

## WINDLOAD CALCULATION

UNI EN 1991-1-4/NA:2010

Created by: Ufficio tecnico Tecnaria - Tecnaria SPA

02 maggio 2024

CUSTOMER

CONTACT PERSON

PROJECT

### Disclaimer

Questa comunicazione comporta assunzione di responsabilità della nostra società per quanto da noi calcolato con solo riferimento alle caratteristiche meccaniche dei fissaggi da noi forniti. Non si assume alcuna responsabilità con riferimento alle altre componenti costituenti la copertura e alla modalità di realizzazione della stessa, essendo al di fuori del nostro controllo. Il progettista strutturale (o il direttore dei lavori) in qualità di tecnico abilitato dovrà redigere la relazione di calcolo strutturale firmata.

Questa nostra valutazione non può sostituire le capacità del tecnico di effettuare una valutazione critica dei risultati ottenuti e di scegliere le soluzioni più idonee alle varie situazioni specifiche.  
Il tecnico dovrà controllare la correttezza dei dati di calcolo della struttura.

Date: 02/05/2024

Customer:

Project:

Created by: Ufficio tecnico Tecnaria - Tecnaria SPA

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# Windload calculation

UNI EN 1991-1-4/NA:2010

|                                    |  |                           |    |                     |    |
|------------------------------------|--|---------------------------|----|---------------------|----|
| Date:                              | 02 mag 2024  |                           |    |                     |    |
| Customer:                          |  |                           |    |                     |    |
| Project:                           |  |                           |    |                     |    |
| Building height (m):               | 10.5   | Building length (m):      | 25 | Building width (m): | 40 |
| Type of roof:                      | Tetti piani $\leq 5^\circ$ , Normale o parapetto, Parapet height (mm): 500         |                           |    |                     |    |
| Type of roof deck:                 | Cemento C25  |                           |    |                     |    |
| Pressure coefficient (Cpi):        | Supporto a tenuta d'aria (Cpi=0,0)   |                           |    |                     |    |
| Type of terrain:                   | Italy classe di rugosità D   |                           |    |                     |    |
| Site location:                     | Scegli..., Italy (bologna, )   | Wind speed at site (m/s): | 25 |                     |    |
| Site related load factors:         | Altitude: 60m   Calt: 1,000   Co: 1,0   Cdir: 1,0   Cseason: 1,0   Cpe1   Cprob: 1 |                           |    |                     |    |
| Distance to sea (km):              | > 30 km  |                           |    |                     |    |
| Characteristic wind pressure (Qp): | 0,93 kN/m <sup>2</sup>   |                           |    |                     |    |
| Safety coefficient:                | elemento costruttivo secondario (YQ=1,25)  |                           |    |                     |    |

## Insulation board fixing

|                               |                               |                               |                               |                               |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Insulation board type:        | PIR                           |                               |                               |                               |
| Insulation board size (m):    | 1,2x1,2                       |                               |                               |                               |
| Insulation thickness (mm):    | 120                           |                               |                               |                               |
| Insulation old build up (mm): | 0                             |                               |                               |                               |
| Fastener methodology:         | Linee guida produttore        |                               |                               |                               |
|                               | Corner                        | Perimeter                     | Field                         | Inner field                   |
| Total area (sqm)              | 71                            | 185                           | 669                           | 76                            |
| Wtot (kN/sqm)                 | 2,35                          | 1,88                          | 1,40                          | 0,23                          |
| Plate/Tube                    | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   |
| Fastener                      | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) |
| Design load (N/pc):           | 450N                          | 450N                          | 450N                          | 450N                          |
| Fasteners/sqm (pcs)           | 2,08                          | 2,08                          | 2,08                          | 2,08                          |
| Fasteners/board (pcs)         | 3                             | 3                             | 3                             | 3                             |
| Number of fixings (pcs)       | 148                           | 386                           | 1394                          | 159                           |

Fixings summary (pcs): 2087

## Roof membrane fixing

|                                       |                               |                               |                               |                               |
|---------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|                                       | Corner                        | Perimeter                     | Field                         | Inner field                   |
| Total area / Est. membrane area (sqm) | 71 / 78                       | 185 / 204                     | 669 / 736                     | 76 / 84                       |
| Cpe                                   | 2,02                          | 1,62                          | 1,20                          | 0,20                          |
| Wtot (kN/m <sup>2</sup> )             | 2,35                          | 1,88                          | 1,40                          | 0,23                          |
| Membrane:                             | Bitumen membrane 1,0mtr       | Bitumen membrane 1,0mtr       | Bitumen membrane 1,0mtr       | Bitumen membrane 1,0mtr       |
| Plate/Tube:                           | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   |
| Fastener:                             | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) |
| Design load (N/pc):                   | 450N                          | 450N                          | 450N                          | 450N                          |
| Fasteners/sqm (pcs):                  | 5,22                          | 4,19                          | 3,10                          | 1,39                          |
| Distance between fastener rows (mm):  | 900                           | 900                           | 900                           | 900                           |
| Fastener CC dist. (mm):               | 213                           | 265                           | 358                           | 800                           |
| Number of fixings (pcs):              | 371                           | 775                           | 2076                          | 106                           |

Fixings summary (pcs): 3328

## Linear perimeter and upstand fixing

|                                |     |
|--------------------------------|-----|
| Method:                        | -   |
| Total perimeter length (m):    | 130 |
| Total number of fixings (pcs): | 0   |

Date: 02/05/2024

Customer:

Project:

Created by: Ufficio tecnico Tecnarìa - Tecnarìa SPA





, E-mail: tecnico@tecnaria.com

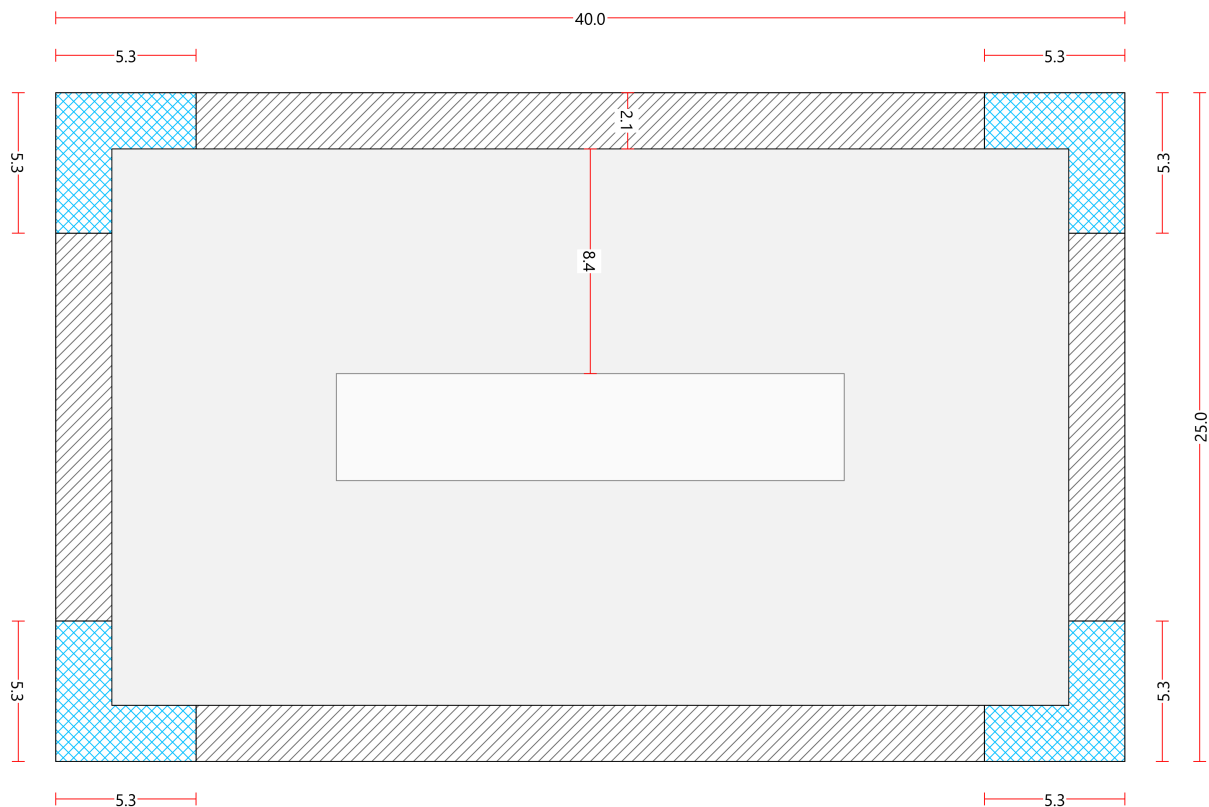
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## Roof plan - Membrane fixing pattern

|           |             |
|-----------|-------------|
| Date:     | 02 mag 2024 |
| Customer: |             |
| Project:  |             |

|                                       | Corner                        | Perimeter                     | Field                         | Inner field                   |
|---------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Total area / Est. membrane area (sqm) | 71 / 78                       | 185 / 204                     | 669 / 736                     | 76 / 84                       |
| Cpe                                   | 2,02                          | 1,62                          | 1,20                          | 0,20                          |
| Wtot (kN/m²)                          | 2,35                          | 1,88                          | 1,40                          | 0,23                          |
| Membrane:                             | Bitumen membrane 1,0mtr       | Bitumen membrane 1,0mtr       | Bitumen membrane 1,0mtr       | Bitumen membrane 1,0mtr       |
| Plate/Tube:                           | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   | Guardian R 75 (450N, 100mm)   |
| Fastener:                             | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) | Guardian CS 6,1 (2038N, 70mm) |
| Design load (N/pc):                   | 450N                          | 450N                          | 450N                          | 450N                          |
| Fasteners/sqm (pcs):                  | 5,22                          | 4,19                          | 3,10                          | 1,39                          |
| Distance between fastener rows (mm):  | 900                           | 900                           | 900                           | 900                           |
| Fastener CC dist. (mm):               | 213                           | 265                           | 358                           | 800                           |
| Number of fixings (pcs):              | 371                           | 775                           | 2076                          | 106                           |

-  Zona d'angolo
  -  Zona di perimetro
  -  Zona di campo
  -  Zona di campo interno
- Unità: Metro (m)  
Building height: 10,5



Scala: 10.0m

Date: 02/05/2024  
 Customer:  
 Project:  
 Created by: Ufficio tecnico Tecnaria - Tecnaria SPA  
 , E-mail: tecnico@tecnaria.com





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# Windload calculation

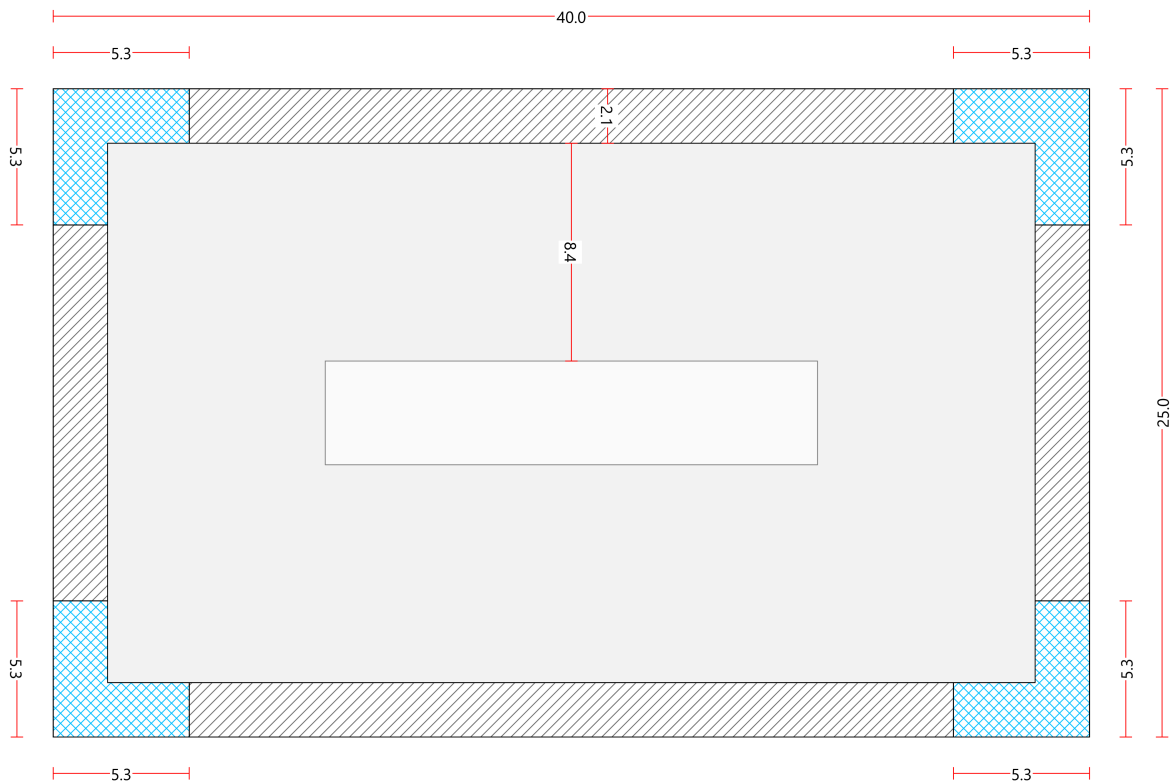
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## Roof plan - Separate fixing of insulation

|                               |                                  |                                  |                                  |                                  |
|-------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Date:                         | 02 mag 2024                      |                                  |                                  |                                  |
| Customer:                     |                                  |                                  |                                  |                                  |
| Project:                      |                                  |                                  |                                  |                                  |
| Insulation board type:        | PIR                              |                                  |                                  |                                  |
| Insulation board size (m):    | 1,2x1,2                          |                                  |                                  |                                  |
| Insulation thickness (mm):    | 120                              |                                  |                                  |                                  |
| Insulation old build up (mm): | 0                                |                                  |                                  |                                  |
| Fastener methodology:         | Linee guida produttore           |                                  |                                  |                                  |
|                               | <b>Corner</b>                    | <b>Perimeter</b>                 | <b>Field</b>                     | <b>Inner field</b>               |
| Total area (sqm)              | 71                               | 185                              | 669                              | 76                               |
| Wtot (kN/sqm)                 | 2,35                             | 1,88                             | 1,40                             | 0,23                             |
| Plate/Tube                    | Guardian R 75<br>(450N, 100mm)   | Guardian R 75<br>(450N, 100mm)   | Guardian R 75<br>(450N, 100mm)   | Guardian R 75<br>(450N, 100mm)   |
| Fastener                      | Guardian CS 6,1<br>(2038N, 70mm) | Guardian CS 6,1<br>(2038N, 70mm) | Guardian CS 6,1<br>(2038N, 70mm) | Guardian CS 6,1<br>(2038N, 70mm) |
| Design load (N/pc):           | 450N                             | 450N                             | 450N                             | 450N                             |
| Fasteners/sqm (pcs)           | 2,08                             | 2,08                             | 2,08                             | 2,08                             |
| Fasteners/board (pcs)         | 3                                | 3                                | 3                                | 3                                |
| Number of fixings (pcs)       | 148                              | 386                              | 1394                             | 159                              |

-  Zona d'angolo
  -  Zona di perimetro
  -  Zona di campo
  -  Zona di campo interno
- Building height: 10,5

Unità: Metro (m)



Scala: 10.0m

Date: 02/05/2024

Customer:

Project:

Created by: Ufficio tecnico Tecnaria - Tecnaria SPA

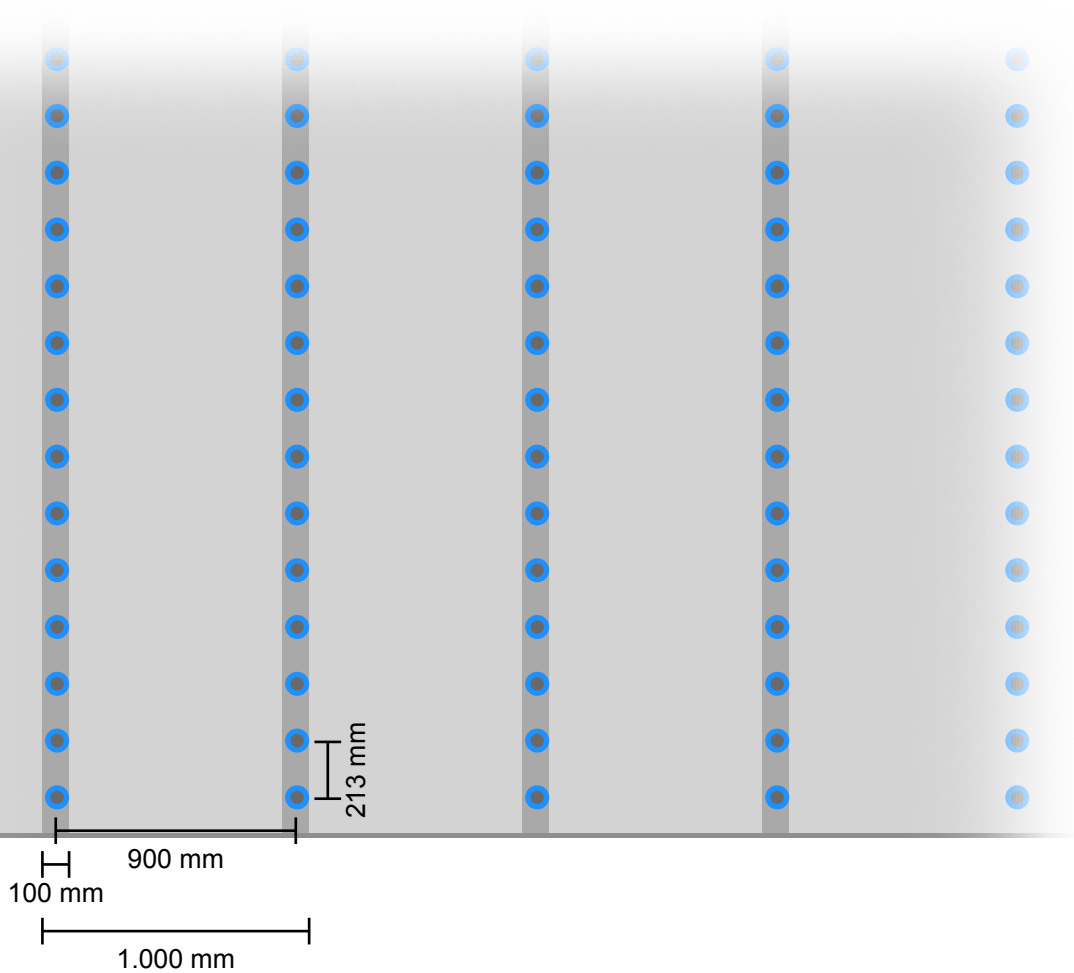
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|           |             |
|-----------|-------------|
| Date:     | 02 mag 2024 |
| Customer: |             |
| Project:  |             |

## Fixing pattern - Corner

- Overlap
- Fastener

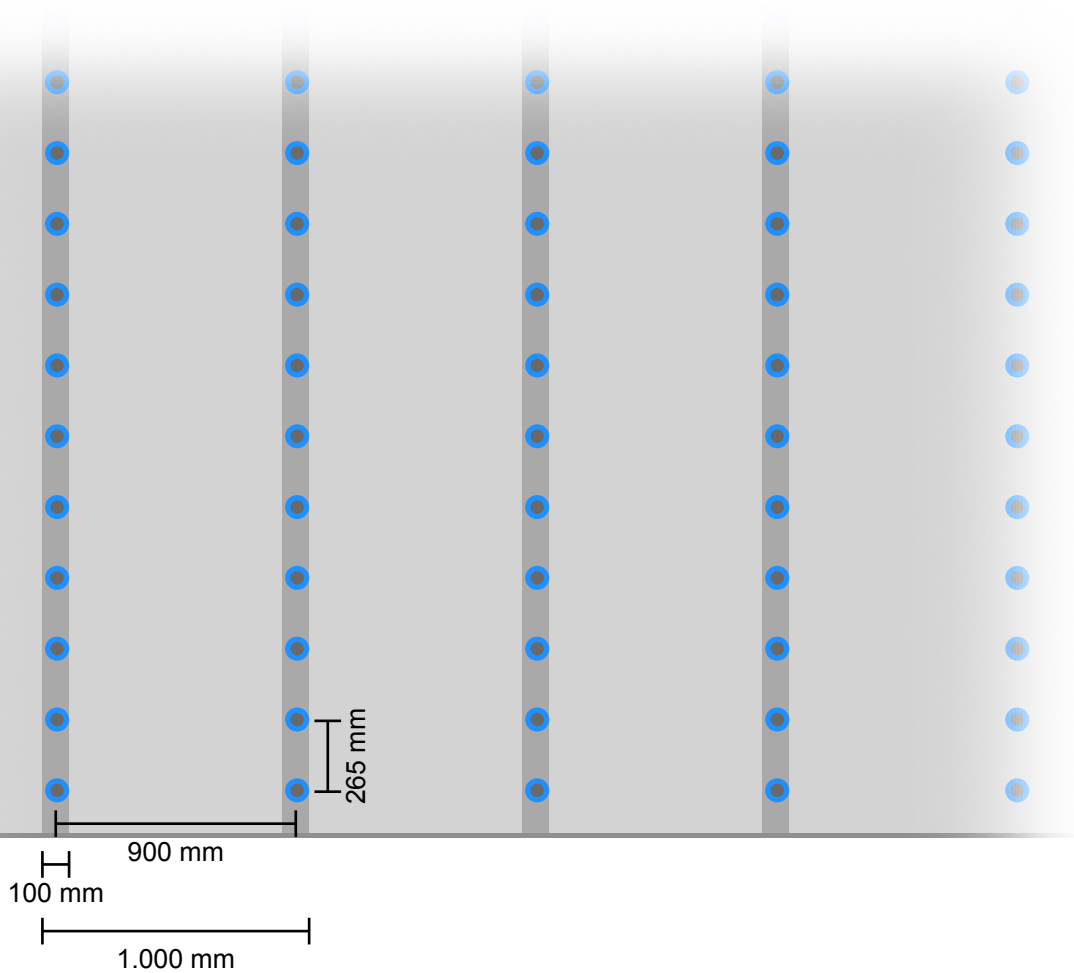


Please note that this is only a visual representation and not set to scale.

|           |             |
|-----------|-------------|
| Date:     | 02 mag 2024 |
| Customer: |             |
| Project:  |             |

## Fixing pattern - Perimeter

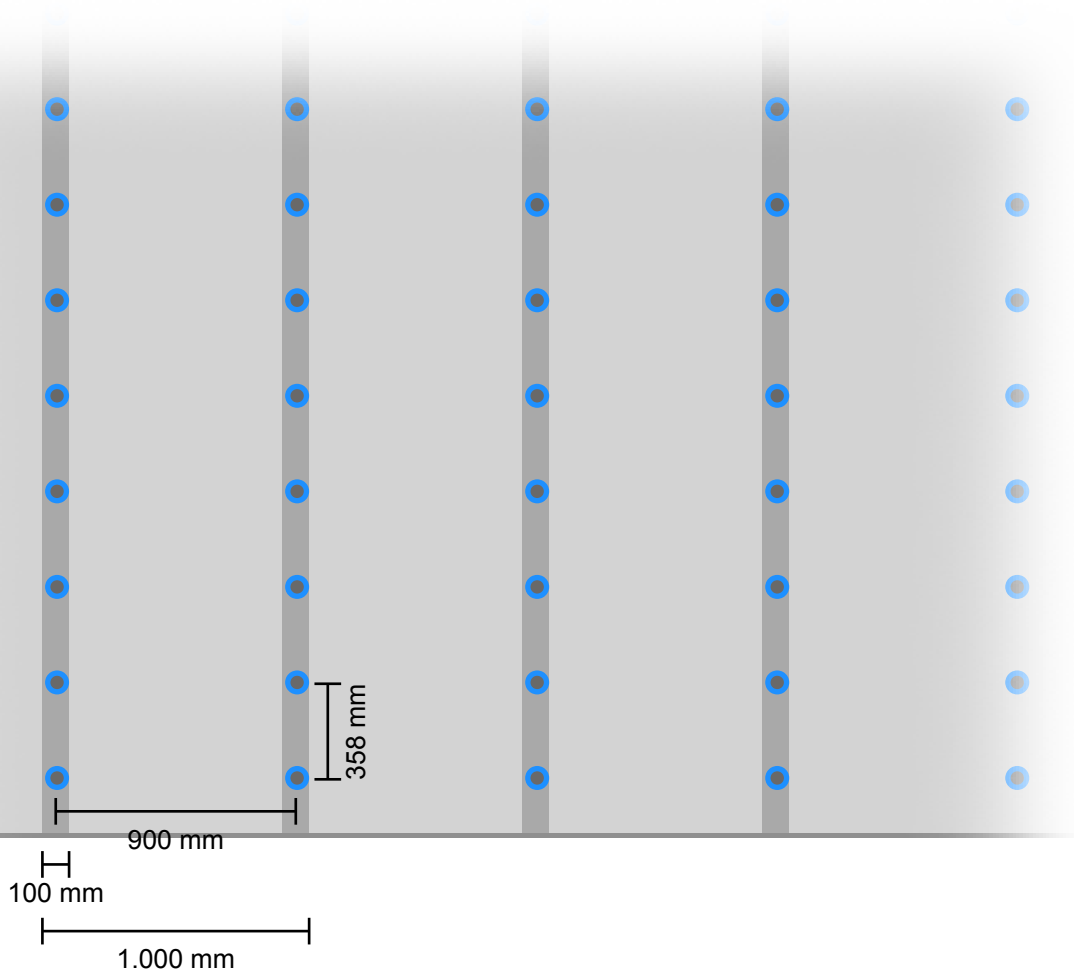
- Overlap
- Fastener



|           |             |
|-----------|-------------|
| Date:     | 02 mag 2024 |
| Customer: |             |
| Project:  |             |

## Fixing pattern - Field

- Overlap
- Fastener

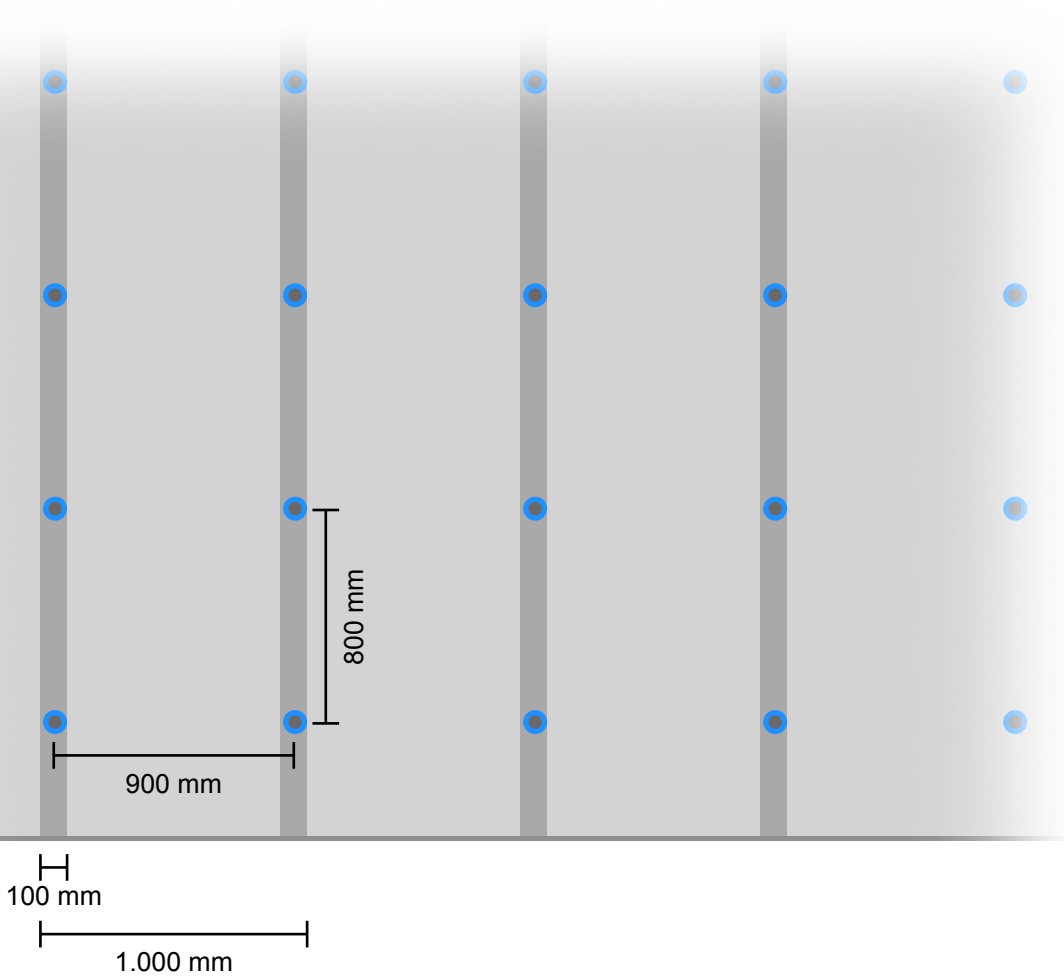


Please note that this is only a visual representation and not set to scale.

|           |             |
|-----------|-------------|
| Date:     | 02 mag 2024 |
| Customer: |             |
| Project:  |             |

## Fixing pattern - Inner field

- Overlap
- Fastener



Please note that this is only a visual representation and not set to scale.



|           |             |
|-----------|-------------|
| Date:     | 02 mag 2024 |
| Customer: |             |
| Project:  |             |

## Materials - Insulation board & fixing

| <i>Insulation</i> |  | Insulation (pcs) |  |
|-------------------|--|------------------|--|
| PIR               |  | n/a              |  |
| <i>Plate/Tube</i> |  | Plate/Tube (pcs) |  |
| Guardian R 75     |  | 2.086            |  |
| <i>Fasteners</i>  |  | Fasteners (pcs)  |  |
| Guardian CS 6,1   |  | 2.086            |  |

## Materials - Roof membrane & fixing

| <i>Membranes</i>        |  | Total area (sqm) |  |
|-------------------------|--|------------------|--|
| Bitumen membrane 1,0mtr |  | 1.102            |  |
| <i>Plate/Tube</i>       |  | Plate/Tube (pcs) |  |
| Guardian R 75           |  | 3.328            |  |
| <i>Fasteners</i>        |  | Fasteners (pcs)  |  |
| Guardian CS 6,1         |  | 3.328            |  |