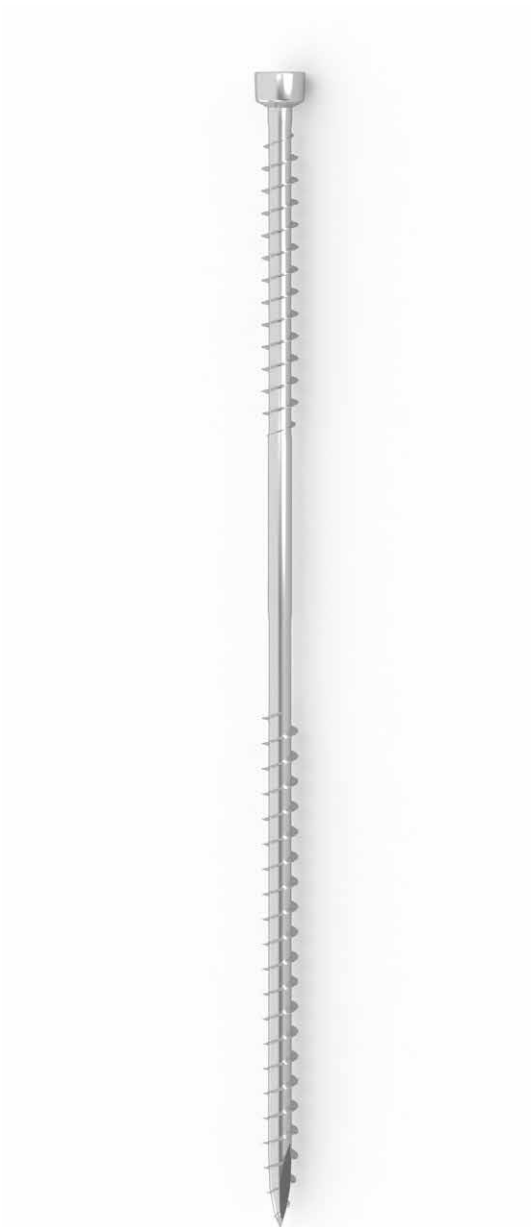
DGZ

DOUBLE THREADED SCREW FOR INSULATION

AC233 ESR-4645 | BIT INCLUDED | MY PROJECT SOFTWARE | ETA-11/0030



SUPERIOR STRENGTH

Steel with superb bending yield strength (minimum of F_{yb} = 1241 N/mm² | **180,000 psi**). Very high torsional strength $f_{tor,k}$ for safer screwing.

CONTINUOUS INSULATION

Connector for hard, soft and façade insulation. Available in two diameters 7,0 mm | **0.28 inch** and 9,0 mm | **0.36 inch** to optimize the number of fasteners. Allows continuous, uninterrupted fastening of roof insulation package. Prevents thermal bridges in compliance with energy saving regulations.

STRUCTURAL APPLICATIONS

Evaluated by ICC-ES according to Acceptance Criteria AC 233.

CHROMIUM (VI) FREE

Total absence of hexavalent chromium. Compliance with the strictest regulations governing chemical substances (SVHC).
REACH information available.

CHARACTERISTICS

FOCUS	insulation package fasteners	
HEAD	cylindrical, countersunk	
DIAMETER	7,0 | 9,0 mm	0.28 | 0.36 inch
LENGTH	from 220 to 520 mm	from 8 5/8 to 20 1/2 inches

MATERIAL

Bright zinc plated carbon steel.

FIELDS OF USE

- sawn lumber and timber
- Glued Laminated Timber
- CLT
- high density woods

Dry in-service conditions.

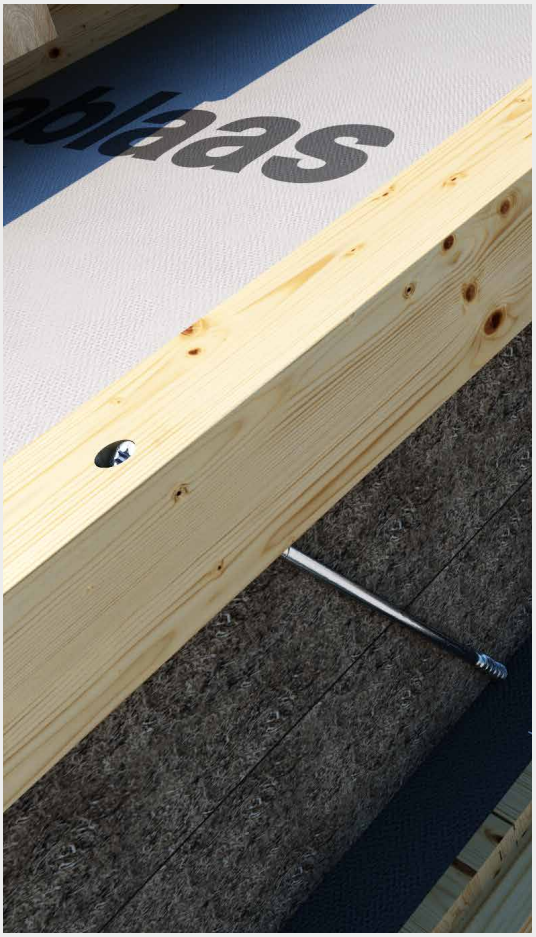
THERMAL BRIDGES

Thanks to the double thread, the roof insulation package can be fixed to the supporting structure without any interruptions, thus preventing thermal bridges. Certification specific for fastening on both hard and soft insulation.

VENTILATED FAÇADES

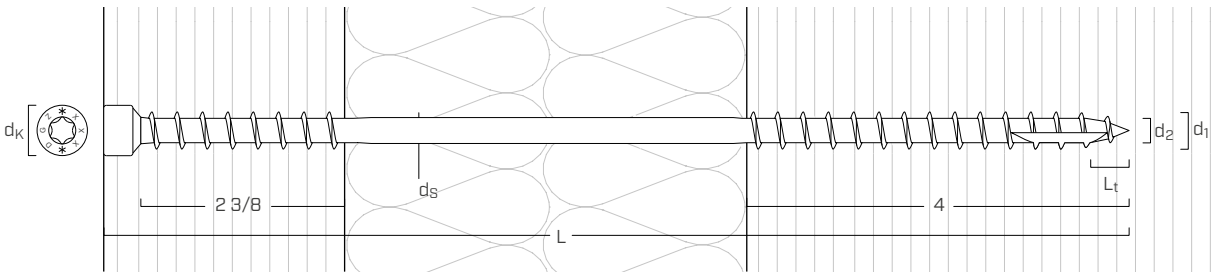
Also tested, certified and calculated on façade joists and with high density woods such as Microllam® LVL.

Fastening of hard insulation on a flat roof.



Ideal for fastening hard insulation, even of great thickness.

GEOMETRY AND MECHANICAL CHARACTERISTICS



Nominal diameter	d_1	[in](1)	0.28	0.36
Outer thread diameter	**d_1**	[mm]	7	9
		[in]	0.276	0.354
Head diameter	d_K	[in]	0.374	0.453
Root diameter	d_2	[in]	0.181	0.232
Shank diameter	d_S	[in]	0.197	0.256
Tip length	L_t	[in]	0.276	0.354
Bending yield strength(2)	$F_{y,b}$	[psi]	195,000	180,000
Tensile strength	f_{tens}	[lbf]	1750	2900

(1) The nominal diameter of the screw is converted into imperial units and rounded up to the nearest decimal point.
(2) Bending yield strengths are determined in accordance with ASTM F1575 using the root diameter d_2.

CODES AND DIMENSIONS

d_1 [mm] [in]	CODE	L [mm]	L [in]	pcs
7 **0.28** **TX 30**	**DGZ7220**	220	8 5/8	50
	DGZ7260	260	10 1/4	50
	DGZ7300	300	11 3/4	50
	DGZ7340	340	13 3/8	50
	DGZ7380	380	15	50

d_1 [mm] [in]	CODE	L [mm]	L [in]	pcs
9 **0.36** **TX 40**	**DGZ9240**	240	9 1/2	50
	DGZ9280	280	11	50
	DGZ9320	320	12 5/8	50
	DGZ9360	360	14 1/4	50
	DGZ9400	400	15 3/4	50
	DGZ9440	440	17 1/4	50
	DGZ9480	480	19	50
	DGZ9520	520	20 1/2	50

NOTES: upon request, EVO version is available.

SCREW SELECTION

MINIMUM SCREW LENGTH DGZ Ø7 | 0.28 inch

insulation + wooden planking thickness [in]	batten thickness(*) s = 1 3/16		s = 1 9/16		s = 2		s = 2 3/8		s = 3 1/8	
	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]
2 3/8	8 5/8	8 5/8	8 5/8	8 5/8	8 5/8	8 5/8	8 5/8	8 5/8	10 1/4	8 5/8
3 1/8	8 5/8	8 5/8	8 5/8	8 5/8	8 5/8	8 5/8	10 1/4	8 5/8	10 1/4	8 5/8
4	8 5/8	8 5/8	10 1/4	8 5/8	10 1/4	8 5/8	10 1/4	8 5/8	11 3/4	10 1/4
4 3/4	10 1/4	8 5/8	10 1/4	8 5/8	10 1/4	10 1/4	11 3/4	10 1/4	11 3/4	10 1/4
5 1/2	10 1/4	10 1/4	11 3/4	10 1/4	11 3/4	10 1/4	11 3/4	10 1/4	13 3/8	11 3/4
6 1/4	11 3/4	10 1/4	11 3/4	10 1/4	13 3/8	11 3/4	13 3/8	11 3/4	13 3/8	11 3/4
7 1/8	13 3/8	11 3/4	13 3/8	11 3/4	13 3/8	11 3/4	13 3/8	11 3/4	15	13 3/8
8	13 3/8	11 3/4	13 3/8	11 3/4	15	13 3/8	15	13 3/8	-	13 3/8
8 5/8	15	13 3/8	15	13 3/8	15	13 3/8	15	13 3/8	-	15
9 1/2	15	13 3/8	15	13 3/8	-	15	-	15	-	15
10 1/4	-	15	-	15	-	15	-	15	-	-
11	-	15	-	15	-	-	-	-	-	-

(*) Minimum batten thicknesses: DGZ Ø7 mm | **0.28 inch**: base = 50 mm | **2 inch**, height = 30 mm | **1 3/16 inch**.

MINIMUM SCREW LENGTH DGZ Ø9 | 0.36 inch

insulation + wooden planking thickness [in]	batten thickness(*) s = 1 3/6		s = 1 9/16		s = 2		s = 2 3/8		s = 3 1/8	
	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]	A DGZ at 60° L_{min} [in]	B DGZ at 90° L_{min} [in]
2 3/8	-	-	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2
3 1/8	-	-	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	11	9 1/2
4	-	-	9 1/2	9 1/2	9 1/2	9 1/2	11	9 1/2	11	9 1/2
4 3/4	-	-	11	9 1/2	11	9 1/2	11	9 1/2	12 5/8	11
5 1/2	-	-	11	9 1/2	12 5/8	11	12 5/8	11	12 5/8	11
6 1/4	-	-	12 5/8	11	12 5/8	11	12 5/8	11	14 1/4	12 5/8
7 1/8	-	-	12 5/8	11	14 1/4	12 5/8	14 1/4	12 5/8	15 3/4	12 5/8
8	-	-	14 1/4	12 5/8	14 1/4	12 5/8	15 3/4	12 5/8	15 3/4	14 1/4
8 5/8	-	-	15 3/4	12 5/8	15 3/4	14 1/4	15 3/4	14 1/4	17 1/4	14 1/4
9 1/2	-	-	15 3/4	14 1/4	15 3/4	14 1/4	17 1/4	14 1/4	17 1/4	15 3/4
10 1/4	-	-	17 1/4	14 1/4	17 1/4	15 3/4	17 1/4	15 3/4	19	15 3/4
11	-	-	17 1/4	15 3/4	19	15 3/4	19	15 3/4	19	17 1/4
11 3/4	-	-	19	15 3/4	19	17 1/4	19	17 1/4	20 1/2	17 1/4
12 5/8	-	-	20 1/2	17 1/4	20 1/2	17 1/4	20 1/2	19	20 1/2	19
13 3/8	-	-	20 1/2	19	20 1/2	19	-	-	-	-

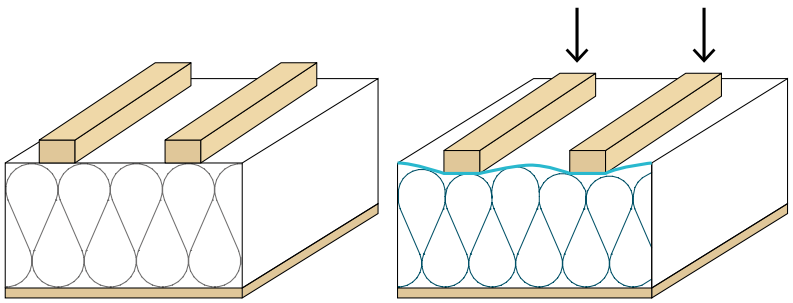
(*) Minimum batten thicknesses: DGZ Ø9 mm | **0.36 inch**: base = 60 mm | **2 3/8 inch**, height = 40 mm | **1 9/16 inch**.

NOTE: check that the screw tip does not stick out from the rafter.

FASTENINGS FOR CONTINUOUS INSULATION

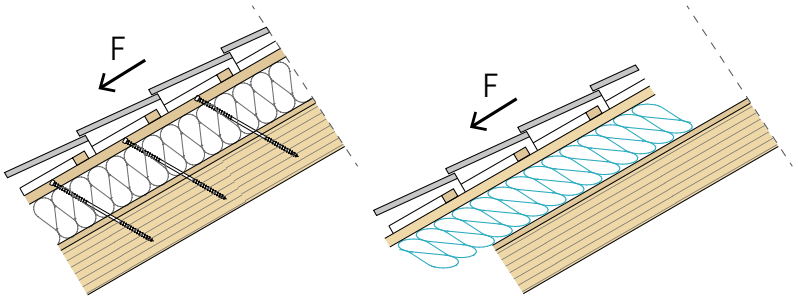
Installation of a continuous layer of insulation guarantees excellent energy performance, eliminating thermal bridges. Efficacy is limited by the proper use of appropriate fastening systems, calculated correctly.

CRUSHING OF THE INSULATION



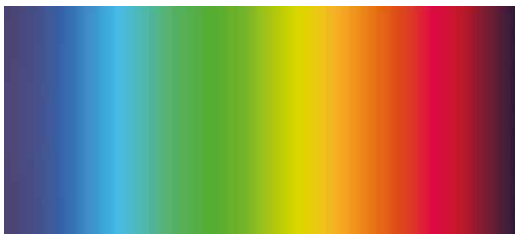
Crushing of the insulation (for very heavy loads) leads to a reduction in the ventilation chamber. As a result, aeration in the hollow space, and thus its efficacy, is reduced.
Additionally, it is possible that the insulating power of the package is diminished, with the thickness being reduced after the crushing. To prevent this problem, it is necessary to verify that the compression resistance of the insulation σ (10%) is sufficient to resist the stresses in question. Alternatively, it is possible to place screws tilted in the two directions so that the load is entirely transferred by the connectors and does not deform the layer of insulation in any way.

SLIP OF THE INSULATION AND THE COATING



The load applied to the structure has a component parallel to the layer/façade which leads, if not restrained (for example through "type A" screws), to a possible shift in the external layers, causing probable damage to the cover surface and the insulating power. Clear thermal, aesthetic and waterproofing problems then result.

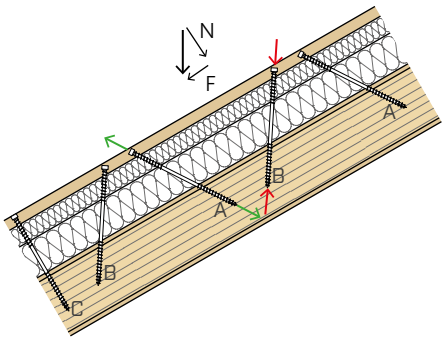
THERMAL BRIDGES



it is important that the insulation be continuous, without breaks or cracks, to optimise performance and minimise thermal bridges. Thermal bridges due to over frequent anchoring or those placed erroneously are also to be avoided.

COVER

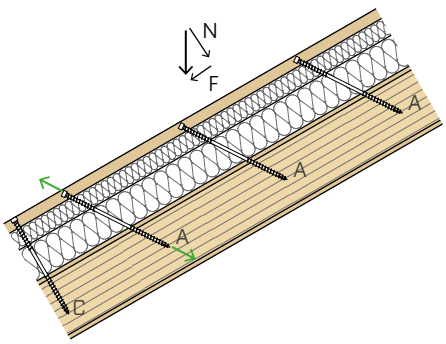
SOFT INSULATION



Low compression resistance

- the insulation does not support the load component perpendicular to the layer (N);
- screws are subject to tensile (A) and compression (B) stresses;
- for very high negative wind pressure loads, additional screws are inserted (C);
- adequate batten thickness makes it possible to optimise the number of fastenings.

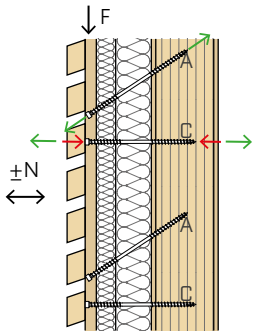
HARD INSULATION



High compression resistance

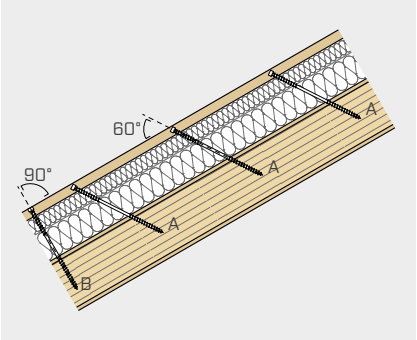
- the insulation supports the load component perpendicular to the layer (N);
- the screws are subject only to tensile stress (A);
- for very high negative wind pressure loads, additional screws are inserted (C);
- adequate batten thickness makes it possible to optimise the number of fastenings.

FAÇADE

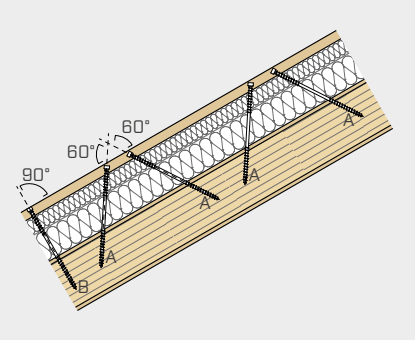


- the screws must support both positive and negative wind pressure loads (±N) and vertical forces (F);
- installation: one screw in tension(A) and one perpendicular to the façade (C), tense or compressed as a function of N, or screws inclined in the 2 directions;
- the screws (C) must support both the positive and negative wind pressure loads (±N) and are alternatively subjected to compression and tensile stresses.

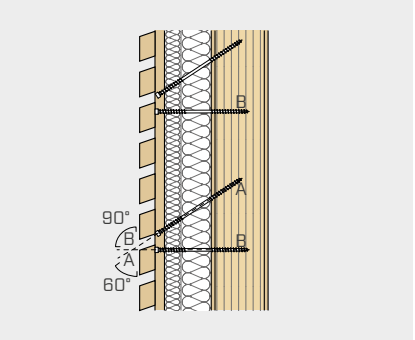
POSSIBLE CONFIGURATIONS



RIGID ROOF INSULATION



SOFT ROOF INSULATION

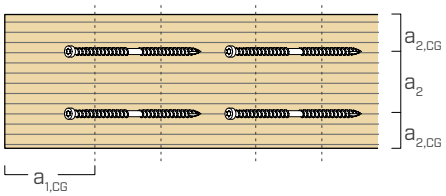


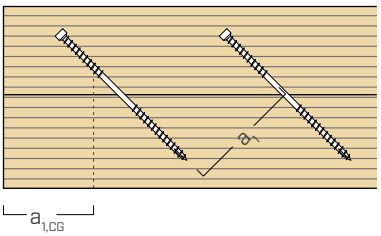
FACADE INSULATION

NOTE: The number and placement of the fastenings depends on the geometry of the surfaces, the type of insulation and the loads acting on them.

MINIMUM DISTANCES FOR AXIAL STRESSES

ESR-4645





			Screws inserted with and without pre-drilling hole **G ≤ 0.55**	
d_1	*[mm]*		*7*	*9*
	[in]		**0.28**	**0.36**
a_1	[mm]	**7·d**	1 15/16	2 1/2
a_2	[mm]	**4·d**	1 1/8	1 7/16
$a_{1,CG}$	[mm]	**10·d**	2 3/4	3 1/2
$a_{2,CG}$	[mm]	**4·d**	1 1/8	1 7/16

d = nominal screw diameter

NOTES:

- The minimum spacing and distances comply with Table 9 of ESR-4645, where d refers to the nominal diameter of the screw.
- Wood member stresses must be checked in accordance with Section 11.1.2 and Appendix E of the NDS, and end distances, edge distances and fastener spacing may need to be increased accordingly.

MINIMUM DISTANCES FOR AXIAL STRESSES

ETA-11/0030

			Screws inserted with and without pre-drilling hole **G ≤ 0.55**	
d_1	*[mm]*		*7*	*9*
	[in]		**0.28**	**0.36**
a_1	[mm]	**5·d**	1 3/8	1 3/4
a_2	[mm]	**5·d**	1 3/8	1 3/4
$a_{1,CG}$	[mm]	**10·d**	2 3/4	3 1/2
$a_{2,CG}$	[mm]	**4·d**	1 1/8	1 7/16

d = nominal screw diameter

NOTES:

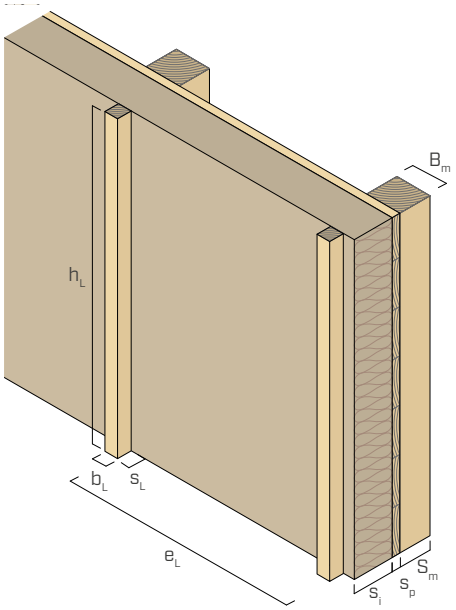
- The tabulated values for the minimum spacing and distances are according to the European Technical Assessment ETA-11/0030. The values from ETA-11/0030 are based on extensive research studies carried out in Europe and are according to the well-established provisions from EN 1995: 2014 (Eurocode 5). Designers may adopt, under their responsibility, the minimum spacing and distances from ETA-11/0030.

CALCULATION EXAMPLE OF THE DGZ SCREWS RESISTANCE ON THE FAÇADE – SOFT INSULATION

PROJECT DATA

FAÇADE LOADS		
Dead load	D_L	24 lbs/ft^2
Total dead load on the batten	F_{DL}	320 lbs
Wind load	LL	21 lbs/ft^2
Total wind suction	F_{LL}	280 lbs

INSULATION PACKAGE FIGURES		
Structural member	B_m x S_m	3 1/2 in x 3 1/2 in
Sheathing	S_p	0.629 in
Thickness of the insulation	S_i	4 3/4 in
Compression resistance (SOFT)	σ(10%)	3.5 psi
Battens	b_L x s_L	2 1/2 in x 1 1/2 in
Spacing between battens	e_L	15 15/16 in
Length of battens	h_L	10 ft

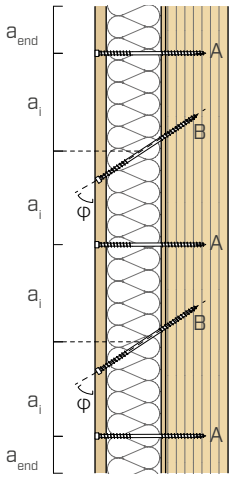


CONNECTOR SELECTION

HORIZONTAL SCREWS - DGZ Ø7		
Thread diameter of the screw	d_1	0.28 in
Length of the screw	L	8 5/8 in

INCLINED SCREWS - DGZ Ø7		
Thread diameter of the screw	d_1	0.28 in
Length of the screw	L	10 1/4 in
Angle to the vertical	φ	60°

DISTRIBUTION OF THE SCREWS		
End distance	a_{end}	4 in
Spacing between connectors	a_i	18 11/16 in



NOTES:

- It is adviced to place at least 2 perpendicular screws to withstand compression and/or tension forces. The screws can be located at the ends of the batten to install the inclined screws more easily. If more than 2 perpendicular screws are required, arrange the screws to create a truss layout (see picture).