, rotary crane Rail crane	$\geq$ 90 m/min	1.30
Lifting and transporting on level ground		1.65
Lifting and transporting on		2.00

The number of anchors n defines the suspension gear used. Suspension gear consisting of more than three lines is always statically undefined when suitable measures do not distribute the load uniformly over all three.
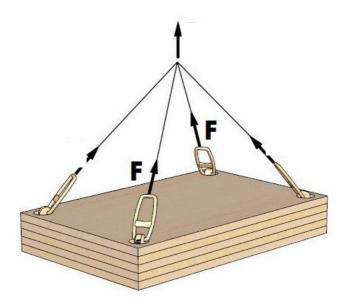
The whole component should be secured with at least two self-tapping screws. However, it must be ensured that the screws are not driven into shrinkage cracks or similar.
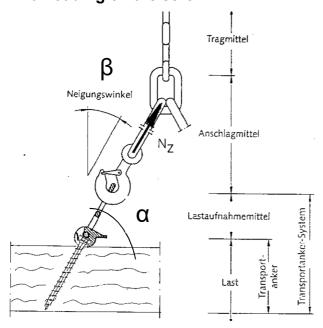

Spreader beam (n = 4)

In the case of statically undefined suspension gear, BGR 500 (Section 2.8) stipulates that the anchors' dimensions must allow two of them to carry the entire load. The loads at the anchor sites must be calculated from the triangle of forces. For safety reasons, the screws may only be used **once**.

Statically undefined suspension gear (n = 2)

Fastening variant 1

Axial loading on the screw

Transport anchor under axial tensile load

Fastening variant "axial loading on screw"

Würth *ASSY*® 4 Combi d = 12 mm, threaded length 60 mm

Attached to solid structural timber, glued laminated timber or to the side of cross-laminated timber

Characteristic density ρ_k =350 kg/m³

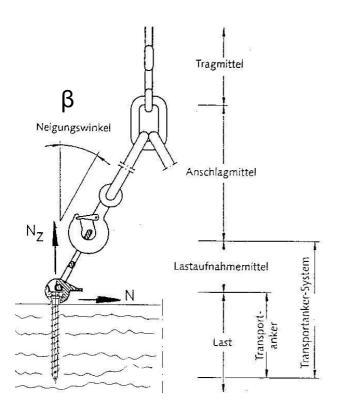| α	$F_{ax,Rk}$	N_z	Load per attachment point				
°	in kN	in kN	kg				
			$\varphi = 1.0$	$\varphi = 1.10$	$\varphi = 1.30$	$\varphi = 1.65$	$\varphi = 2.00$
90	7.2	3.69	369	336	284	224	185
85	7.2	3.69	368	334	283	223	184
80	7.2	3.69	364	331	280	220	182
75	7.2	3.69	357	324	274	216	178
70	7.2	3.69	347	315	267	210	173
65	7.2	3.69	335	304	257	203	167
60	7.2	3.69	320	291	246	194	160
55	7.2	3.69	302	275	233	183	151
50	7.2	3.69	283	257	218	171	141
45	7.2	3.69	261	237	201	158	131
40	6.6	3.41	219	199	168	133	109
35	6.1	3.12	179	163	138	108	89
30	5.5	2.83	142	129	109	86	71

Assumptions: Characteristic density ρk =350 kg/m³
The thread is anchored completely in the wood, without gaps in the component

The screws' anchoring depth in the face of cross-laminated timber must be at least 120 mm.
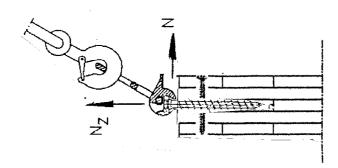
Fastening variant 2

Inclined loading on the screw

Transport anchor under inclined load

A force component acting perpendicular to the side may promote lateral tensile failure. Lateral tensile failure must be prevented by means of a reinforcement secured parallel to the face with full thread screws (see Figure below).

Full thread screws preventing lateral tensile failure in a cross-laminated timber element

Fastening variant "inclined tensile loading on screw"

Würth *ASSY*® 4 Combi d = 12 mm, threaded length 60 mm (10x100/60)

Anchoring depth of the screw in the timber t_1 = 90 mm

Attached to solid structural timber, glued laminated timber or to the side of cross-laminated timber

Characteristic density ρ_k =350 kg/m³

(angle between screw axis and direction of grain α = 90°)

β	F_{Ed}	N_{SZ}	Load per attachment point				
°	in kN	in kN	kg				
			φ = 1.00	φ = 1.10	φ = 1.30	φ = 1.65	φ = 2.00
0	4.98	3.69	369	336	284	224	185
5	4.98	3.69	367	334	282	223	184
10	4.95	3.66	361	328	278	219	180
15	4.90	3.63	351	319	270	213	175
20	4.85	3.59	337	307	259	204	169
25	4.78	3.54	321	292	247	194	160
30	4.70	3.48	302	274	232	183	151
35	4.62	3.42	280	255	216	170	140
40	4.54	3.36	258	234	198	156	129
45	4.46	3.30	234	212	180	142	117
50	4.39	3.25	209	190	161	127	104
55	4.32	3.20	183	167	141	111	92
60	4.25	3.15	158	143	121	95	79

Assumptions: **Characteristic density ρ_k =350 kg/m³**

The thread is anchored completely in the wood, without gaps in the component

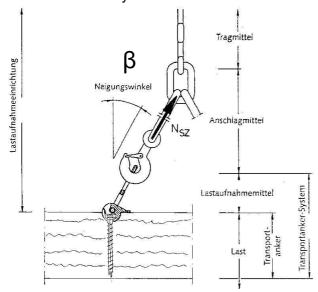**The screws' anchoring depth in the face of cross-laminated timber must be at least 120 mm.**

Fastening variant 3

Inclined loading on the screw with coupling head precision-fitted in cutout

When the coupling head of the load bearing equipment is **precision-fitted** in a cutout, it reroutes the horizontal force component of the inclined tensile load directly into the wood.

Transport anchor under inclined tensile load-coupling head of the load bearing equipment precision-fitted in a cutout

Fastening variant "inclined tensile loading on the screw with precision-fitted cutout"

Würth *ASSY*® 4 Combi d = 12 mm, threaded length 60 mm

Attached to solid structural timber, glued laminated timber or to the side of cross-laminated timber
Characteristic density ρ_k =350 kg/m³

(angle between screw axis and direction of grain α = 90°)

β	$F_{ax,Rd}$	N_z	Load per attachment point				
°	in kN	in kN	kg				
			φ =1.00	φ = 1.10	φ = 1.30	φ = 1.65	φ = 2.00
0 ÷ 60	4.98	3.69	369	336	284	224	185

Assumptions: Characteristic density ρk =350 kg/m³

The thread is anchored completely in the wood, without gaps in the component

The screws' anchoring depth in the face of cross-laminated timber must be at least 120 mm.