Specifications of the edge distances of wood screwings acc. to the wood construction standard.

In the following information sheet, you will find excerpts of the applicable wood construction standard 1052 (08:04) for the fastening of roof hooks and hanger bolts.

12.6 Connections with wood screws

(1) The regulations on connections with wood screws apply for the applications of wood screws with a thread acc. to DIN 7998 and a minimum nominal diameter of 4 mm. The utilization of different wood screws is admissible, if their suitability has been verified by an approval by the building authorities. The nominal diameter d corresponds to the external diameter of the screw thread.

(3) For wood screws with a thread acc. to DIN 7998 and d > 8 mm (screw diameter), the components that are to be connected have to be predrilled down to the depth of the unthreaded shank with the diameter of the shank and down to the engagement of the threaded part of the screw with a drill-diameter of 0.7 x d.

(10) As minimum distances between the wood screws in the wood and between the wood screws and the edges, the values according to chart 10 apply. The denominations are defined in picture 41.

Chart 10 - Minimum distances between nails

		1	2	3	4
			not pre-drilled		pre-drilled
			$\rho_k \leq 420 \text{ kg/m}^3$	$420 \text{ kg/m}^3 < \rho_k < 500 \text{ kg/m}^3$	
1	a_1	parallel to the direction of fiber	$d < 5$ mm: $(5 + 5 \cdot \cos \alpha) \cdot d$ $d \geq 5$ mm: $(5 + 7 \cdot \cos \alpha) \cdot d$	$(7 + 8 \cdot \cos \alpha) \cdot d$	$(3 + 2 \cdot \cos \alpha) \cdot d$
2	a_2	at right angle to the direction of fiber	$5 \cdot d$	$7 \cdot d$	$3 \cdot d$
3	$a_{1,t}$	loaded edge of the end-grain wood	$d < 5$ mm: $(7 + 5 \cos \alpha) \cdot d$ $d \geq 5$ mm: $(10 + 5 \cdot \cos \alpha) \cdot d$	$(15 + 5 \cdot \cos \alpha) \cdot d$	$(7 + 5 \cdot \cos \alpha) \cdot d$
4	$a_{1,c}$	unloaded edge of the end-grain wood	$d < 5$ mm: $7 \cdot d$ $d \geq 5$ mm: $10 \cdot d$	$15 \cdot d$	$7 \cdot d$
5	$a_{2,t}$	loaded edge	$d < 5$ mm: $(5 + 2 \cdot \sin \alpha) \cdot d$ $d \geq 5$ mm: $(5 + 5 \cdot \sin \alpha) \cdot d$	$d < 5$ mm: $(7 + 2 \cdot \sin \alpha) \cdot d$ $d \geq 5$ mm: $(7 + 5 \cdot \sin \alpha) \cdot d$	$(3 + 4 \cdot \sin \alpha) \cdot d$
6	$a_{2,c}$	unloaded edge	$5 \cdot d$	$7 \cdot d$	$3 \cdot d$

α is the angle between the direction of force and the direction of fiber

Chart10 Excerpt from the wood construction standard 1052 (08:04)

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Edge distances of wood screwings

RAL
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In case of wooden rafters in vertical direction, loaded edges have to be considered in the calculations (see drawing 41 a2,c), **the definition predrilled – not predrilled is important**, for a non-predrilled screwing that means 5 x d resp. 7 x d, and in case of a predrilled screwing, 3 x d (see examples).
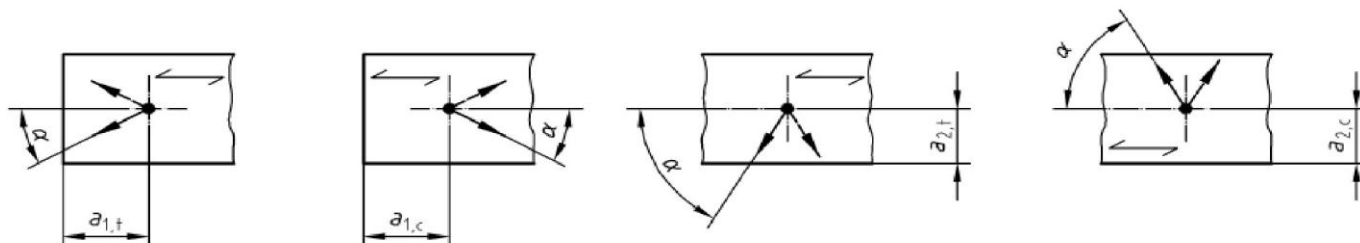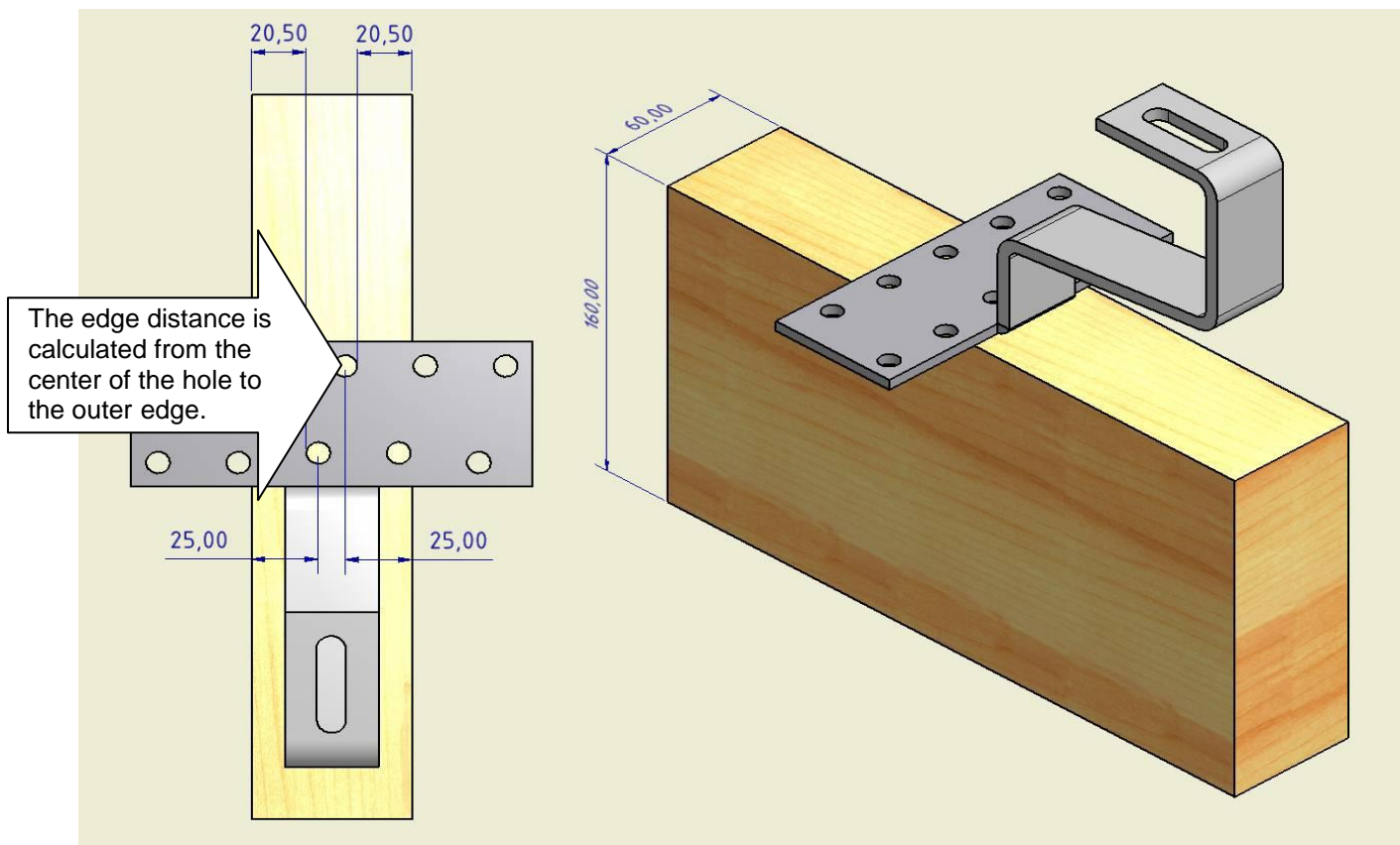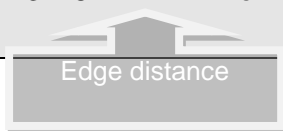

Picture 41 - Definition of the average connection distances

Picture 41 Excerpt from the wood construction standard 1052 (08:04)

Example 1: In case of a predrilled screw diameter of 8 mm and a vertical rafter, the following values have to be used for calculation:

a2, c unloaded edge 3 x d; → 3 x 8 = 24 mm from the hole center to the outer edge of the rafter (see picture)

Edge distance

The edge distance is calculated from the center of the hole to the outer edge.

Example 2: In case of a non-predrilled screw diameter of 8 mm and a vertical rafter, the following values have to be used for the calculation:

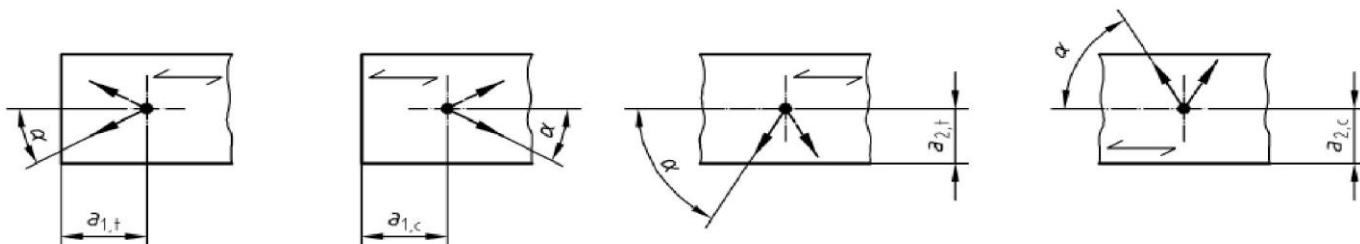## a2, c unloaded edge, classified according to type of wood pk = bulk density

(Bulk density pk <420 kg/m³ applies for solid wood C 24 and glued-laminated timber up to GI28h, which is used in most cases)

pk > 420 kg/m³	pk > 420 kg/m³ < pk > 500 kg/m³
5 x d	7 x d
5 x 8 = 40 mm	7 x 8 = 56 mm
Edge distance	Edge distance

In case of horizontal wood purlins, loaded edges have to be considered in the calculations (see drawing a², t), but also in this case, the definitions "predrilled" or "not predrilled" are important. It also has to be considered that the angle α used for calculation must not be bigger than 90°!

Picture 41 - Definition of the average connection distances

Picture 41 Excerpt from the wood construction standard 1052 (08:04)

Example 3: In case of predrilled screw diameters of 8 mm and horizontal purlins, the following values have to be used for the calculation:

(3 + 4 x sin α) x d; with sin 90° → (3 + 4 x sin 90°) x 8 = 56 mm

Edge distance

Example 4: In case of predrilled screw diameters of 8 mm and horizontal purlins, the following values have to be used for the calculation:

(Bulk density pk <420 kg/m³ applies for solid wood C 24 and glued-laminated timber up to GI28h, which is used in most cases)

pk > 420 kg/m³	pk > 420 kg/m³ < pk > 500 kg/m³
(5 + 5 x sin α) x d	(5 + 7 x sin α) x d
(5 + 5 x sin 90°) x 8 = 80 mm	(7 + 5 x sin 90°) x 8 = 96 mm
Edge distance	Edge distance

All values have been calculated on the basis of a screw diameter of 8 mm, in case of a bigger d, the distances also get bigger!

In case of wooden rafters or purlins smaller than 80 mm, it is definitely recommendable to predrill the wood in order to keep the edge distances.

If wood screws without a screw thread according to DIN 7998 are used, it has to be made sure that these screws are approved by the building authorities!