# DGZ

ELC-4645 ESR-4645 UKTA-0836 22/6195 ETA-11/0030

## DOUBLE THREADED SCREW FOR INSULATION

### CONTINUOUS INSULATION

Allows continuous, uninterrupted fastening of roof insulation package. Limits thermal bridges in compliance with energy saving regulations. The cylindrical head is ideal for hidden insertion in the batten. Screw also certified in versions with flange head (DGT) and countersunk head (DGS).

### CERTIFICATION

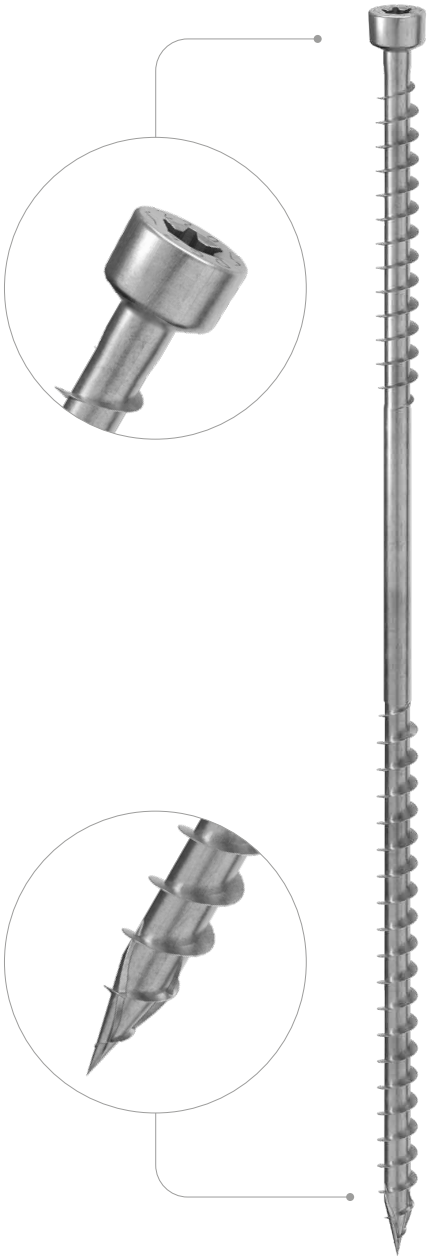
Connector for hard and soft insulation, for roofing and façade applications, CE certified according to ETA-11/0030. Available in two diameters (0.16 and 0.18 inch) to optimize the number of fasteners.

### MYPROJECT

Free MyProject software for customized fastening calculation, accompanied by a calculation report.

### 3 THORNS TIP

Thanks to the 3 THORNS tip, minimum installation distances are reduced. More screws can be used in less space and larger screws in smaller elements. Costs and time for project implementation are reduced.



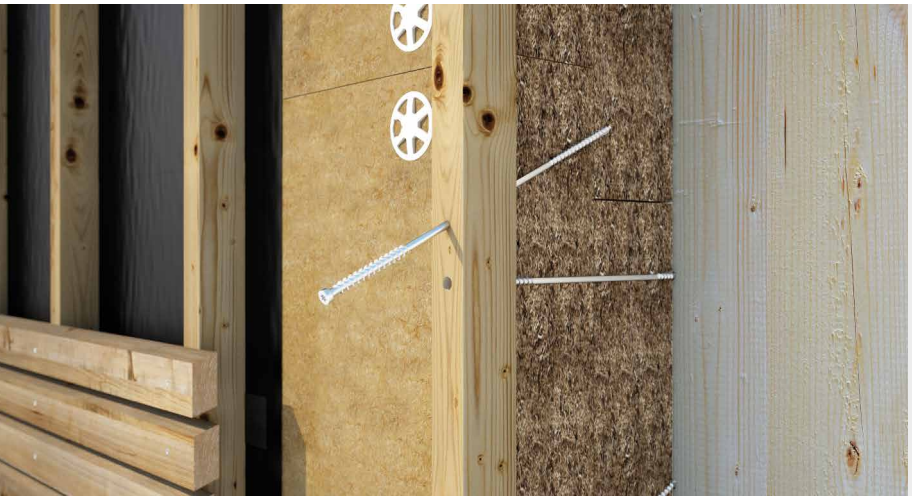
MY PROJECT SOFTWARE

BIT INCLUDED

| | | | | | | |
|---|---|---|---|---|---|---|
| **DIAMETER** [in] | 0.24 | | **0.28** | **0.36** | | 0.36 |
| **LENGTH** [in] | 3 1/8 | | | **8 5/8** | **20 1/2** | 20 1/2 |
| **EXPOSURE CONDITION** | **EC1** | **DRY** | | | | |
| **ATMOSPHERIC CORROSIVITY** | **C1** | **C2** | | | | |
| **WOOD CORROSIVITY** | T1 | T2 | | | | |
| **MATERIAL** | **Zn** ELECTRO PLATED | electrogalvanized carbon steel | | | | |


## FIELDS OF USE

- timber based panels
- solid timber
- glulam (Glued Laminated Timber)
- CLT, LVL
- engineered timbers

## THERMAL BRIDGES

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

## VENTILATED FAÇADES

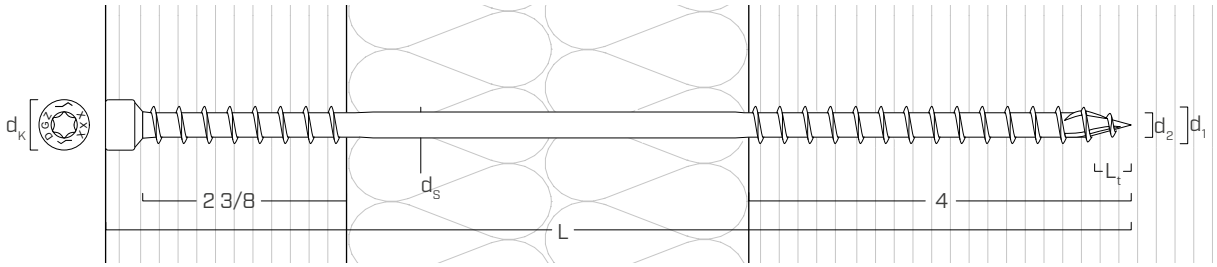
Also tested, certified and calculated on façade joists and with engineered woods such as LVL, Plywood or other laminated veneer products.

## CODES AND DIMENSIONS

| $d_1$ [mm] [in] | CODE | L [mm] | L [in] | pcs |
|---|---|---|---|---|
| 7 **0.28** #16 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 |

## GEOMETRY AND MECHANICAL CHARACTERISTICS




### GEOMETRY

| **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 |

(1) The nominal diameter of the screw is converted into imperial units and rounded up to the nearest decimal point.

### MECHANICAL PARAMETERS

| **Nominal diameter** | $d_1$ | [in] | 0.28 | 0.36 |
|---|---|---|---|---|
| Tensile strength (allowable) | $f_{tens}$ | [lbf] | 1750 | 2900 |
| Bending yield strength (specified) | $F_{y,b}$ | [psi] | 195000 | 180000 |

| **Nominal diameter** | $d_1$ | [in] | | 0.28 | 0.36 |
|---|---|---|---|---|---|
| Withdrawal (design value) | $W_{90}$ | [lbf/in] | G = 0.35 | 141 | 192 |
| | | | G = 0.42 | 164 | 220 |
| | | | G = 0.49 | 185 | 255 |
| | | | G = 0.55 | 203 | 280 |
| minimum embedded length | | [in] | | 1 5/8 | 2 1/8 |
| Head pull-through (design value) | $W_H$ | [lbf] | G = 0.35 | 191 | 196 |
| | | | G = 0.42 | 220 | 225 |
| | | | G = 0.49 | 248 | 253 |
| | | | G = 0.55 | 270 | 277 |
| minimum side member thickness | | [in] | | 1 1/2 | 1 1/2 |

## SCREW SELECTION

### MINIMUM SCREW LENGTH DGZ 0.28 inch (7 mm)

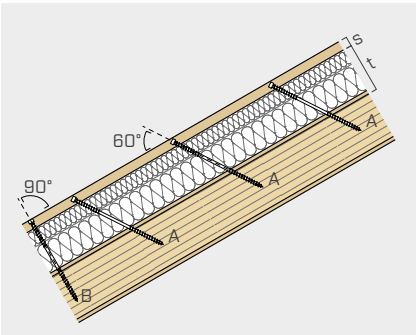
| insulation + wooden planking thickness | batten thickness(*) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | s = 1 3/16 | | s = 1 9/16 | | s = 2 | | s = 2 3/8 | | s = 3 1/8 | |
| | A DGZ at 60° | B DGZ at 90° | A DGZ at 60° | B DGZ at 90° | A DGZ at 60° | B DGZ at 90° | A DGZ at 60° | B DGZ at 90° | A DGZ at 60° | B DGZ at 90° |
| t [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [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 dimensions: DGZ 0.28 inch (7 mm): base = 2 inch (50 mm), height = 1 3/16 inch (30 mm).

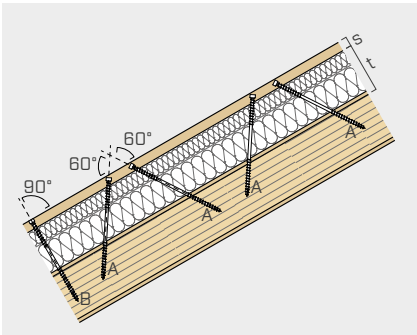
### MINIMUM SCREW LENGTH DGZ 0.36 inch (9 mm)

| insulation + wooden planking thickness | batten thickness(*) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | s = 1 3/6 | | s = 1 9/16 | | s = 2 | | s = 2 3/8 | | s = 3 1/8 | |
| | A DGZ at 60° | B DGZ at 90° | A DGZ at 60° | B DGZ at 90° | A DGZ at 60° | B DGZ at 90° | A DGZ at 60° | B DGZ at 90° | A DGZ at 60° | B DGZ at 90° |
| t [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [in] | $L_{min}$ [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 | - | - | - | - |

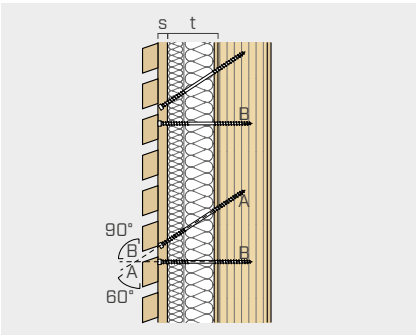
(*) Minimum batten dimensions: DGZ 0.36 inch (9 mm): base = 2 3/8 inch (60 mm), height = 1 9/16 inch (40 mm).




RIGID ROOF INSULATION




SOFT ROOF INSULATION




FACADE INSULATION

NOTES:

- Check that the screw length is compatible with the size of the structural wooden element and that the tip does not stick out from the rafter.
- The number and placement of the fastenings depends on the geometry of the surfaces, the type of insulation and the loads acting on them.

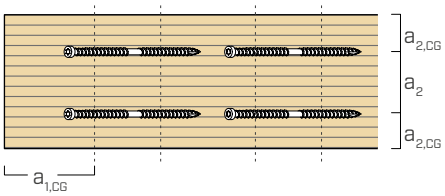
## MINIMUM DISTANCES FOR AXIAL STRESSES | TIMBER

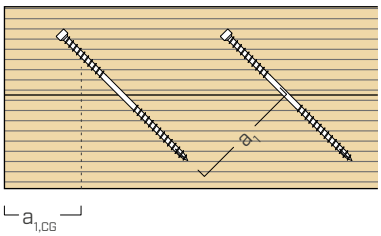
screws inserted **WITHOUT pre-drilled hole**

| $d_1$ | [in] | | 0.28 | 0.36 |
|---|---|---|---|---|
| | [mm] | | 7 | 9 |
| $a_1$ | [in] | **7·d** | 1 15/16 | 2 1/2 |
| $a_2$ | [in] | **4·d** | 1 1/8 | 1 7/16 |
| $a_{1,CG}$ | [in] | **10·d** | 2 3/4 | 3 1/2 |
| $a_{2,CG}$ | [in] | **4·d** | 1 1/8 | 1 7/16 |

screws inserted **WITH pre-drilled hole**

| $d_1$ | [in] | | 0.28 | 0.36 |
|---|---|---|---|---|
| | [mm] | | 7 | 9 |
| $a_1$ | [in] | **7·d** | 1 15/16 | 2 1/2 |
| $a_2$ | [in] | **3·d** | 13/16 | 1 1/16 |
| $a_{1,CG}$ | [in] | **7·d** | 1 15/16 | 2 1/2 |
| $a_{2,CG}$ | [in] | **3·d** | 13/16 | 1 1/16 |



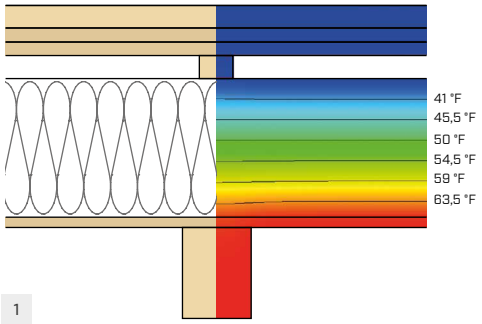

NOTES:

- 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.

# RESEARCH & DEVELOPMENT

## INSULATION AND INFLUENCE OF THERMAL BRIDGES

### CONTINUOUS INSULATION

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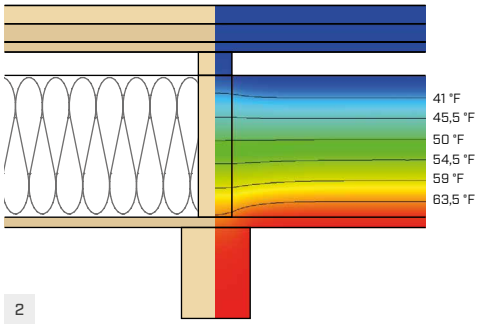
### INTERRUPTED INSULATION

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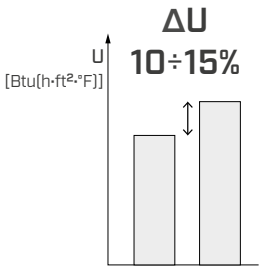
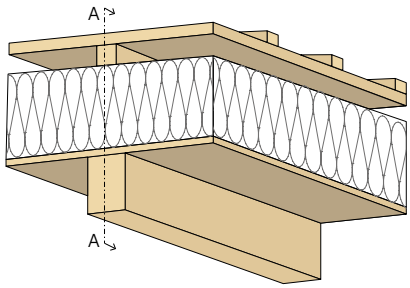
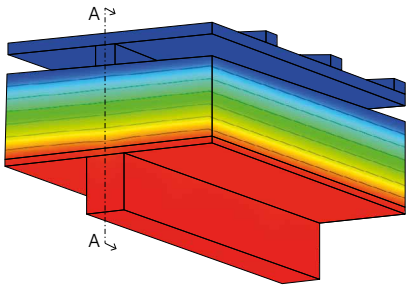
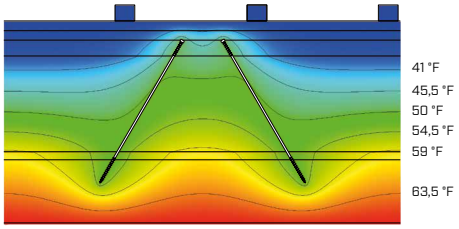



The use of continuous insulation helps to limit the presence of thermal bridges.
If the fastening of the package requires rigid elements within the insulation, there is a drop in thermal performance due to the presence of a thermal bridge distributed along the entire axis of the interposed secondary joists.
Moreover, in the case of interrupted insulation, local discontinuities between the elements present may be more frequent during installation, further aggravating the thermal bridge.

### FASTENING OF CONTINUOUS INSULATION WITH DGZ




Section A-A

The use of the DGZ screw allows the installation of continuous insulation, without interruptions and discontinuities.
In this case, the thermal bridge is localised and concentrated only at the connectors and therefore has an irrelevant contribution to the thermal performance of the package, which is therefore maintained.
Excessive anchoring or incorrect arrangements should be avoided in order not to compromise the thermal performance of the package.

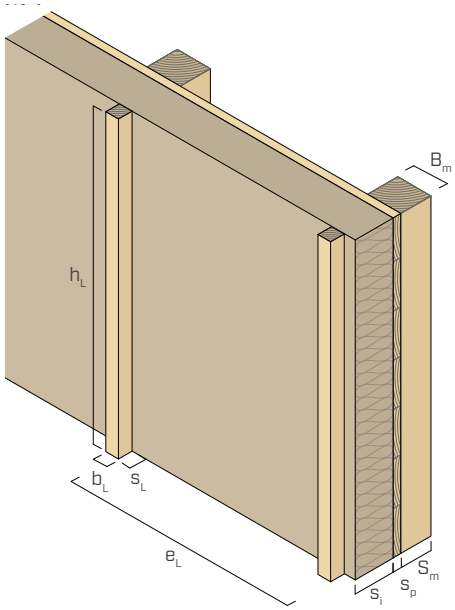
Calculation performed by EURAC Research as part of MEZeroE project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 953157.
For more info www.mezeroe.eu

# 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 |

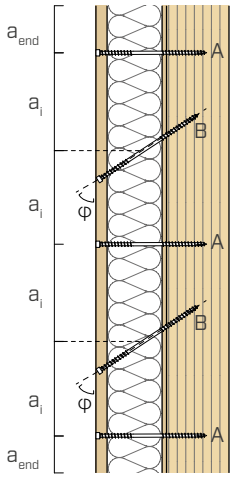



## CONNECTOR SELECTION

| HORIZONTAL SCREWS - DGZ Ø0.28 | | |
|---|---|---|
| Thread diameter of the screw | $d_1$ | 0.28 in |
| Length of the screw | L | 8 5/8 in |

| INCLINED SCREWS - DGZ Ø0.28 | | |
|---|---|---|
| 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).