

Printworks, Manchester - Gen Fit

## Project information

**SOLEN**

Project name

**Printworks, Manchester - Gen Fit**

Company

Project location

**Hanover, 27 Withy Grove, Manchester M4  
2BS, UK**

Project reference

DC Power

**220,05 kWp**

Module quantity

**489 pcs**

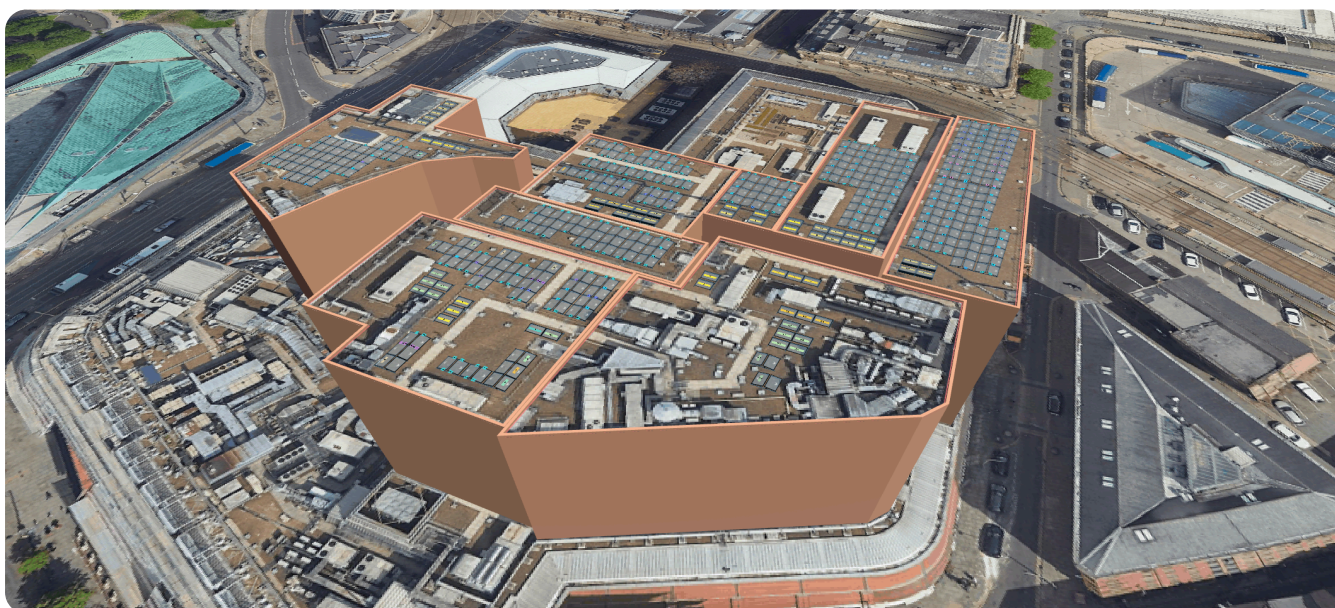
Brand/type of solar panel

**DMEGC 450Wp**

Dimensions/weight solar panel

**1.762 x 1.134 x 30 mm / 24,5 kg**

Creation date

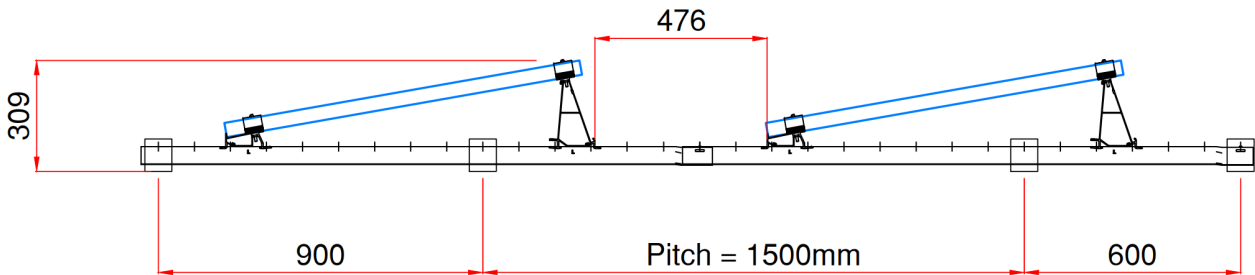
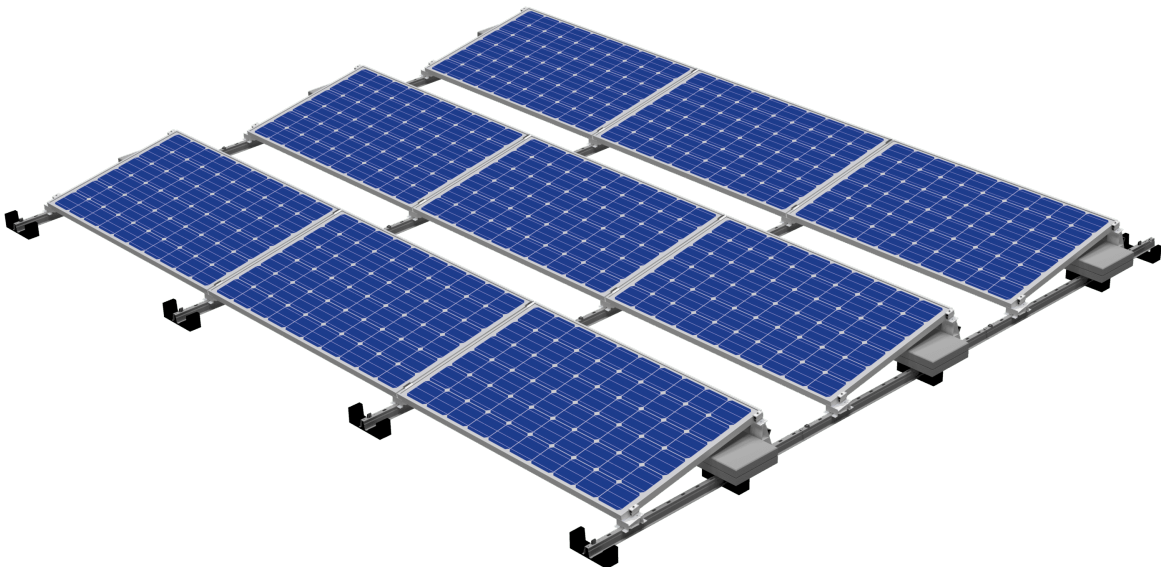
**29 May 2025 at 12:45**



# System specification

## ValkPro+ L10 South

|             |           |             |              |
|-------------|-----------|-------------|--------------|
| System type | ValkPro+  | Fixation    | Ballast      |
| Orientation | Landscape | Foot type   | Tile carrier |
| Module tilt | 10°       | Colour      | Grey         |
| Row pitch   | 1.500 mm  | Side plates | Yes          |

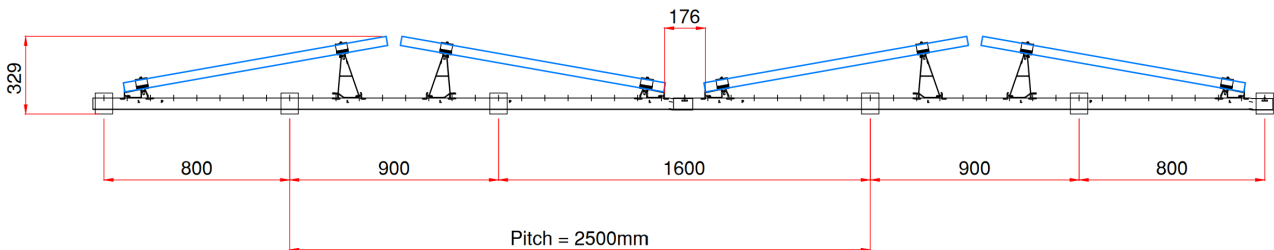
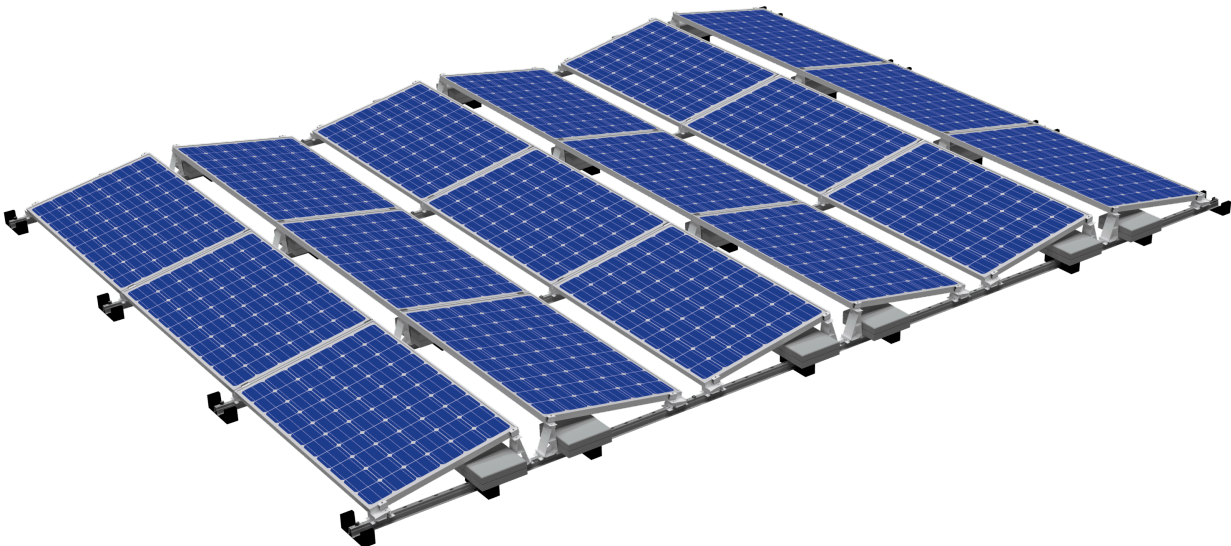




# System specification

## ValkPro+ L10 East-West

|             |           |             |              |
|-------------|-----------|-------------|--------------|
| System type | ValkPro+  | Fixation    | Ballast      |
| Orientation | Landscape | Foot type   | Tile carrier |
| Module tilt | 10°       | Colour      | Grey         |
| Row pitch   | 2.500 mm  | Side plates | Yes          |

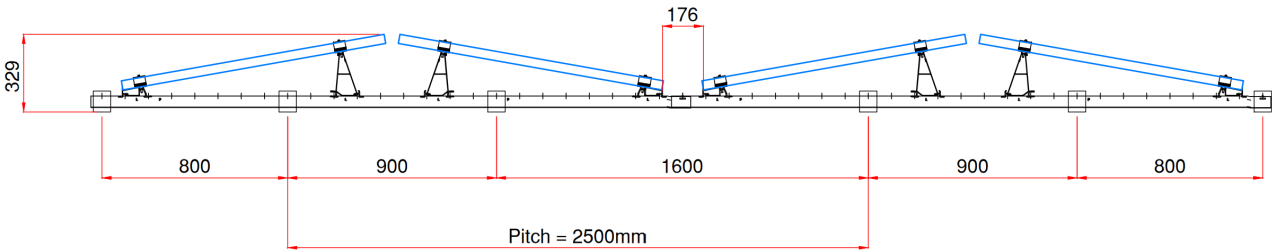
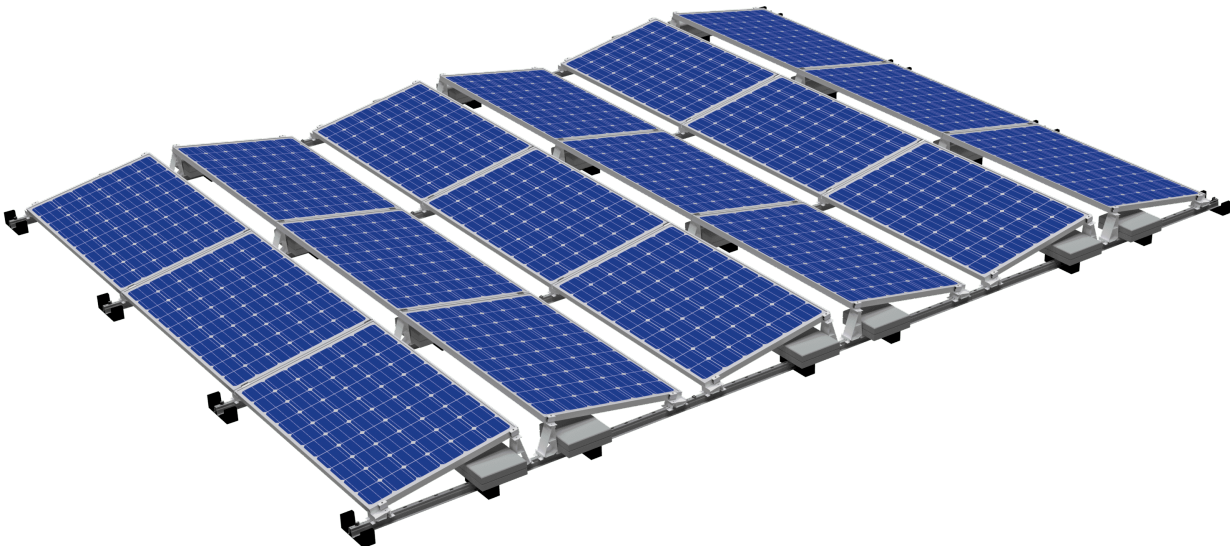




# System specification

## ValkPro+ L10 East-West

|             |           |             |              |
|-------------|-----------|-------------|--------------|
| System type | ValkPro+  | Fixation    | Ballast      |
| Orientation | Landscape | Foot type   | Tile carrier |
| Module tilt | 10°       | Colour      | Grey         |
| Row pitch   | 2.500 mm  | Side plates | No           |



## Wind and snow load

Country

**United Kingdom**

Standard - Wind actions

**BS EN 1991-1-4/NA:2008**

Basic Wind Speed  $V_{b,0}$

**22,5 m/s**

Standard - Snow loads

**BS EN 1991-1-3/NA:2018**

Snow load zone

**Zone 3**

Height above sea level

**54,12 m**

Design lifetime

**25 years**

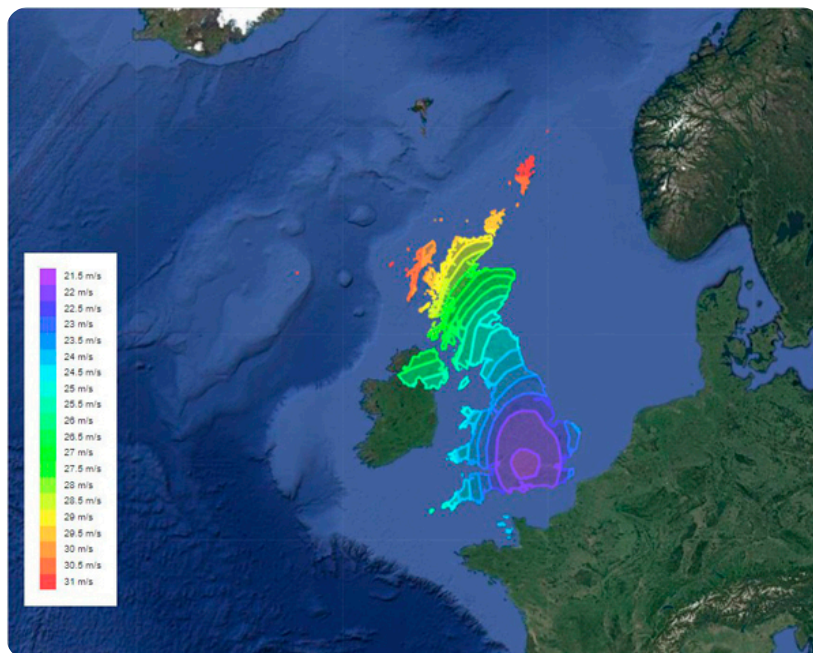
Consequence Class

**CC1 (EN 1990)**

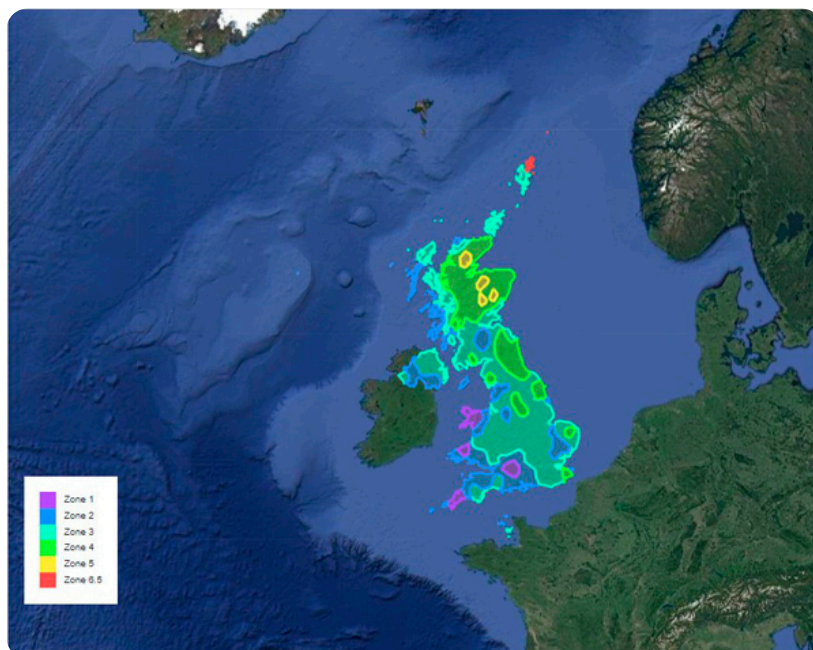
Orography factor

**$C_o = 1,000$**

Wind speed map



Snow load map





## Terrain category

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### Terrain category Town

Urban area covered with buildings, hedges, vineyards, grove



Highest building (m)

25,00 m

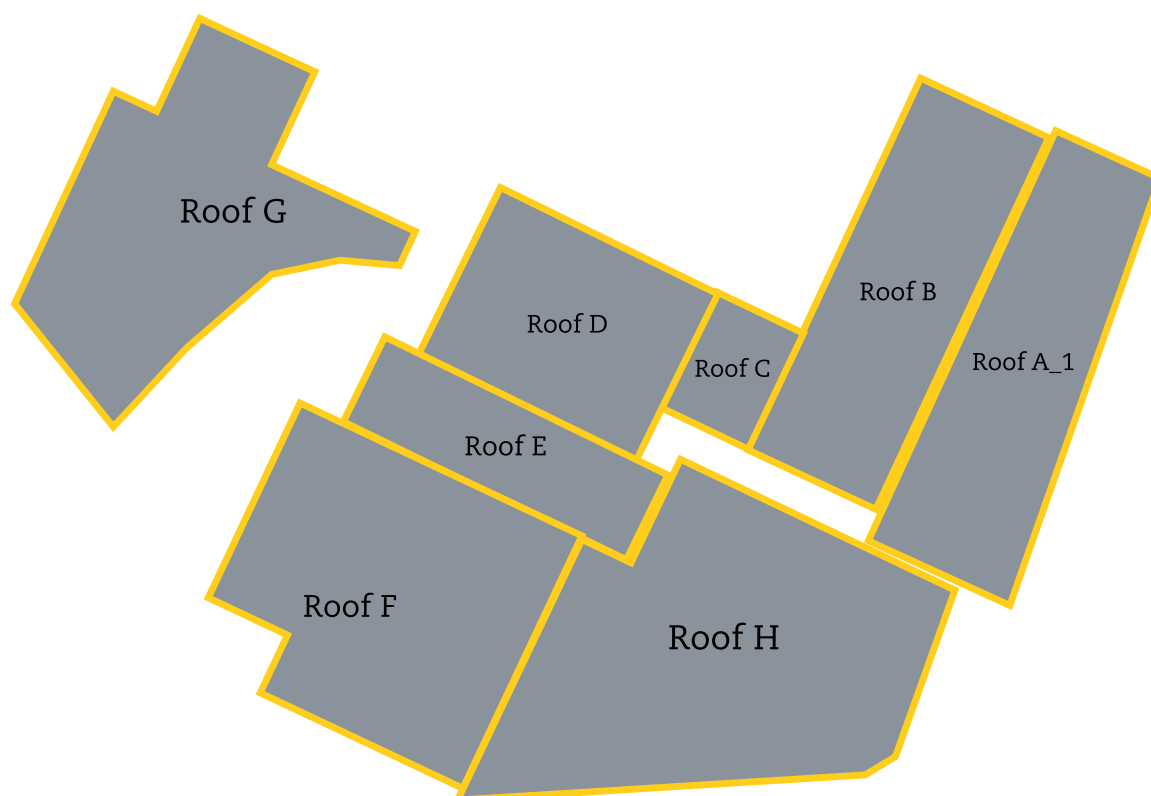
Perimeter radius (m)

500





## Project overview





## Roof A\_1 | Summary

### Roof properties

|                      |         |                    |             |
|----------------------|---------|--------------------|-------------|
| Height               | 25,00 m | Roof area          | 468,4 m²    |
| Slope                | 1°      | PV-system area     | 276,4 m²    |
| Roof type            | Flat    | Cladding           | Gravel roof |
| Parapet height       | 0,30 m  | Roof membrane type | CONCRETE    |
| Parapet width        | 0,30 m  | Number of panels   | 489 pcs     |
| Friction coefficient | 0,6     | Power              | 220,05 kWp  |

### Eurocode calculations

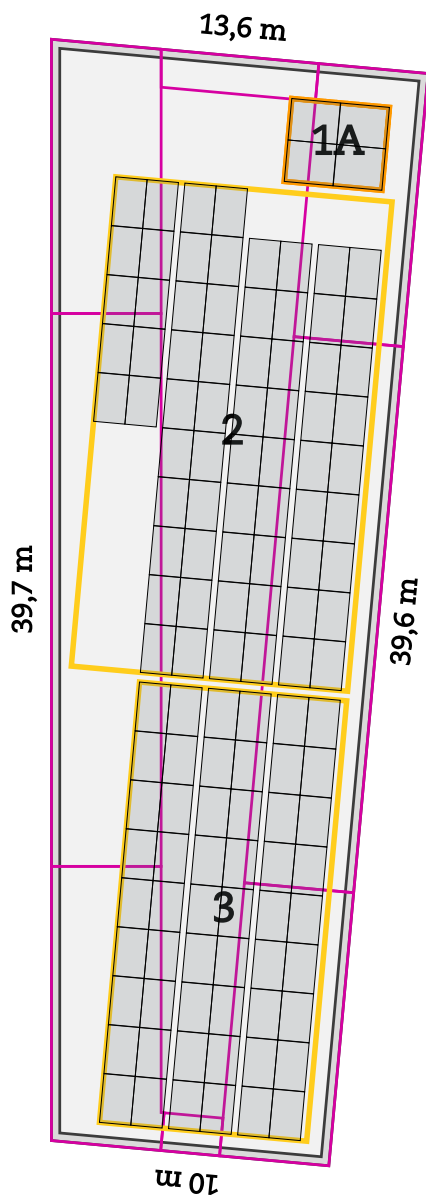
|                             |                                |                                  |     |
|-----------------------------|--------------------------------|----------------------------------|-----|
| Peak wind velocity pressure | 0,87 kPa                       | Combination factor for wind load | 0,5 |
| Characteristic snow load    | 0,47 kPa                       | Combination factor for snow load | 0,5 |
| Min. point load on roof     | 8 kPa                          |                                  |     |
| Max. point load on roof     | 16 kPa                         |                                  |     |
| Load case                   | Dead weight (system + ballast) |                                  |     |

### Weight calculations

|                           |          |                                  |            |
|---------------------------|----------|----------------------------------|------------|
| Weight of solar panels    | 3.038 kg | Average weight on roof area      | 11,2 kg/m² |
| Weight of mounting system | 800 kg   | Average weight on PV-system area | 19 kg/m²   |
| Ballast weight            | 1.422 kg |                                  |            |
| Total weight              | 5.260 kg |                                  |            |



## Roof A\_1 | Field 1 | Solar panels



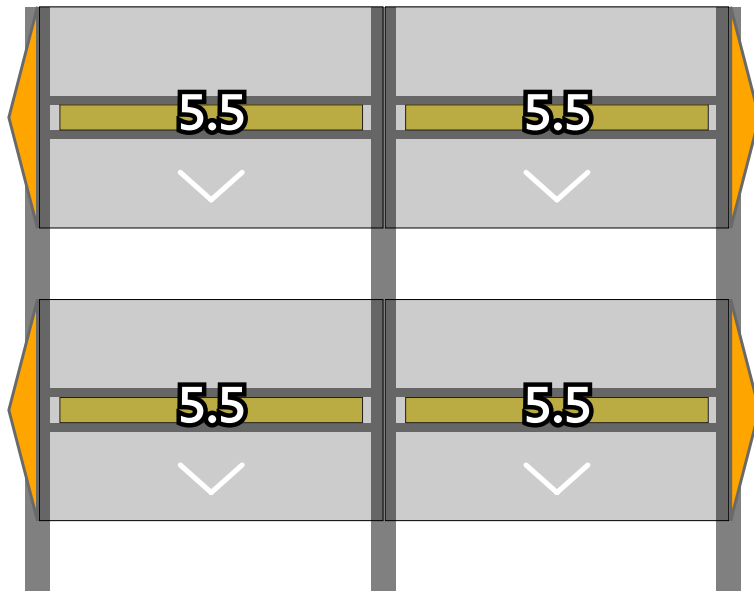
— Corner/edge zone

## Components

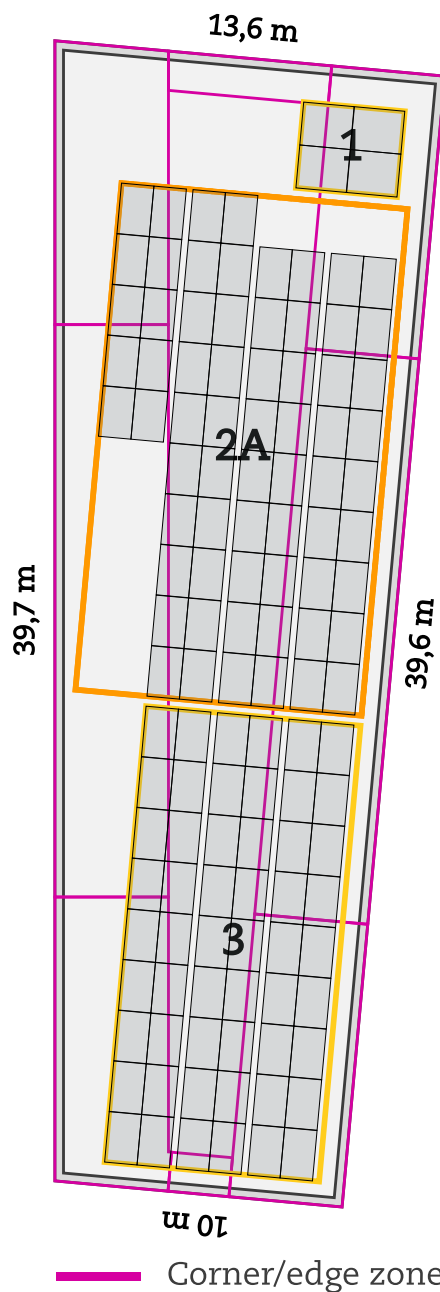
|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 4 Pcs | Galv side plate ValkPro+ L10° universal | 4 Pcs  |
| Alu rear foot ValkPro+ L10° middle     | 2 Pcs | SS thread-forming bolt M6x20mm - T30    | 18 Pcs |
| Alu rear foot ValkPro+ L10° side       | 4 Pcs | Rubber tile carrier - click - ValkPro+  | 12 Pcs |
| Alu front foot ValkPro+ P/L10° middle  | 2 Pcs | Rubber block - gravel roof - ValkPro+   | 12 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 4 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 8 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut  | 3 Pcs | Ballast full tiles                      | 20 Pcs |
| Galv back plate ValkPro+ L10° L=1980mm | 4 Pcs | Ballast half tiles                      | 4 Pcs  |
| Galv roof carrier L=1500x1,5mm         | 6 Pcs |                                         |        |



## Roof A\_1 | Field 1 - part 1A | Solar panels



## Roof A\_1 | Field 2 | Solar panels

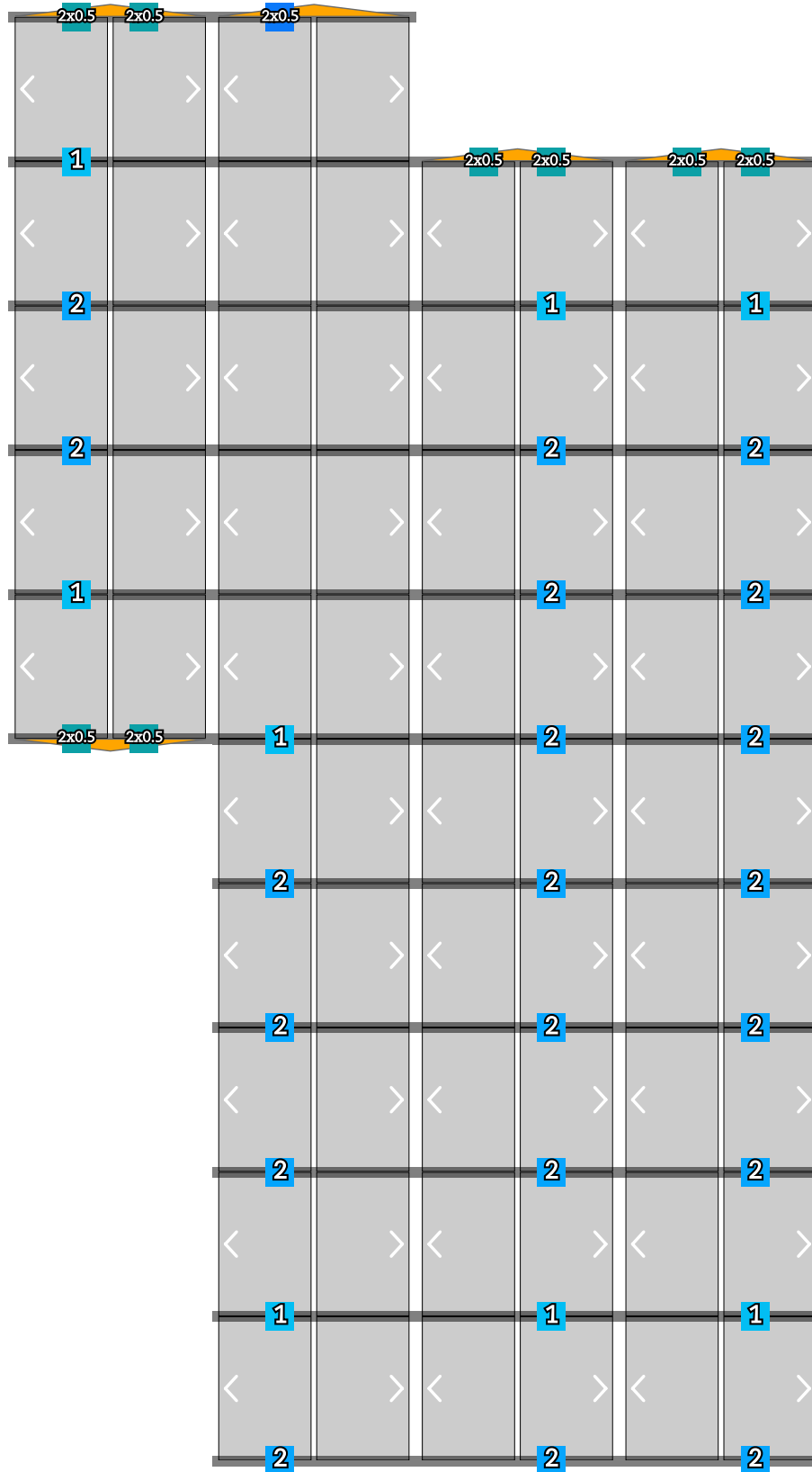


## Components

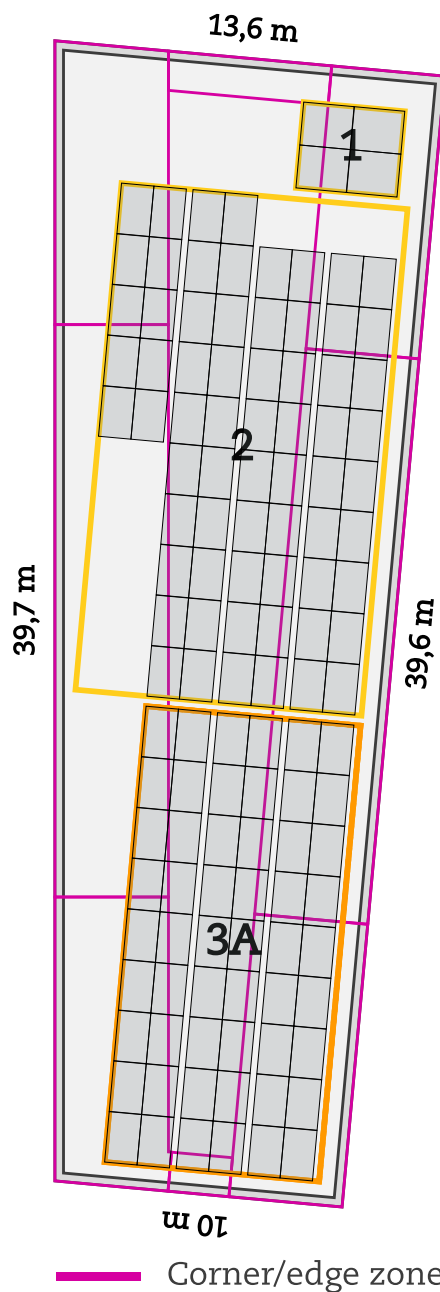
|                                       |        |                                         |        |
|---------------------------------------|--------|-----------------------------------------|--------|
| Module                                | 66 Pcs | Galv side plate ValkPro+ L10° universal | 10 Pcs |
| Alu rear foot ValkPro+ L10° middle    | 58 Pcs | SS thread-forming bolt M6x20mm - T30    | 30 Pcs |
| Alu rear foot ValkPro+ L10° side      | 16 Pcs | Rubber tile carrier - click - ValkPro+  | 96 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 58 Pcs | Rubber block - gravel roof - ValkPro+   | 96 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 16 Pcs | Ballast full tiles                      | 48 Pcs |
| SS hammerhead bolt M8x20mm + lock nut | 26 Pcs | Ballast half tiles                      | 18 Pcs |
| Galv roof carrier L=2500x1,5mm        | 37 Pcs |                                         |        |



# Roof A\_1 | Field 2 - part 2A | Solar panels



## Roof A\_1 | Field 3 | Solar panels

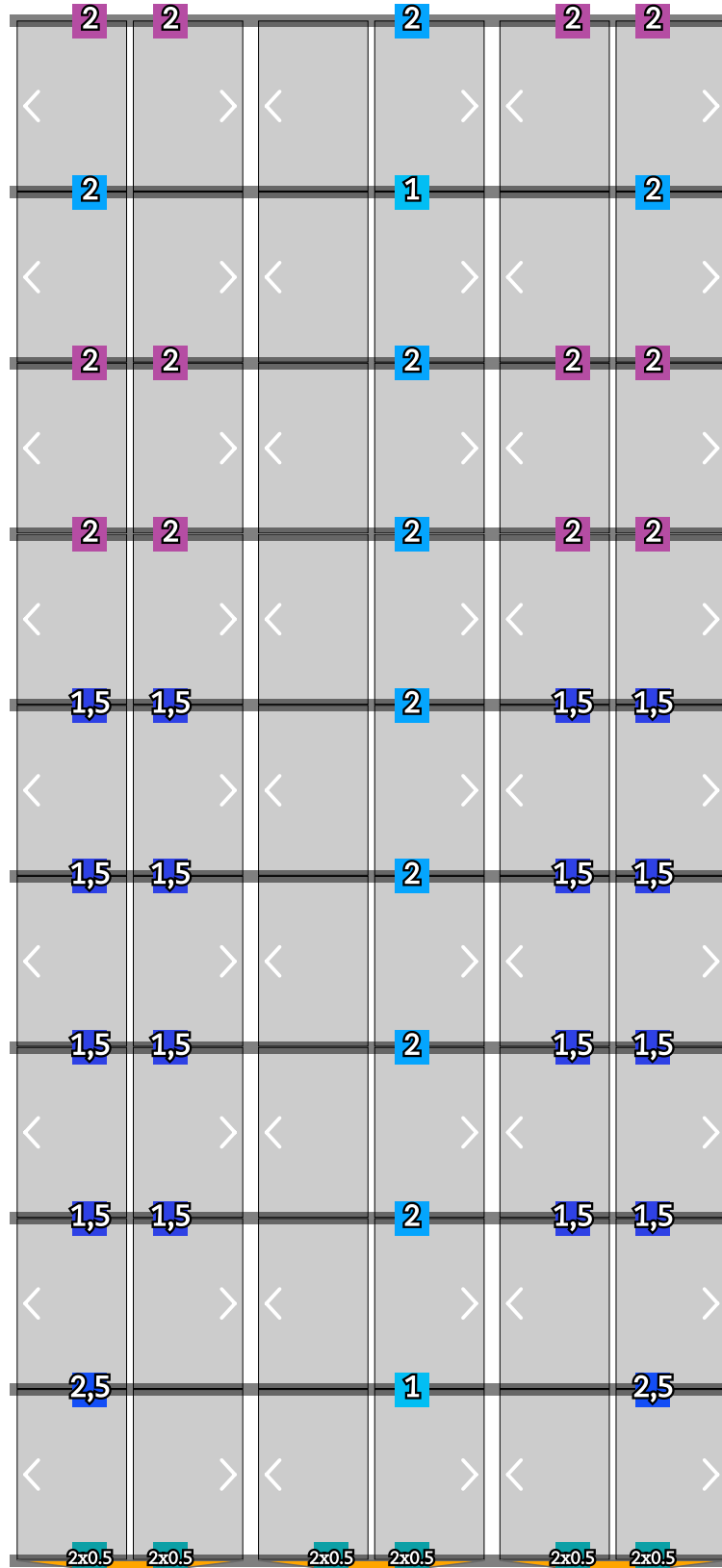


## Components

|                                       |        |                                         |        |
|---------------------------------------|--------|-----------------------------------------|--------|
| Module                                | 54 Pcs | Rubber tile carrier - click - ValkPro+  | 80 Pcs |
| Alu rear foot ValkPro+ L10° middle    | 48 Pcs | Rubber block - gravel roof - ValkPro+   | 80 Pcs |
| Alu rear foot ValkPro+ L10° side      | 12 Pcs | Galv side plate ValkPro+ L10° universal | 6 Pcs  |
| Alu front foot ValkPro+ P/L10° middle | 48 Pcs | SS thread-forming bolt M6x20mm - T30    | 18 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 12 Pcs | Ballast full tiles                      | 64 Pcs |
| SS hammerhead bolt M8x20mm + lock nut | 20 Pcs | Ballast half tiles                      | 30 Pcs |
| Galv roof carrier L=2500x1,5mm        | 30 Pcs |                                         |        |



## Roof A\_1 | Field 3 - part 3A | Solar panels





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## Roof A\_1 | Bill of materials

| Item no.          | Panel type | Qty     |
|-------------------|------------|---------|
| DM450M10RT-B54HBT | DMEGC      | 124 pcs |

| Item no.  | Mounting system                         | Calc. Qty |
|-----------|-----------------------------------------|-----------|
| 724650    | Alu rear foot ValkPro+ L10° middle      | 108 Pcs   |
| 724651    | Alu rear foot ValkPro+ L10° side        | 32 Pcs    |
| 724660    | Alu front foot ValkPro+ P/L10° middle   | 108 Pcs   |
| 724661    | Alu front foot ValkPro+ P/L10° side     | 32 Pcs    |
| 774221    | SS hammerhead bolt M8x20mm + lock nut   | 49 Pcs    |
| 742512    | Galv back plate ValkPro+ L10° L=1980mm  | 4 Pcs     |
| 741802500 | Galv roof carrier L=2500x1,5mm          | 67 Pcs    |
| 741801500 | Galv roof carrier L=1500x1,5mm          | 6 Pcs     |
| 742540    | Galv side plate ValkPro+ L10° universal | 20 Pcs    |
| 773320    | SS thread-forming bolt M6x20mm - T30    | 66 Pcs    |
| 729622    | Rubber tile carrier - click - ValkPro+  | 188 Pcs   |
| 729627    | Rubber block - gravel roof - ValkPro+   | 188 Pcs   |
| 742564    | Galv. ballast carrier ValkPro+ L=1979mm | 8 Pcs     |

| Item no.   | Additional items                  | Calc. Qty |
|------------|-----------------------------------|-----------|
| 7506301545 | Tile 30 x 15 x 4,5cm - 4,5kg - NL | 52 pcs    |
| 7506303045 | Tile 30 x 30 x 4,5cm - 9kg - NL   | 132 pcs   |



## Roof B | Summary

### Roof properties

|                      |         |                    |             |
|----------------------|---------|--------------------|-------------|
| Height               | 25,00 m | Roof area          | 445,3 m²    |
| Slope                | 1°      | PV-system area     | 177,2 m²    |
| Roof type            | Flat    | Cladding           | Gravel roof |
| Parapet height       | 0,30 m  | Roof membrane type | CONCRETE    |
| Parapet width        | 0,30 m  | Number of panels   | 489 pcs     |
| Friction coefficient | 0,6     | Power              | 220,05 kWp  |

### Eurocode calculations

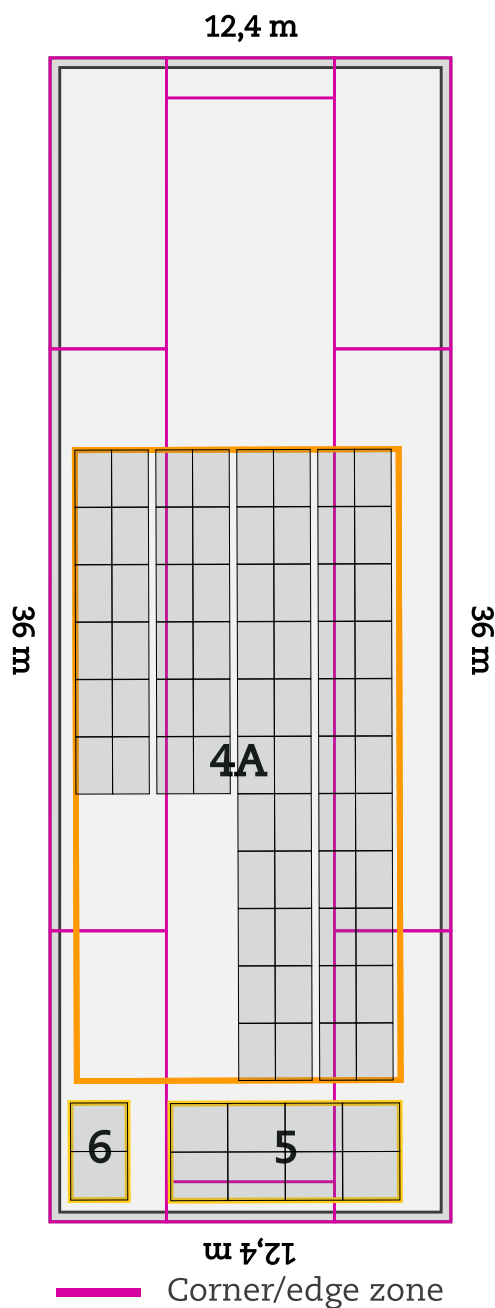
|                             |                                |                                  |     |
|-----------------------------|--------------------------------|----------------------------------|-----|
| Peak wind velocity pressure | 0,87 kPa                       | Combination factor for wind load | 0,5 |
| Characteristic snow load    | 0,47 kPa                       | Combination factor for snow load | 0,5 |
| Min. point load on roof     | 8 kPa                          |                                  |     |
| Max. point load on roof     | 16 kPa                         |                                  |     |
| Load case                   | Dead weight (system + ballast) |                                  |     |

### Weight calculations

|                           |          |                                  |            |
|---------------------------|----------|----------------------------------|------------|
| Weight of solar panels    | 1.911 kg | Average weight on roof area      | 7,8 kg/m²  |
| Weight of mounting system | 588 kg   | Average weight on PV-system area | 19,5 kg/m² |
| Ballast weight            | 955 kg   |                                  |            |
| Total weight              | 3.454 kg |                                  |            |



## Roof B | Field 4 | Solar panels

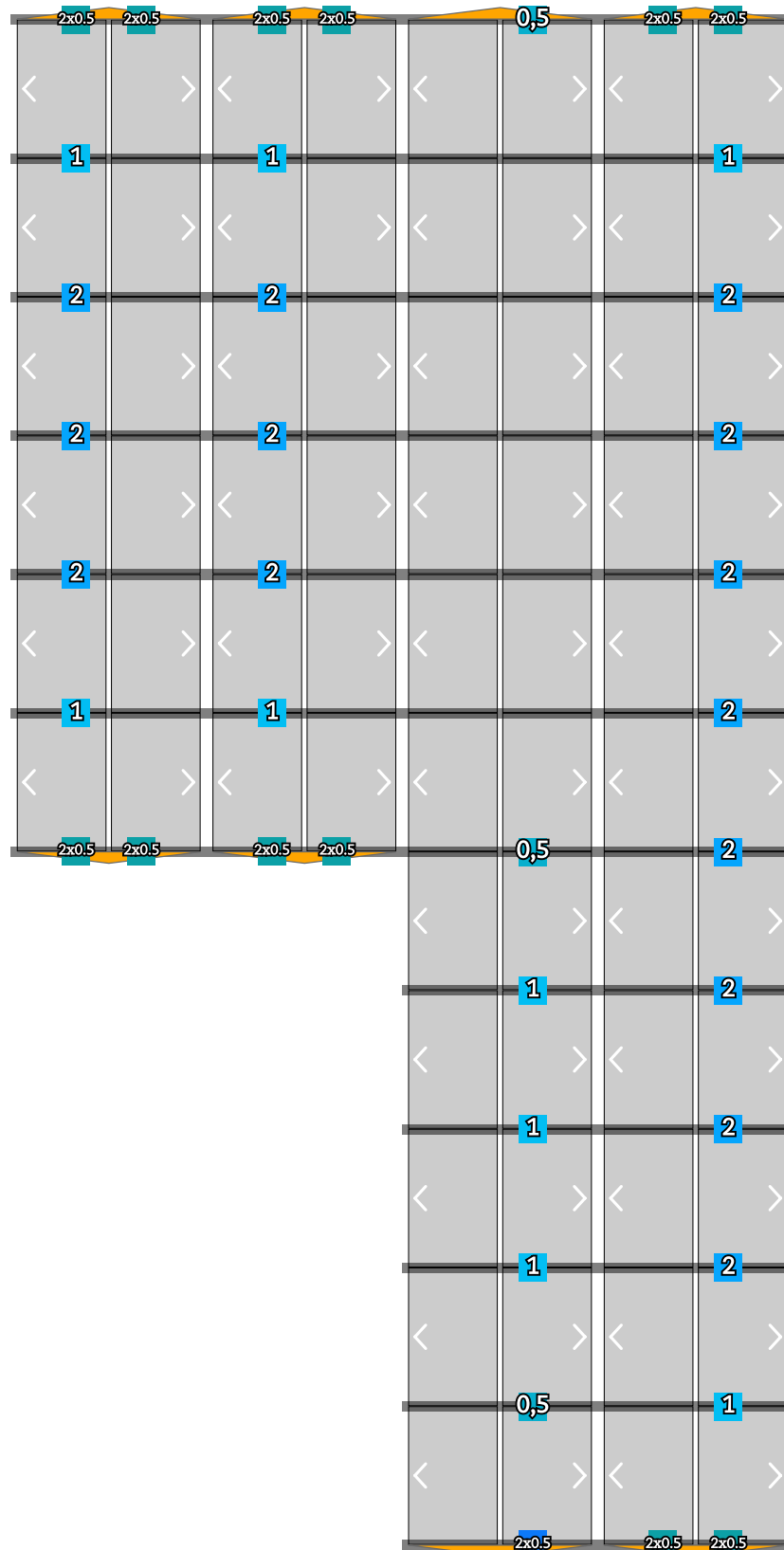


## Components

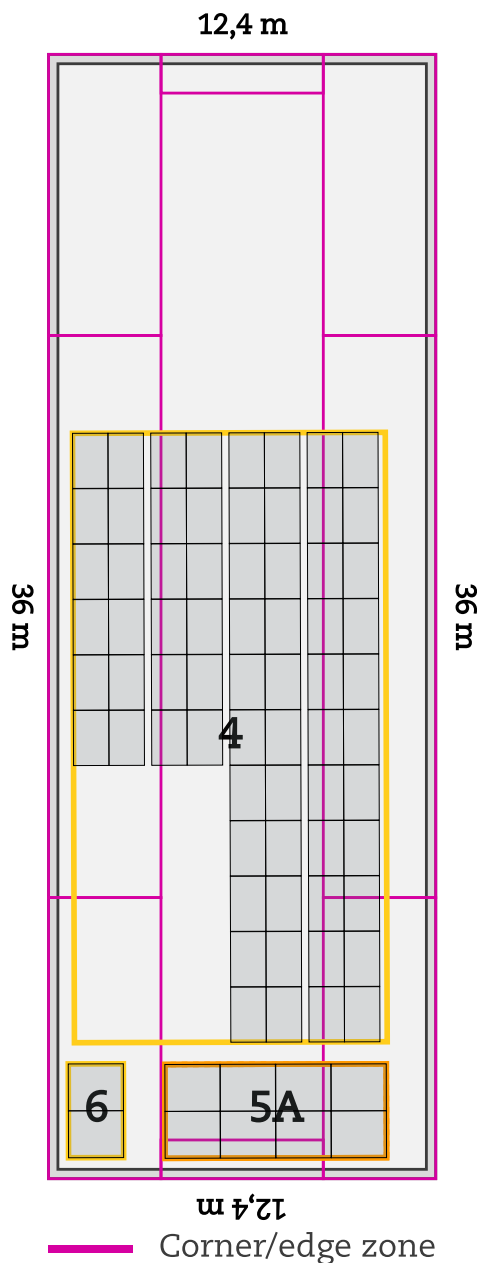
|                                       |        |                                         |         |
|---------------------------------------|--------|-----------------------------------------|---------|
| Module                                | 68 Pcs | Galv side plate ValkPro+ L10° universal | 16 Pcs  |
| Alu rear foot ValkPro+ L10° middle    | 60 Pcs | SS thread-forming bolt M6x20mm - T30    | 48 Pcs  |
| Alu rear foot ValkPro+ L10° side      | 16 Pcs | Rubber tile carrier - click - ValkPro+  | 100 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 60 Pcs | Rubber block - gravel roof - ValkPro+   | 100 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 16 Pcs | Ballast full tiles                      | 37 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut | 26 Pcs | Ballast half tiles                      | 29 Pcs  |
| Galv roof carrier L=2500x1,5mm        | 38 Pcs |                                         |         |



## Roof B | Field 4 - part 4A | Solar panels



## Roof B | Field 5 | Solar panels

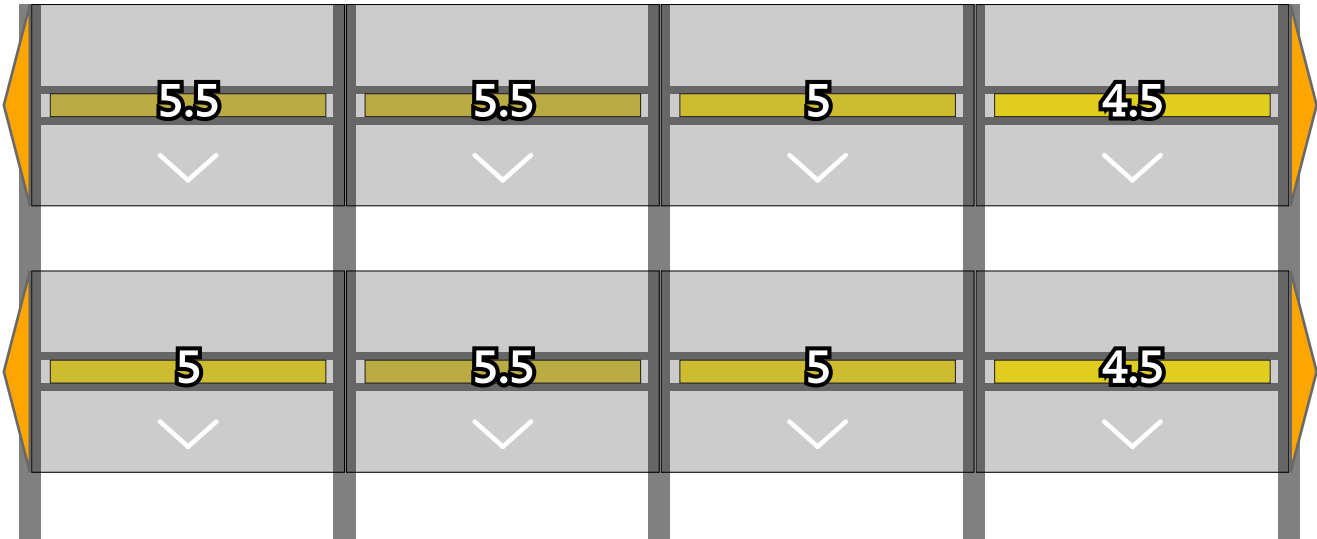


## Components

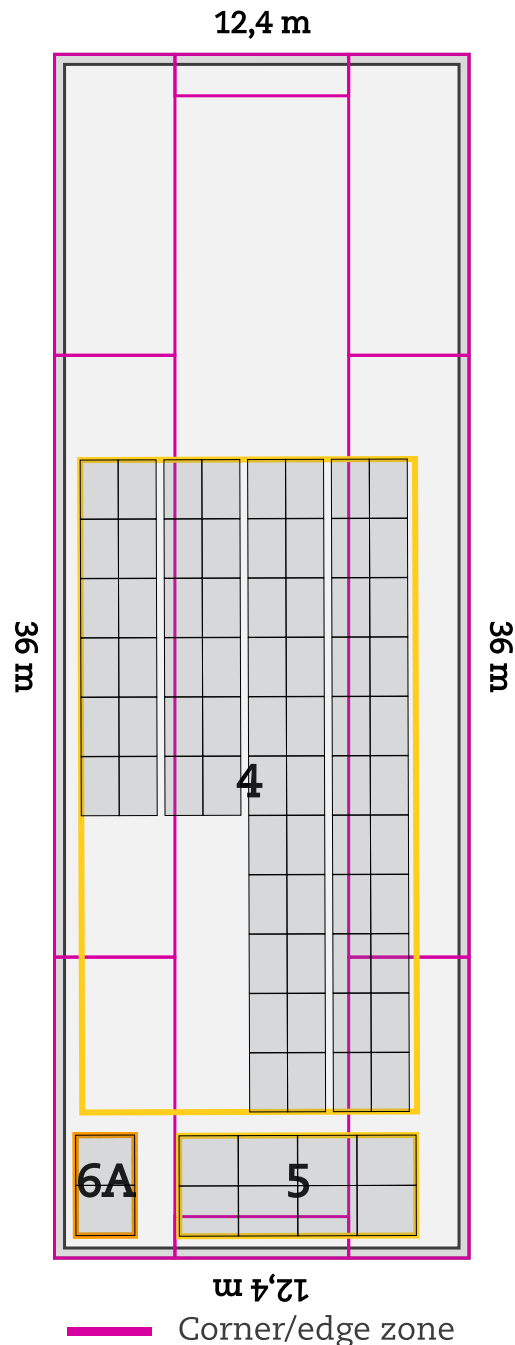
|                                        |        |                                         |        |
|----------------------------------------|--------|-----------------------------------------|--------|
| Module                                 | 8 Pcs  | Galv side plate ValkPro+ L10° universal | 4 Pcs  |
| Alu rear foot ValkPro+ L10° middle     | 6 Pcs  | SS thread-forming bolt M6x20mm - T30    | 22 Pcs |
| Alu rear foot ValkPro+ L10° side       | 4 Pcs  | Rubber tile carrier - click - ValkPro+  | 20 Pcs |
| Alu front foot ValkPro+ P/L10° middle  | 6 Pcs  | Rubber block - gravel roof - ValkPro+   | 20 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 4 Pcs  | Galv. ballast carrier ValkPro+ L=1979mm | 16 Pcs |
| SS hammerhead bolt M8x20mm + lock nut  | 5 Pcs  | Ballast full tiles                      | 38 Pcs |
| Galv back plate ValkPro+ L10° L=1980mm | 8 Pcs  | Ballast half tiles                      | 5 Pcs  |
| Galv roof carrier L=1500x1,5mm         | 10 Pcs |                                         |        |



Roof B | Field 5 - part 5A | Solar panels



## Roof B | Field 6 | Solar panels

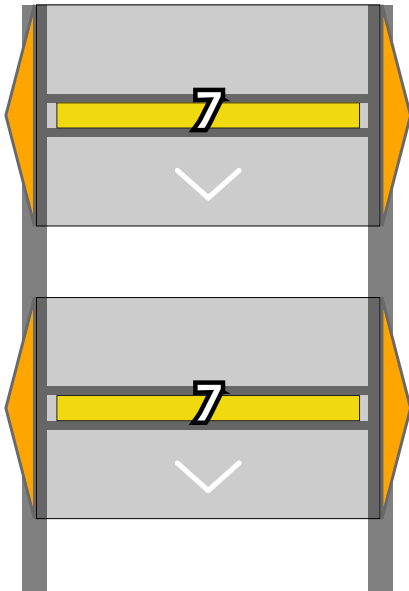


## Components

|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 2 Pcs | Galv side plate ValkPro+ L10° universal | 4 Pcs  |
| Alu rear foot ValkPro+ L10° side       | 4 Pcs | SS thread-forming bolt M6x20mm - T30    | 16 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 4 Pcs | Rubber tile carrier - click - ValkPro+  | 8 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut  | 2 Pcs | Rubber block - gravel roof - ValkPro+   | 8 Pcs  |
| Galv back plate ValkPro+ L10° L=1980mm | 2 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 4 Pcs  |
| Galv roof carrier L=1500x1,5mm         | 4 Pcs | Ballast full tiles                      | 14 Pcs |



## Roof B | Field 6 - part 6A | Solar panels





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## Roof B | Bill of materials

| Item no.          | Panel type | Qty    |
|-------------------|------------|--------|
| DM450M10RT-B54HBT | DMEGC      | 78 pcs |

| Item no.  | Mounting system                         | Calc. Qty |
|-----------|-----------------------------------------|-----------|
| 724650    | Alu rear foot ValkPro+ L10° middle      | 66 Pcs    |
| 724651    | Alu rear foot ValkPro+ L10° side        | 24 Pcs    |
| 724660    | Alu front foot ValkPro+ P/L10° middle   | 66 Pcs    |
| 724661    | Alu front foot ValkPro+ P/L10° side     | 24 Pcs    |
| 774221    | SS hammerhead bolt M8x20mm + lock nut   | 33 Pcs    |
| 742512    | Galv back plate ValkPro+ L10° L=1980mm  | 10 Pcs    |
| 741802500 | Galv roof carrier L=2500x1,5mm          | 38 Pcs    |
| 742540    | Galv side plate ValkPro+ L10° universal | 24 Pcs    |
| 741801500 | Galv roof carrier L=1500x1,5mm          | 14 Pcs    |
| 773320    | SS thread-forming bolt M6x20mm - T30    | 86 Pcs    |
| 729622    | Rubber tile carrier - click - ValkPro+  | 128 Pcs   |
| 729627    | Rubber block - gravel roof - ValkPro+   | 128 Pcs   |
| 742564    | Galv. ballast carrier ValkPro+ L=1979mm | 20 Pcs    |

| Item no.   | Additional items                  | Calc. Qty |
|------------|-----------------------------------|-----------|
| 7506301545 | Tile 30 x 15 x 4,5cm - 4,5kg - NL | 34 pcs    |
| 7506303045 | Tile 30 x 30 x 4,5cm - 9kg - NL   | 89 pcs    |



## Roof C | Summary

### Roof properties

|                      |         |                    |                     |
|----------------------|---------|--------------------|---------------------|
| Height               | 25,00 m | Roof area          | 95,3 m <sup>2</sup> |
| Slope                | 1°      | PV-system area     | 63,8 m <sup>2</sup> |
| Roof type            | Flat    | Cladding           | Gravel roof         |
| Parapet height       | 0,30 m  | Roof membrane type | CONCRETE            |
| Parapet width        | 0,30 m  | Number of panels   | 489 pcs             |
| Friction coefficient | 0,6     | Power              | 220,05 kWp          |

### Eurocode calculations

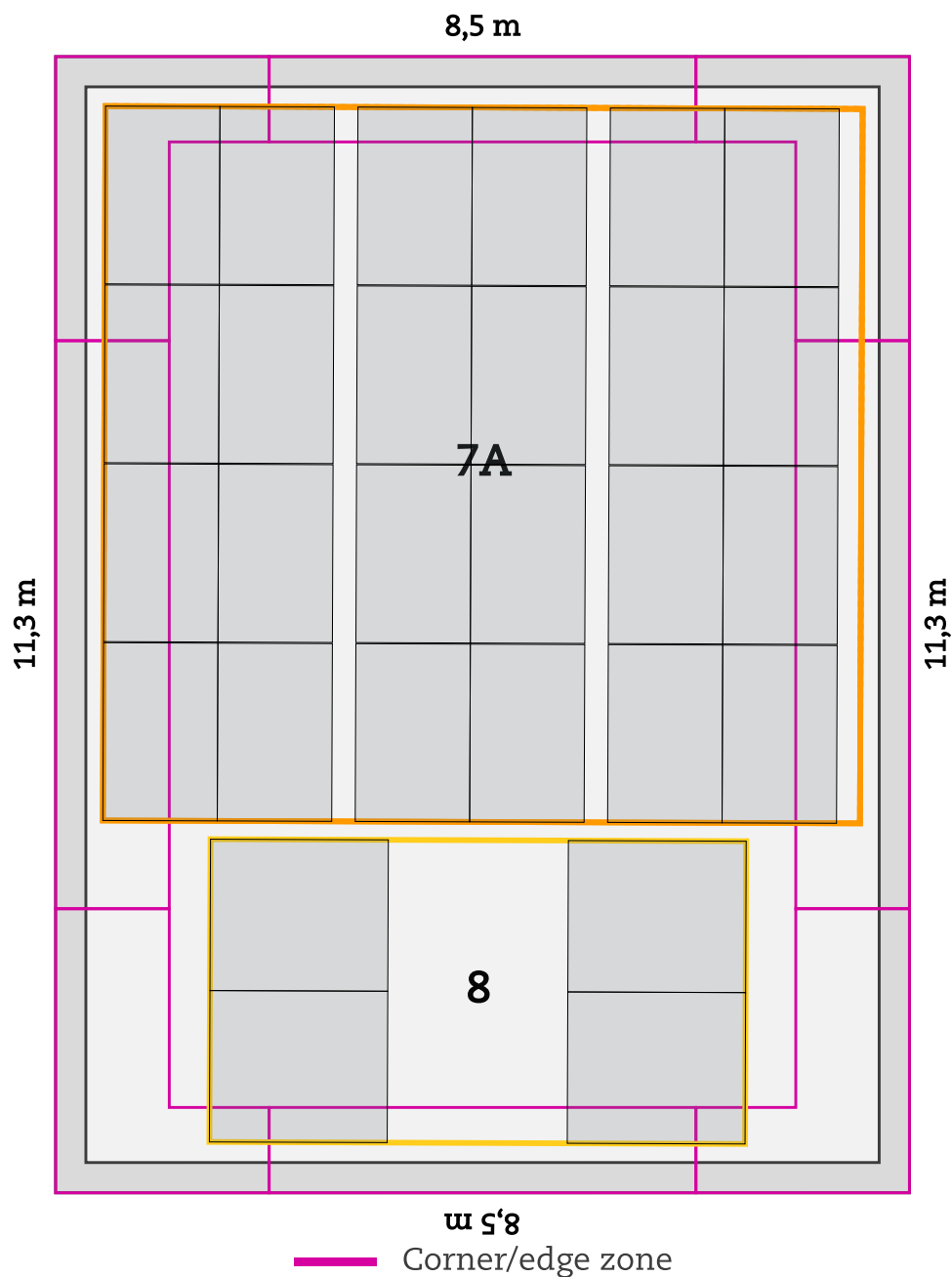
|                             |                                |                                  |     |
|-----------------------------|--------------------------------|----------------------------------|-----|
| Peak wind velocity pressure | 0,87 kPa                       | Combination factor for wind load | 0,5 |
| Characteristic snow load    | 0,37 kPa                       | Combination factor for snow load | 0,5 |
| Min. point load on roof     | 10 kPa                         |                                  |     |
| Max. point load on roof     | 15 kPa                         |                                  |     |
| Load case                   | Dead weight (system + ballast) |                                  |     |

### Weight calculations

|                           |          |                                  |                        |
|---------------------------|----------|----------------------------------|------------------------|
| Weight of solar panels    | 686 kg   | Average weight on roof area      | 14 kg/m <sup>2</sup>   |
| Weight of mounting system | 261 kg   | Average weight on PV-system area | 20,8 kg/m <sup>2</sup> |
| Ballast weight            | 383 kg   |                                  |                        |
| Total weight              | 1.330 kg |                                  |                        |



## Roof C | Field 7 | Solar panels

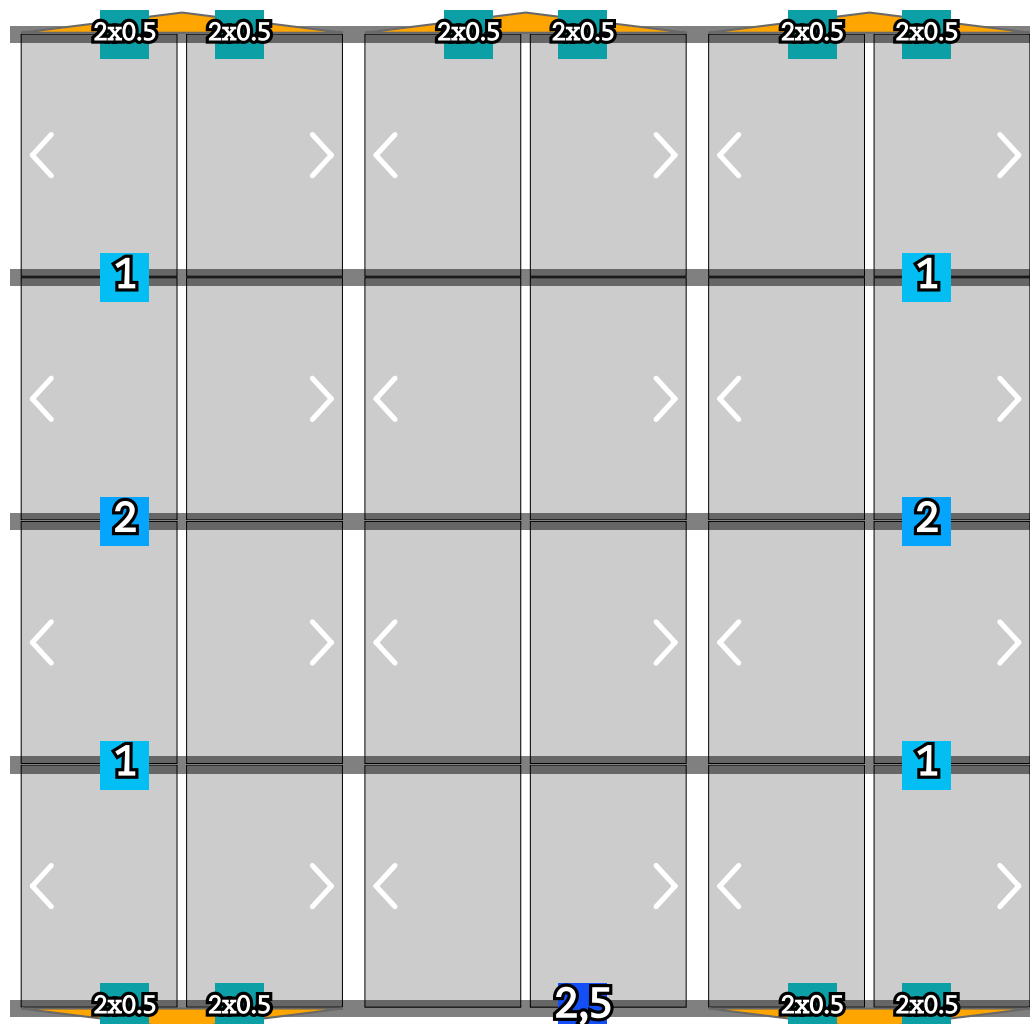


## Components

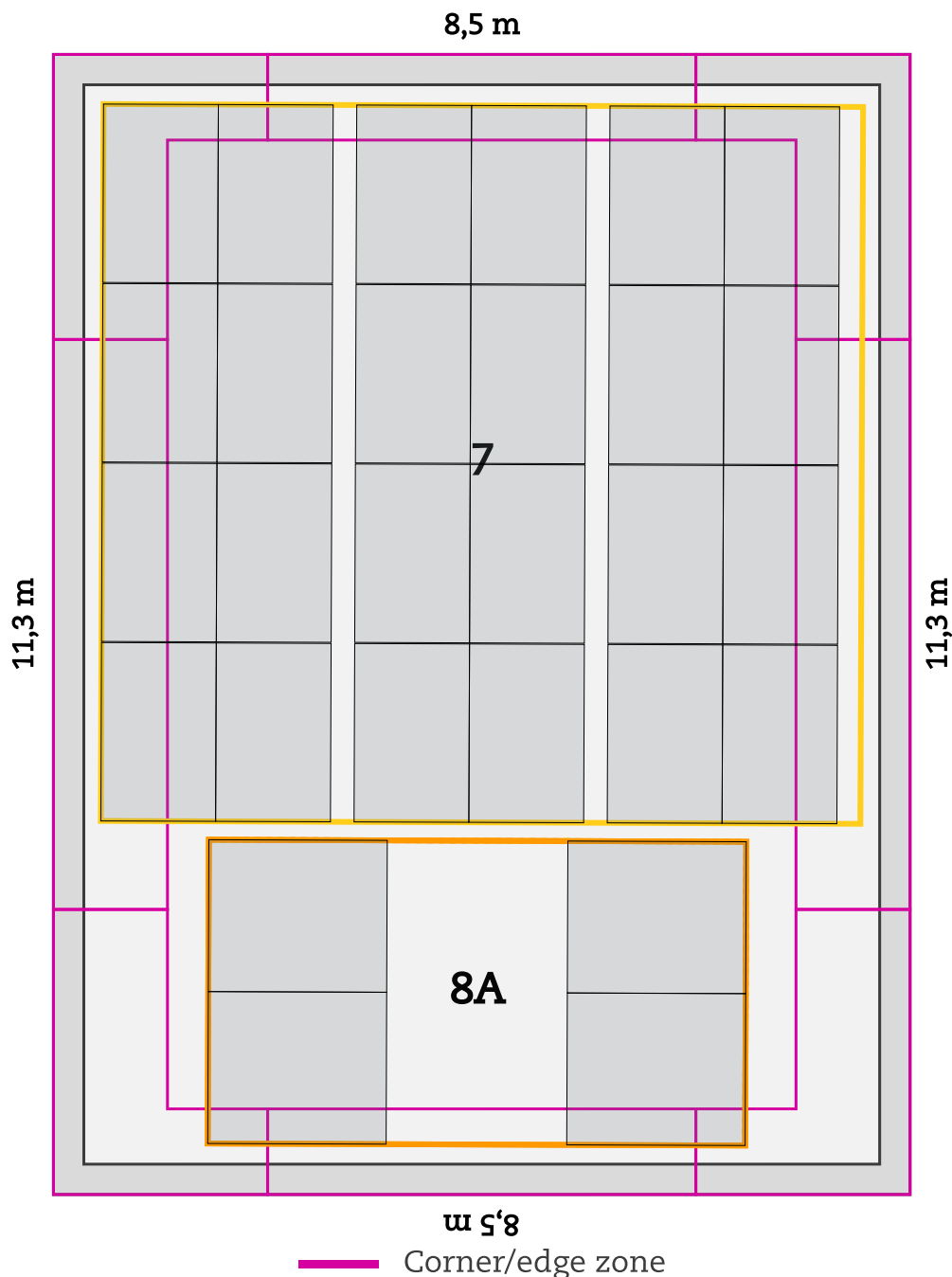
|                                       |        |                                         |        |
|---------------------------------------|--------|-----------------------------------------|--------|
| Module                                | 24 Pcs | Galv side plate ValkPro+ L10° universal | 10 Pcs |
| Alu rear foot ValkPro+ L10° middle    | 18 Pcs | SS thread-forming bolt M6x20mm - T30    | 30 Pcs |
| Alu rear foot ValkPro+ L10° side      | 12 Pcs | Rubber tile carrier - click - ValkPro+  | 40 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 18 Pcs | Rubber block - gravel roof - ValkPro+   | 40 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 12 Pcs | Ballast full tiles                      | 10 Pcs |
| SS hammerhead bolt M8x20mm + lock nut | 10 Pcs | Ballast half tiles                      | 21 Pcs |
| Galv roof carrier L=2500x1,5mm        | 15 Pcs |                                         |        |



## Roof C | Field 7 - part 7A | Solar panels



## Roof C | Field 8 | Solar panels

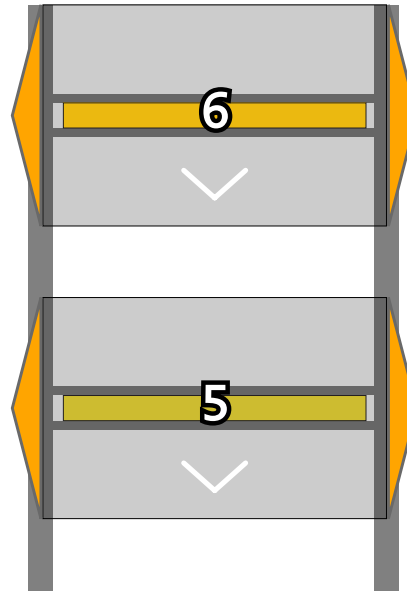
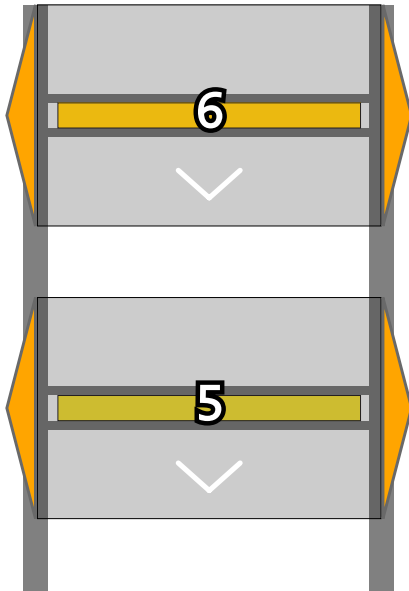


## Components

|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 4 Pcs | Galv side plate ValkPro+ L10° universal | 8 Pcs  |
| Alu rear foot ValkPro+ L10° side       | 8 Pcs | SS thread-forming bolt M6x20mm - T30    | 32 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 8 Pcs | Rubber tile carrier - click - ValkPro+  | 16 Pcs |
| SS hammerhead bolt M8x20mm + lock nut  | 4 Pcs | Rubber block - gravel roof - ValkPro+   | 16 Pcs |
| Galv back plate ValkPro+ L10° L=1980mm | 4 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 8 Pcs  |
| Galv roof carrier L=1500x1,5mm         | 8 Pcs | Ballast full tiles                      | 22 Pcs |



## Roof C | Field 8 - part 8A | Solar panels





## Roof C | Bill of materials

| Item no.          | Panel type | Qty    |
|-------------------|------------|--------|
| DM450M10RT-B54HBT | DMEGC      | 28 pcs |

| Item no.  | Mounting system                         | Calc. Qty |
|-----------|-----------------------------------------|-----------|
| 724650    | Alu rear foot ValkPro+ L10° middle      | 18 Pcs    |
| 724651    | Alu rear foot ValkPro+ L10° side        | 20 Pcs    |
| 724660    | Alu front foot ValkPro+ P/L10° middle   | 18 Pcs    |
| 724661    | Alu front foot ValkPro+ P/L10° side     | 20 Pcs    |
| 742512    | Galv back plate ValkPro+ L10° L=1980mm  | 4 Pcs     |
| 774221    | SS hammerhead bolt M8x20mm + lock nut   | 14 Pcs    |
| 741801500 | Galv roof carrier L=1500x1,5mm          | 8 Pcs     |
| 741802500 | Galv roof carrier L=2500x1,5mm          | 15 Pcs    |
| 742540    | Galv side plate ValkPro+ L10° universal | 18 Pcs    |
| 773320    | SS thread-forming bolt M6x20mm - T30    | 62 Pcs    |
| 729622    | Rubber tile carrier - click - ValkPro+  | 56 Pcs    |
| 729627    | Rubber block - gravel roof - ValkPro+   | 56 Pcs    |
| 742564    | Galv. ballast carrier ValkPro+ L=1979mm | 8 Pcs     |

| Item no.   | Additional items                  | Calc. Qty |
|------------|-----------------------------------|-----------|
| 7506301545 | Tile 30 x 15 x 4,5cm - 4,5kg - NL | 21 pcs    |
| 7506303045 | Tile 30 x 30 x 4,5cm - 9kg - NL   | 32 pcs    |



## Roof D | Summary

### Roof properties

|                      |         |                    |             |
|----------------------|---------|--------------------|-------------|
| Height               | 25,00 m | Roof area          | 354,4 m²    |
| Slope                | 1°      | PV-system area     | 134,7 m²    |
| Roof type            | Flat    | Cladding           | Gravel roof |
| Parapet height       | 0,30 m  | Roof membrane type | CONCRETE    |
| Parapet width        | 0,30 m  | Number of panels   | 489 pcs     |
| Friction coefficient | 0,6     | Power              | 220,05 kWp  |

### Eurocode calculations

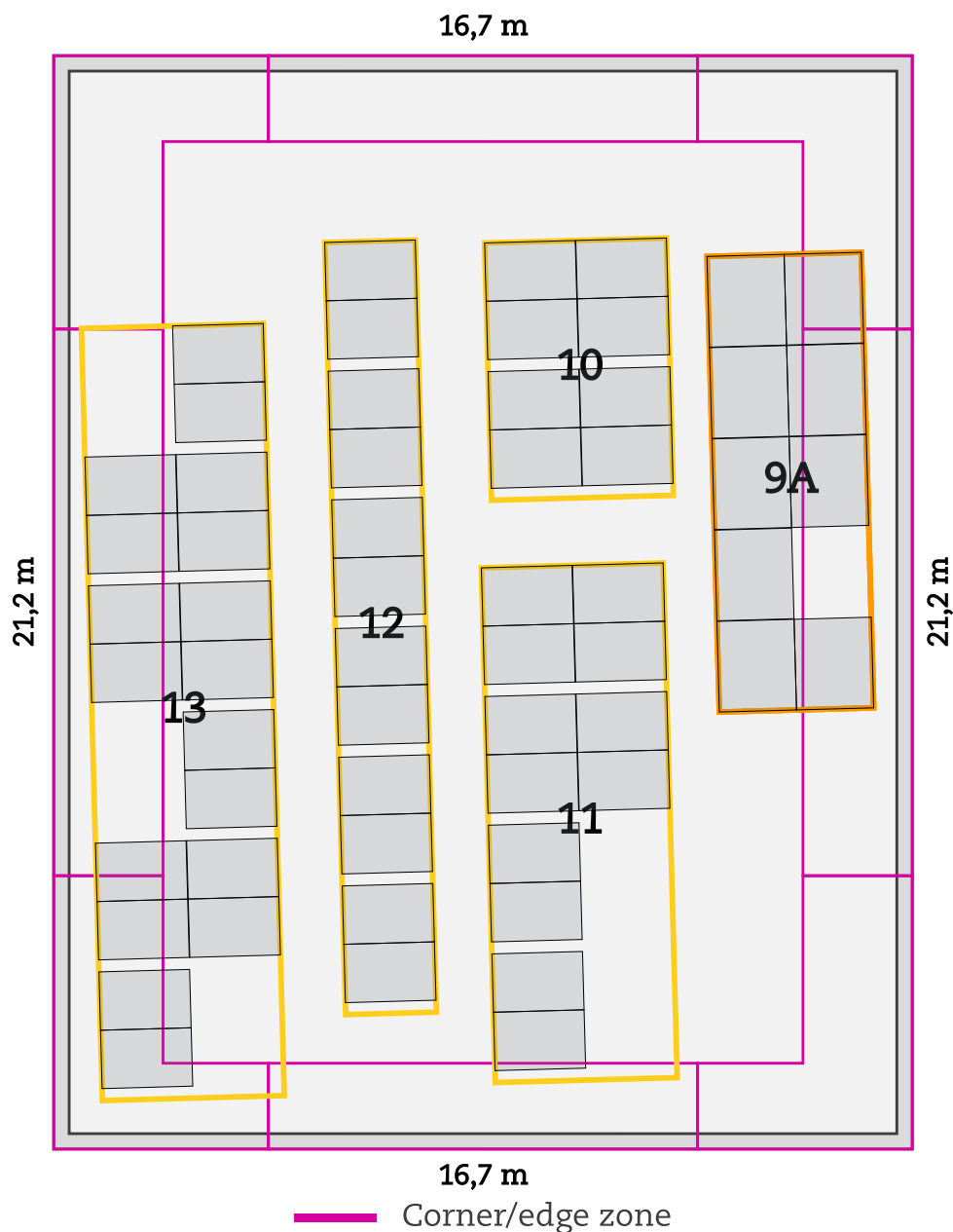
|                             |                                |                                  |     |
|-----------------------------|--------------------------------|----------------------------------|-----|
| Peak wind velocity pressure | 0,87 kPa                       | Combination factor for wind load | 0,5 |
| Characteristic snow load    | 0,47 kPa                       | Combination factor for snow load | 0,5 |
| Min. point load on roof     | 10 kPa                         |                                  |     |
| Max. point load on roof     | 19 kPa                         |                                  |     |
| Load case                   | Dead weight (system + ballast) |                                  |     |

### Weight calculations

|                           |          |                                  |            |
|---------------------------|----------|----------------------------------|------------|
| Weight of solar panels    | 1.446 kg | Average weight on roof area      | 9,7 kg/m²  |
| Weight of mounting system | 683 kg   | Average weight on PV-system area | 25,4 kg/m² |
| Ballast weight            | 1.293 kg |                                  |            |
| Total weight              | 3.421 kg |                                  |            |



## Roof D | Field 9 | Solar panels

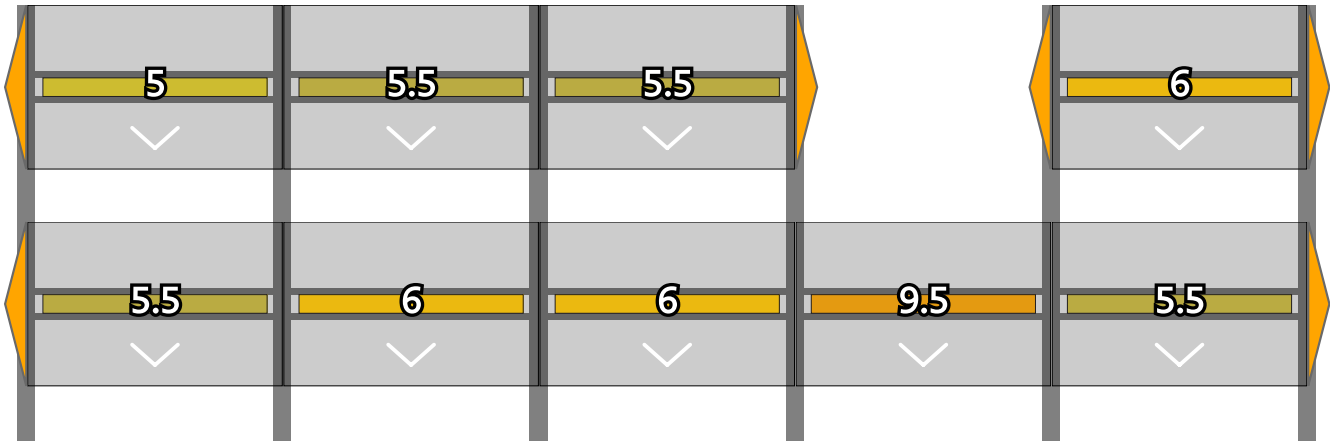


## Components

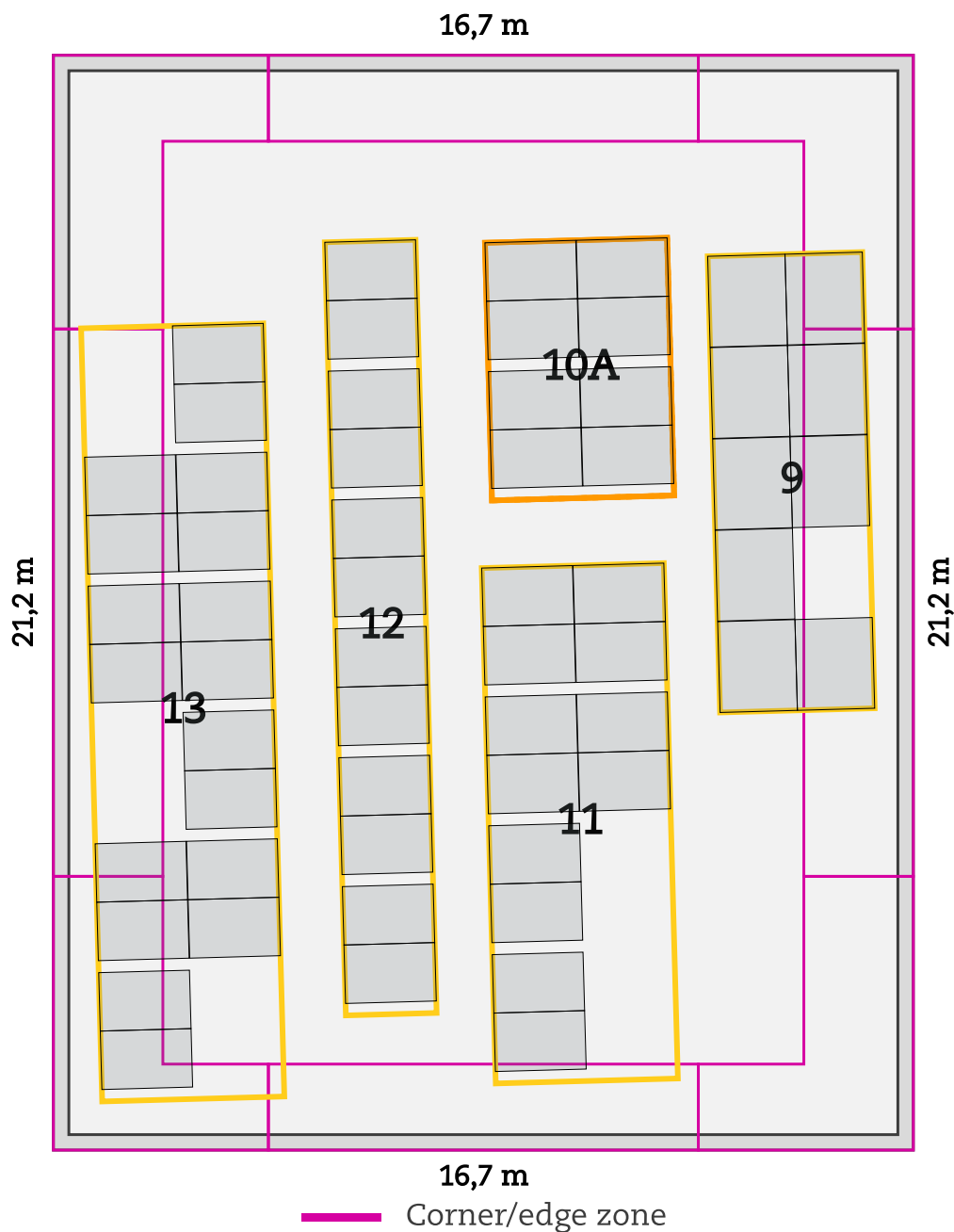
|                                        |        |                                         |        |
|----------------------------------------|--------|-----------------------------------------|--------|
| Module                                 | 9 Pcs  | Galv side plate ValkPro+ L10° universal | 6 Pcs  |
| Alu rear foot ValkPro+ L10° middle     | 6 Pcs  | SS thread-forming bolt M6x20mm - T30    | 30 Pcs |
| Alu rear foot ValkPro+ L10° side       | 6 Pcs  | Rubber tile carrier - click - ValkPro+  | 24 Pcs |
| Alu front foot ValkPro+ P/L10° middle  | 6 Pcs  | Rubber block - gravel roof - ValkPro+   | 24 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 6 Pcs  | Galv. ballast carrier ValkPro+ L=1979mm | 18 Pcs |
| SS hammerhead bolt M8x20mm + lock nut  | 6 Pcs  | Ballast full tiles                      | 52 Pcs |
| Galv back plate ValkPro+ L10° L=1980mm | 9 Pcs  | Ballast half tiles                      | 5 Pcs  |
| Galv roof carrier L=1500x1,5mm         | 12 Pcs |                                         |        |



Roof D | Field 9 - part 9A | Solar panels



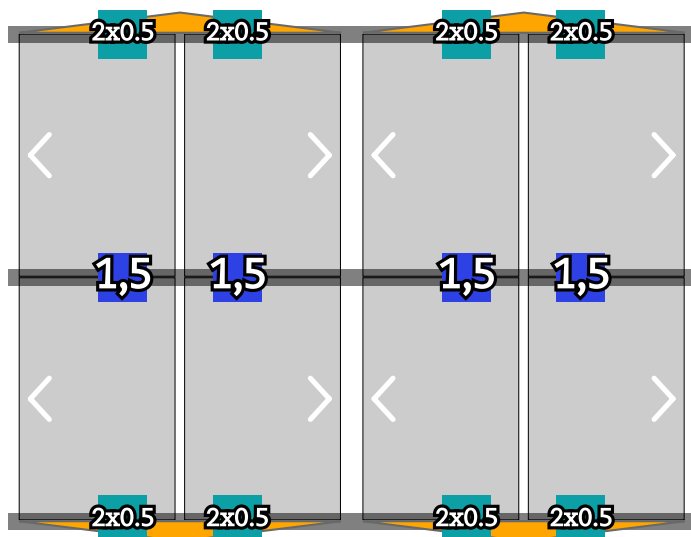
## Roof D | Field 10 | Solar panels



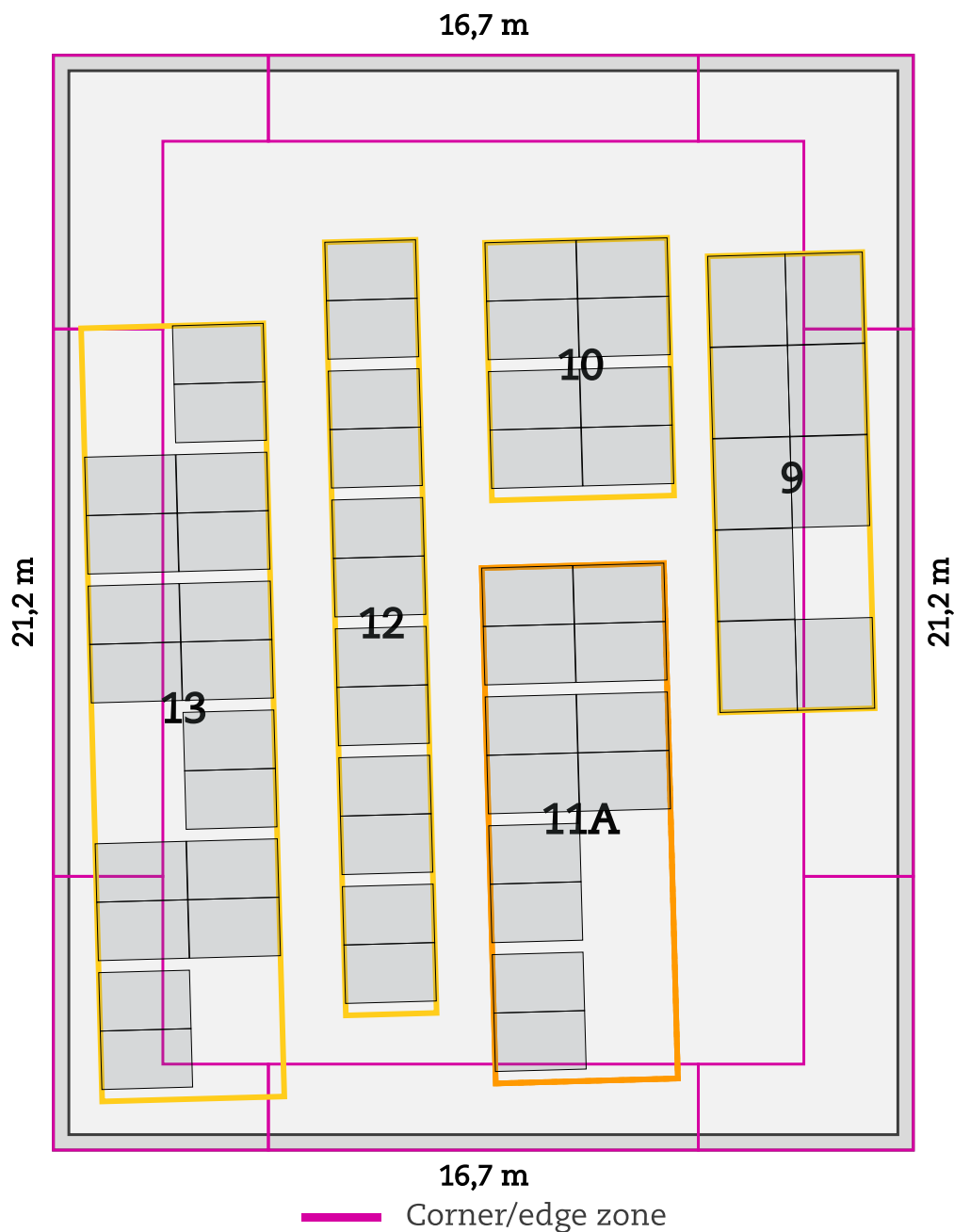
## Components

|                                       |       |                                         |        |
|---------------------------------------|-------|-----------------------------------------|--------|
| Module                                | 8 Pcs | Galv side plate ValkPro+ L10° universal | 8 Pcs  |
| Alu rear foot ValkPro+ L10° middle    | 4 Pcs | SS thread-forming bolt M6x20mm - T30    | 24 Pcs |
| Alu rear foot ValkPro+ L10° side      | 8 Pcs | Rubber tile carrier - click - ValkPro+  | 18 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 4 Pcs | Rubber block - gravel roof - ValkPro+   | 18 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 8 Pcs | Ballast full tiles                      | 4 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut | 3 Pcs | Ballast half tiles                      | 20 Pcs |
| Galv roof carrier L=2500x1,5mm        | 6 Pcs |                                         |        |

## Roof D | Field 10 - part 10A | Solar panels



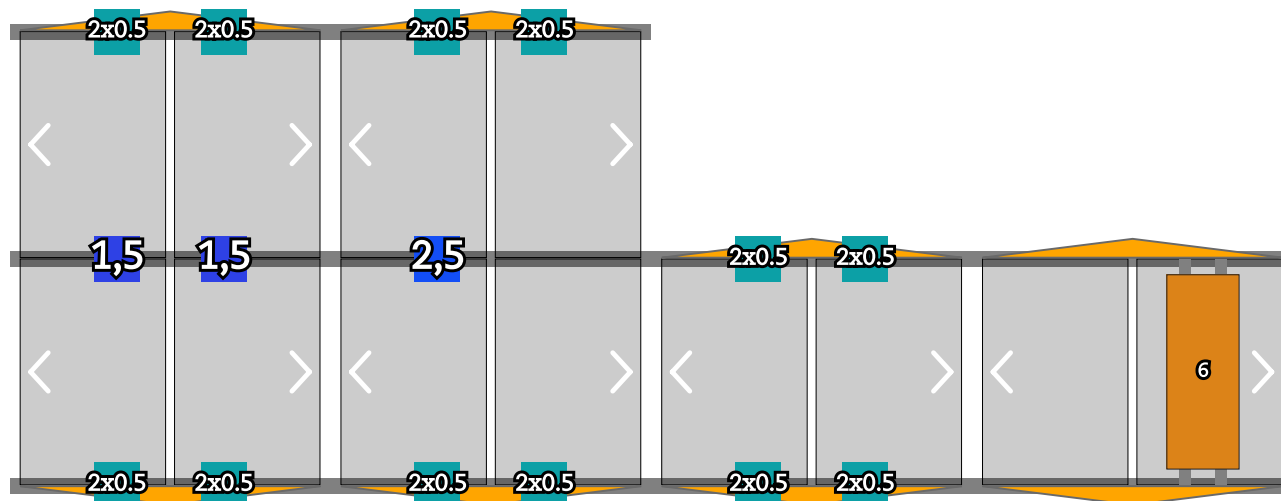
## Roof D | Field 11 | Solar panels



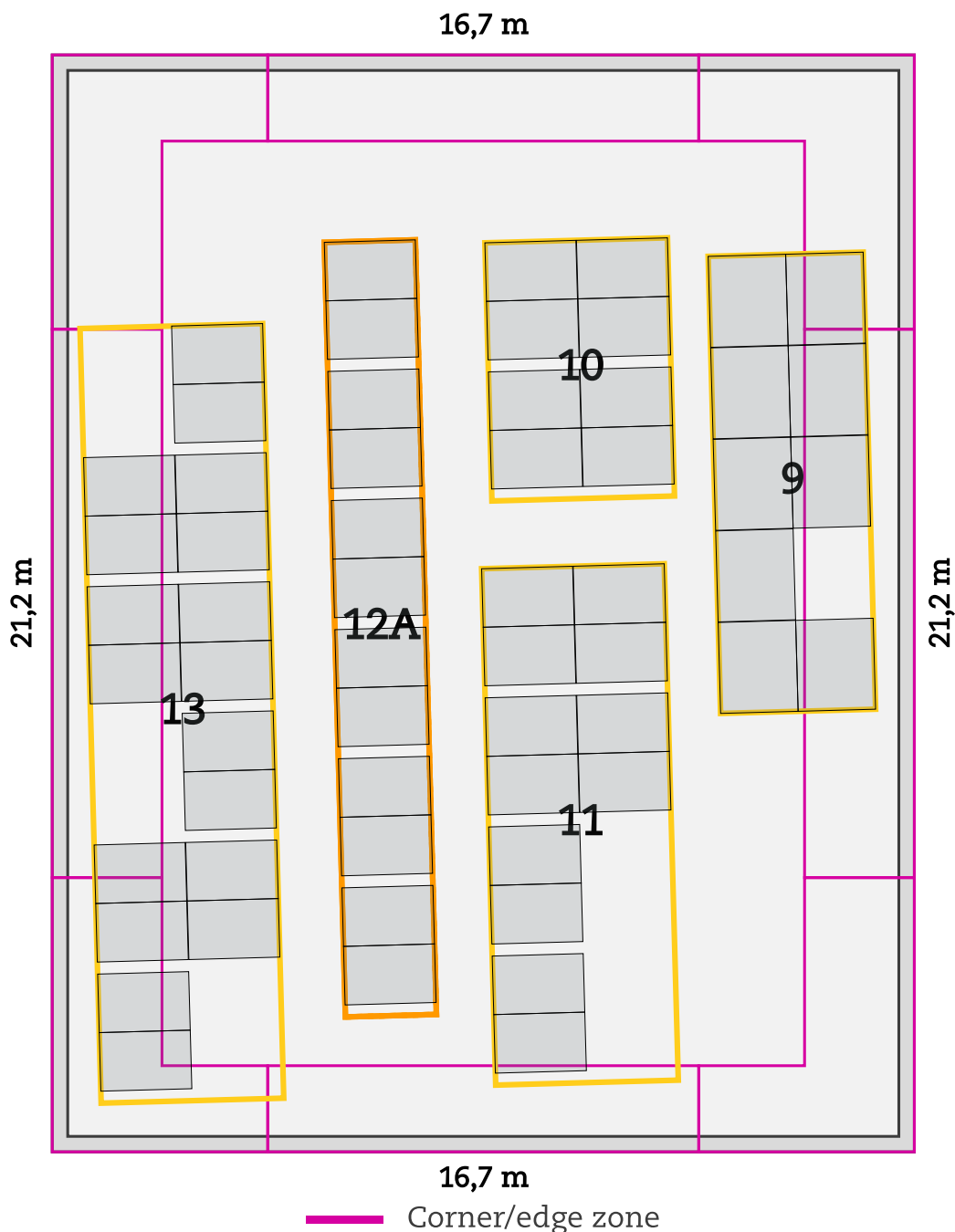
## Components

|                                       |        |                                         |        |
|---------------------------------------|--------|-----------------------------------------|--------|
| Module                                | 12 Pcs | Galv side plate ValkPro+ L10° universal | 16 Pcs |
| Alu rear foot ValkPro+ L10° middle    | 4 Pcs  | SS thread-forming bolt M6x20mm - T30    | 48 Pcs |
| Alu rear foot ValkPro+ L10° side      | 16 Pcs | Rubber tile carrier - click - ValkPro+  | 26 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 4 Pcs  | Rubber block - gravel roof - ValkPro+   | 26 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 16 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 2 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut | 7 Pcs  | Ballast full tiles                      | 10 Pcs |
| Galv roof carrier L=2500x1,5mm        | 10 Pcs | Ballast half tiles                      | 27 Pcs |

## Roof D | Field 11 - part 11A | Solar panels



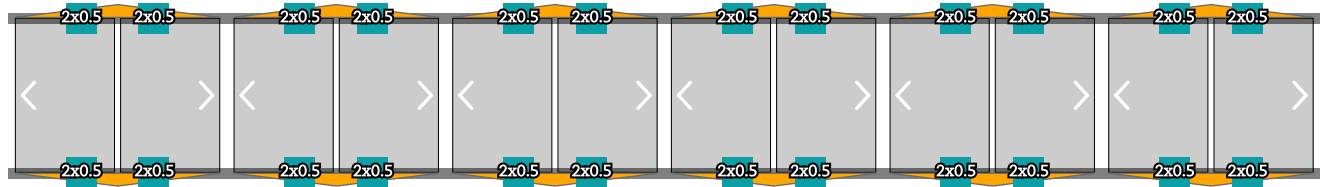
## Roof D | Field 12 | Solar panels



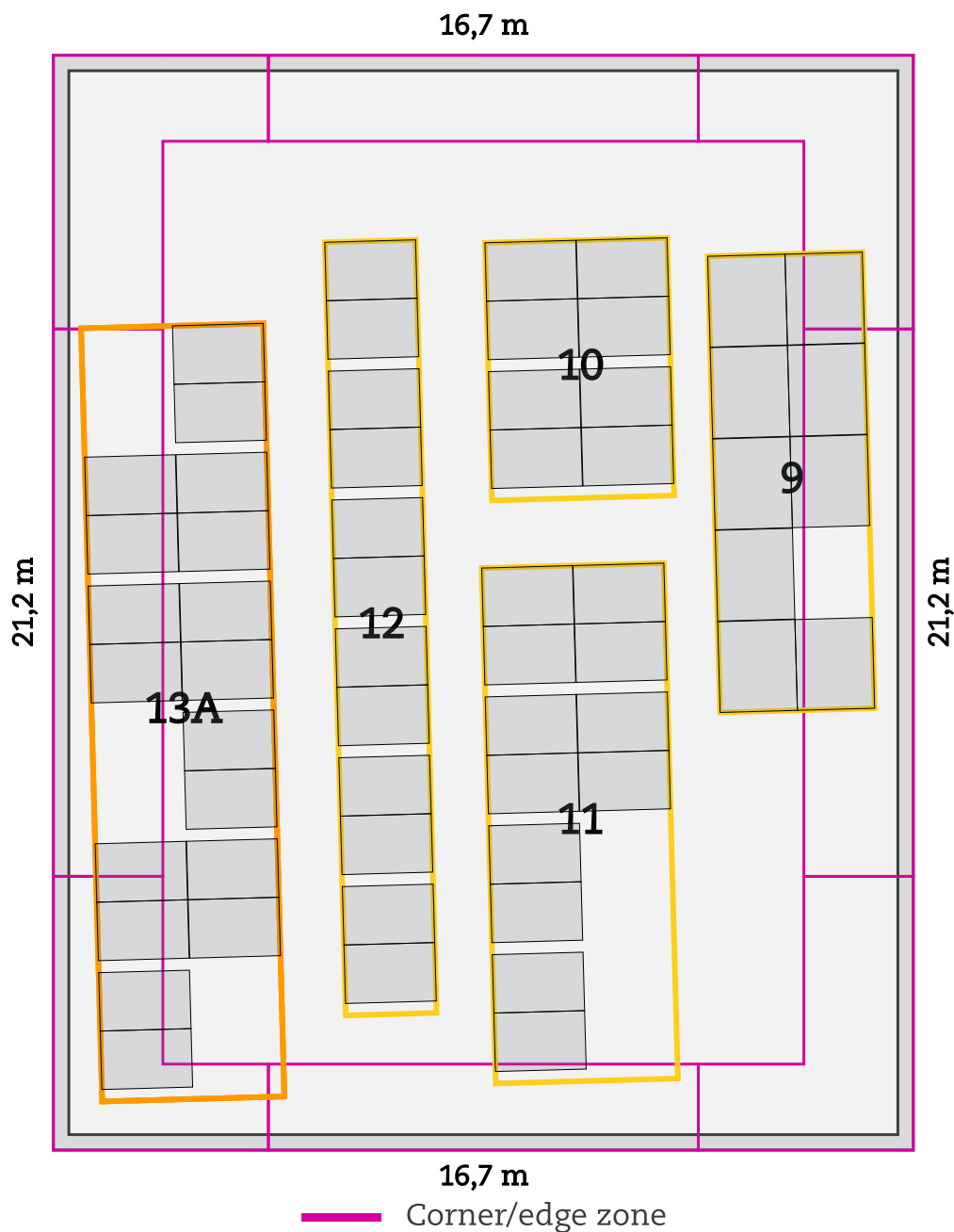
## Components

|                                         |        |                                        |        |
|-----------------------------------------|--------|----------------------------------------|--------|
| Module                                  | 12 Pcs | SS thread-forming bolt M6x20mm - T30   | 72 Pcs |
| Alu rear foot ValkPro+ L10° side        | 24 Pcs | Rubber tile carrier - click - ValkPro+ | 28 Pcs |
| Alu front foot ValkPro+ P/L10° side     | 24 Pcs | Rubber block - gravel roof - ValkPro+  | 28 Pcs |
| SS hammerhead bolt M8x20mm + lock nut   | 10 Pcs | Ballast full tiles                     | 0 Pcs  |
| Galv roof carrier L=2500x1,5mm          | 12 Pcs | Ballast half tiles                     | 48 Pcs |
| Galv side plate ValkPro+ L10° universal | 24 Pcs |                                        |        |

## Roof D | Field 12 - part 12A | Solar panels



## Roof D | Field 13 | Solar panels

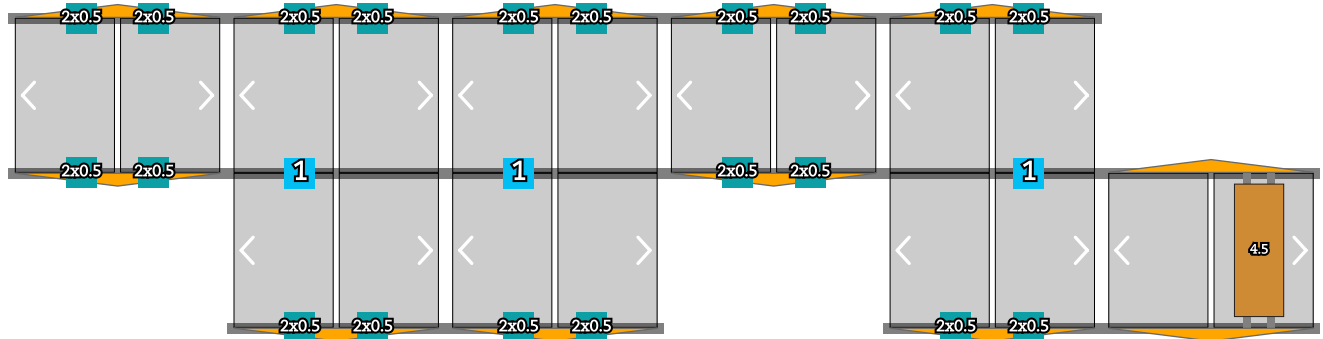


## Components

|                                         |        |                                         |        |
|-----------------------------------------|--------|-----------------------------------------|--------|
| Module                                  | 18 Pcs | Rubber tile carrier - click - ValkPro+  | 38 Pcs |
| Alu rear foot ValkPro+ L10° side        | 24 Pcs | Rubber block - gravel roof - ValkPro+   | 38 Pcs |
| Alu front foot ValkPro+ P/L10° side     | 24 Pcs | Alu rear foot ValkPro+ L10° middle      | 6 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut   | 11 Pcs | Alu front foot ValkPro+ P/L10° middle   | 6 Pcs  |
| Galv roof carrier L=2500x1,5mm          | 15 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 2 Pcs  |
| Galv side plate ValkPro+ L10° universal | 24 Pcs | Ballast full tiles                      | 7 Pcs  |
| SS thread-forming bolt M6x20mm - T30    | 72 Pcs | Ballast half tiles                      | 41 Pcs |



## Roof D | Field 13 - part 13A | Solar panels





Printworks, Manchester - Gen Fit

## Roof D | Bill of materials

| Item no.          | Panel type | Qty    |
|-------------------|------------|--------|
| DM450M10RT-B54HBT | DMEGC      | 59 pcs |

| Item no.  | Mounting system                         | Calc. Qty |
|-----------|-----------------------------------------|-----------|
| 724650    | Alu rear foot ValkPro+ L10° middle      | 20 Pcs    |
| 724651    | Alu rear foot ValkPro+ L10° side        | 78 Pcs    |
| 724660    | Alu front foot ValkPro+ P/L10° middle   | 20 Pcs    |
| 724661    | Alu front foot ValkPro+ P/L10° side     | 78 Pcs    |
| 774221    | SS hammerhead bolt M8x20mm + lock nut   | 37 Pcs    |
| 742512    | Galv back plate ValkPro+ L10° L=1980mm  | 9 Pcs     |
| 741802500 | Galv roof carrier L=2500x1,5mm          | 43 Pcs    |
| 741801500 | Galv roof carrier L=1500x1,5mm          | 12 Pcs    |
| 742540    | Galv side plate ValkPro+ L10° universal | 78 Pcs    |
| 773320    | SS thread-forming bolt M6x20mm - T30    | 246 Pcs   |
| 729622    | Rubber tile carrier - click - ValkPro+  | 134 Pcs   |
| 729627    | Rubber block - gravel roof - ValkPro+   | 134 Pcs   |
| 742564    | Galv. ballast carrier ValkPro+ L=1979mm | 22 Pcs    |

| Item no.   | Additional items                  | Calc. Qty |
|------------|-----------------------------------|-----------|
| 7506301545 | Tile 30 x 15 x 4,5cm - 4,5kg - NL | 141 pcs   |
| 7506303045 | Tile 30 x 30 x 4,5cm - 9kg - NL   | 73 pcs    |



## Roof E | Summary

### Roof properties

|                      |         |                    |             |
|----------------------|---------|--------------------|-------------|
| Height               | 25,00 m | Roof area          | 228,8 m²    |
| Slope                | 1°      | PV-system area     | 93 m²       |
| Roof type            | Flat    | Cladding           | Gravel roof |
| Parapet height       | 0,30 m  | Roof membrane type | CONCRETE    |
| Parapet width        | 0,30 m  | Number of panels   | 489 pcs     |
| Friction coefficient | 0,6     | Power              | 220,05 kWp  |

### Eurocode calculations

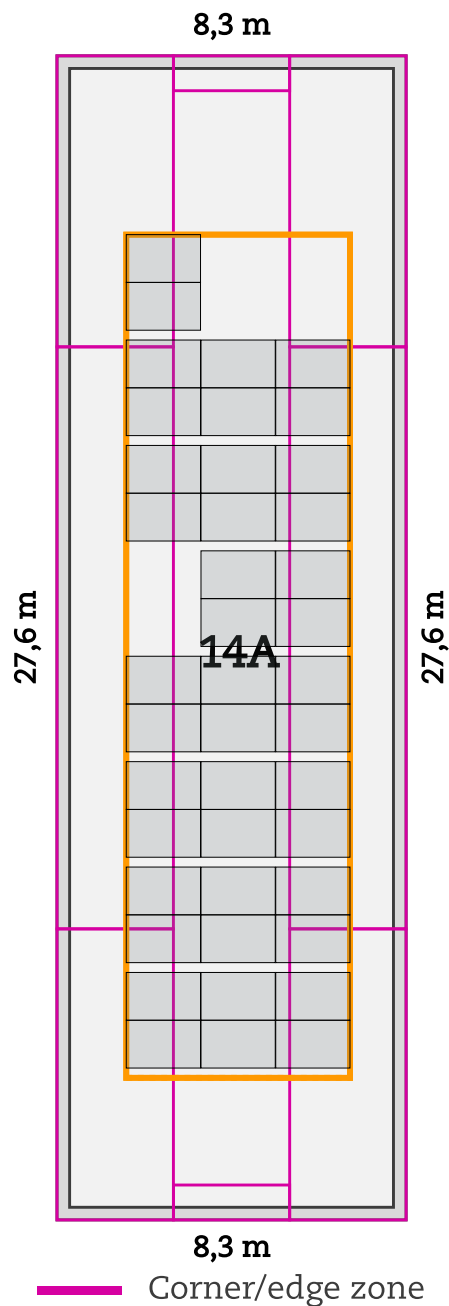
|                             |                                |                                  |     |
|-----------------------------|--------------------------------|----------------------------------|-----|
| Peak wind velocity pressure | 0,87 kPa                       | Combination factor for wind load | 0,5 |
| Characteristic snow load    | 0,37 kPa                       | Combination factor for snow load | 0,5 |
| Min. point load on roof     | 10 kPa                         |                                  |     |
| Max. point load on roof     | 15 kPa                         |                                  |     |
| Load case                   | Dead weight (system + ballast) |                                  |     |

### Weight calculations

|                           |          |                                  |            |
|---------------------------|----------|----------------------------------|------------|
| Weight of solar panels    | 1.029 kg | Average weight on roof area      | 7,3 kg/m²  |
| Weight of mounting system | 332 kg   | Average weight on PV-system area | 18,1 kg/m² |
| Ballast weight            | 320 kg   |                                  |            |
| Total weight              | 1.681 kg |                                  |            |



## Roof E | Field 14 | Solar panels

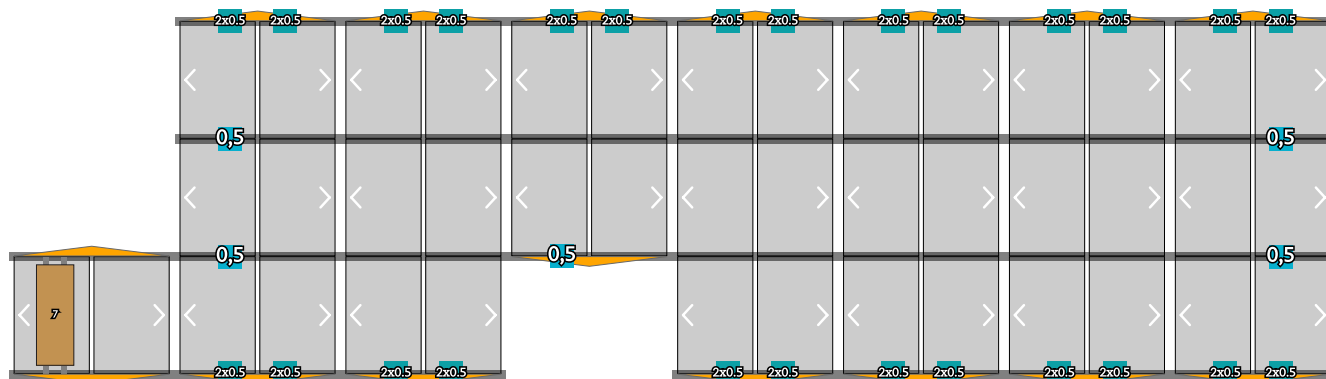


## Components

|                                       |        |                                         |        |
|---------------------------------------|--------|-----------------------------------------|--------|
| Module                                | 42 Pcs | Galv side plate ValkPro+ L10° universal | 32 Pcs |
| Alu rear foot ValkPro+ L10° middle    | 26 Pcs | SS thread-forming bolt M6x20mm - T30    | 96 Pcs |
| Alu rear foot ValkPro+ L10° side      | 32 Pcs | Rubber tile carrier - click - ValkPro+  | 68 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 26 Pcs | Rubber block - gravel roof - ValkPro+   | 68 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 32 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 2 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut | 24 Pcs | Ballast full tiles                      | 7 Pcs  |
| Galv roof carrier L=2500x1,5mm        | 29 Pcs | Ballast half tiles                      | 57 Pcs |



## Roof E | Field 14 - part 14A | Solar panels





## Roof E | Bill of materials

| Item no.                 | Panel type   | Qty           |
|--------------------------|--------------|---------------|
| <b>DM450M10RT-B54HBT</b> | <b>DMEGC</b> | <b>42 pcs</b> |

| Item no.         | Mounting system                                | Calc. Qty     |
|------------------|------------------------------------------------|---------------|
| <b>724650</b>    | <b>Alu rear foot ValkPro+ L10° middle</b>      | <b>26 Pcs</b> |
| <b>724651</b>    | <b>Alu rear foot ValkPro+ L10° side</b>        | <b>32 Pcs</b> |
| <b>724660</b>    | <b>Alu front foot ValkPro+ P/L10° middle</b>   | <b>26 Pcs</b> |
| <b>724661</b>    | <b>Alu front foot ValkPro+ P/L10° side</b>     | <b>32 Pcs</b> |
| <b>774221</b>    | <b>SS hammerhead bolt M8x20mm + lock nut</b>   | <b>24 Pcs</b> |
| <b>741802500</b> | <b>Galv roof carrier L=2500x1,5mm</b>          | <b>29 Pcs</b> |
| <b>742540</b>    | <b>Galv side plate ValkPro+ L10° universal</b> | <b>32 Pcs</b> |
| <b>773320</b>    | <b>SS thread-forming bolt M6x20mm - T30</b>    | <b>96 Pcs</b> |
| <b>729622</b>    | <b>Rubber tile carrier - click - ValkPro+</b>  | <b>68 Pcs</b> |
| <b>729627</b>    | <b>Rubber block - gravel roof - ValkPro+</b>   | <b>68 Pcs</b> |
| <b>742564</b>    | <b>Galv. ballast carrier ValkPro+ L=1979mm</b> | <b>2 Pcs</b>  |

| Item no.          | Additional items                         | Calc. Qty     |
|-------------------|------------------------------------------|---------------|
| <b>7506301545</b> | <b>Tile 30 x 15 x 4,5cm - 4,5kg - NL</b> | <b>57 pcs</b> |
| <b>7506303045</b> | <b>Tile 30 x 30 x 4,5cm - 9kg - NL</b>   | <b>7 pcs</b>  |



## Roof F | Summary

### Roof properties

|                      |         |                    |                      |
|----------------------|---------|--------------------|----------------------|
| Height               | 25,00 m | Roof area          | 626,1 m <sup>2</sup> |
| Slope                | 1°      | PV-system area     | 168,3 m <sup>2</sup> |
| Roof type            | Flat    | Cladding           | Gravel roof          |
| Parapet height       | 0,30 m  | Roof membrane type | CONCRETE             |
| Parapet width        | 0,30 m  | Number of panels   | 489 pcs              |
| Friction coefficient | 0,6     | Power              | 220,05 kWp           |

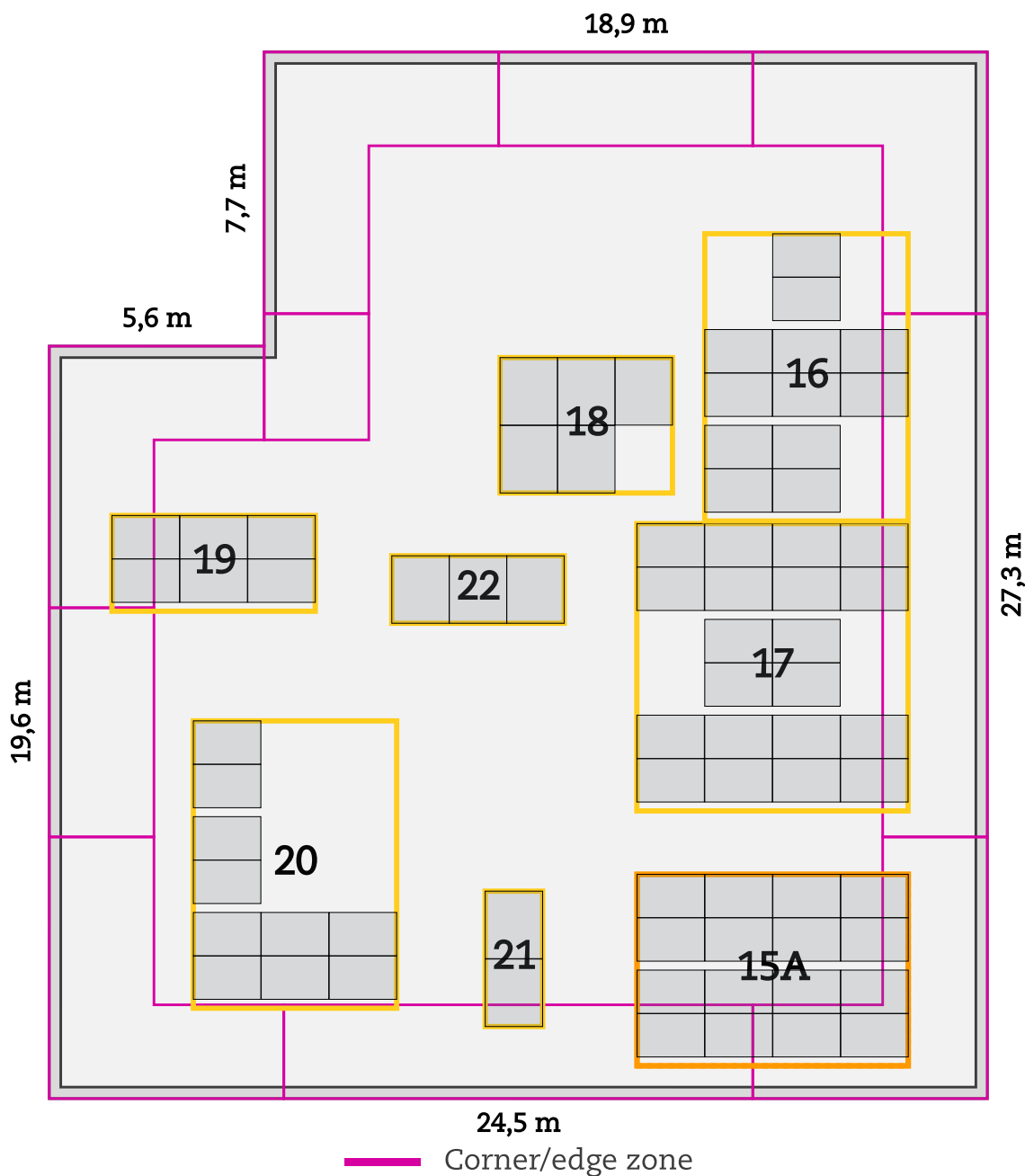
### Eurocode calculations

|                             |                                |                                  |     |
|-----------------------------|--------------------------------|----------------------------------|-----|
| Peak wind velocity pressure | 0,87 kPa                       | Combination factor for wind load | 0,5 |
| Characteristic snow load    | 0,47 kPa                       | Combination factor for snow load | 0,5 |
| Min. point load on roof     | 8 kPa                          |                                  |     |
| Max. point load on roof     | 31 kPa                         |                                  |     |
| Load case                   | Dead weight (system + ballast) |                                  |     |

### Weight calculations

|                           |          |                                  |                        |
|---------------------------|----------|----------------------------------|------------------------|
| Weight of solar panels    | 1.813 kg | Average weight on roof area      | 6,8 kg/m <sup>2</sup>  |
| Weight of mounting system | 780 kg   | Average weight on PV-system area | 25,3 kg/m <sup>2</sup> |
| Ballast weight            | 1.663 kg |                                  |                        |
| Total weight              | 4.256 kg |                                  |                        |

## Roof F | Field 15 | Solar panels

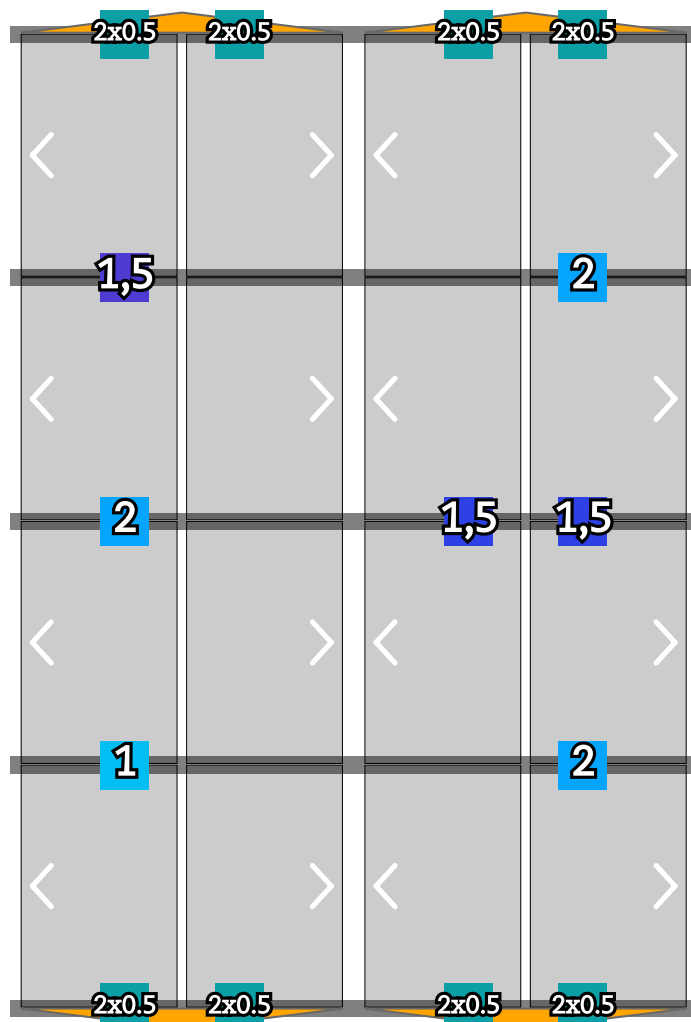


## Components

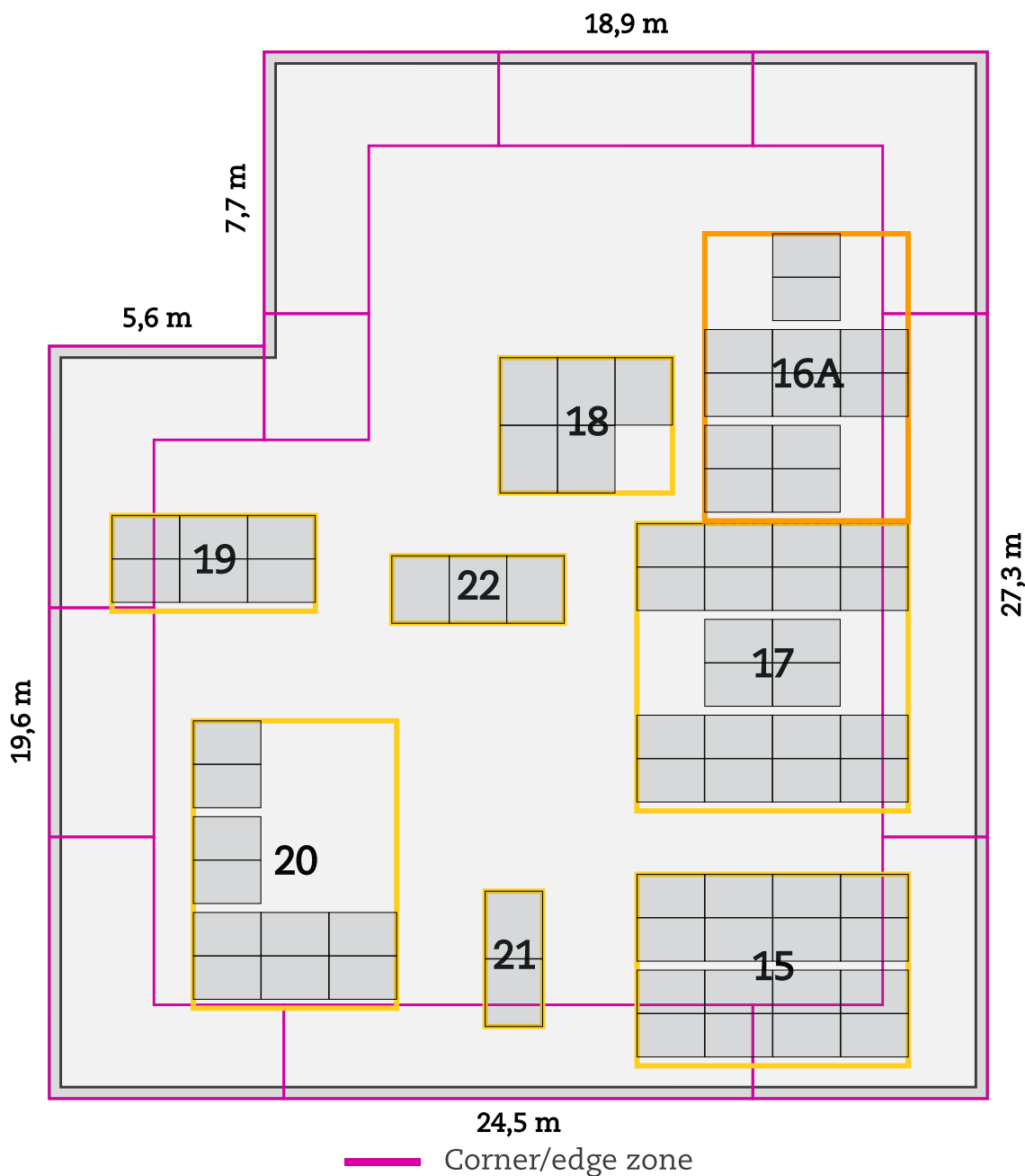
|                                       |        |                                         |        |
|---------------------------------------|--------|-----------------------------------------|--------|
| Module                                | 16 Pcs | Galv side plate ValkPro+ L10° universal | 8 Pcs  |
| Alu rear foot ValkPro+ L10° middle    | 12 Pcs | SS thread-forming bolt M6x20mm - T30    | 24 Pcs |
| Alu rear foot ValkPro+ L10° side      | 8 Pcs  | Rubber tile carrier - click - ValkPro+  | 30 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 12 Pcs | Rubber block - gravel roof - ValkPro+   | 30 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 8 Pcs  | Ballast full tiles                      | 10 Pcs |
| SS hammerhead bolt M8x20mm + lock nut | 5 Pcs  | Ballast half tiles                      | 19 Pcs |
| Galv roof carrier L=2500x1,5mm        | 10 Pcs |                                         |        |



## Roof F | Field 15 - part 15A | Solar panels



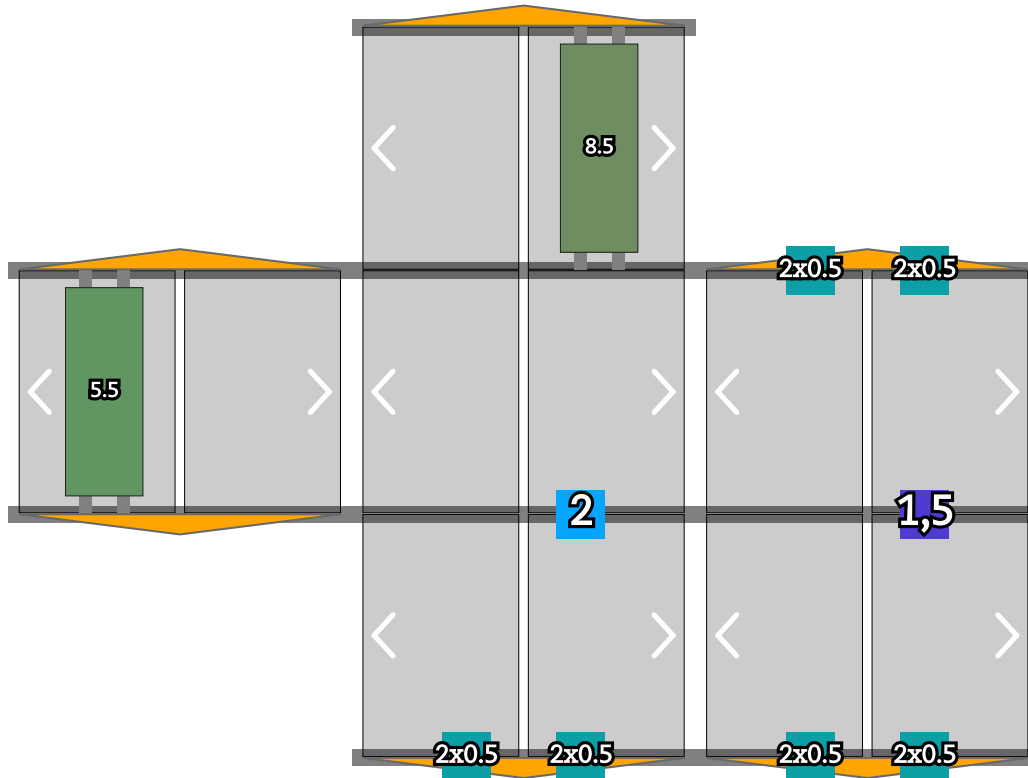
## Roof F | Field 16 | Solar panels



## Components

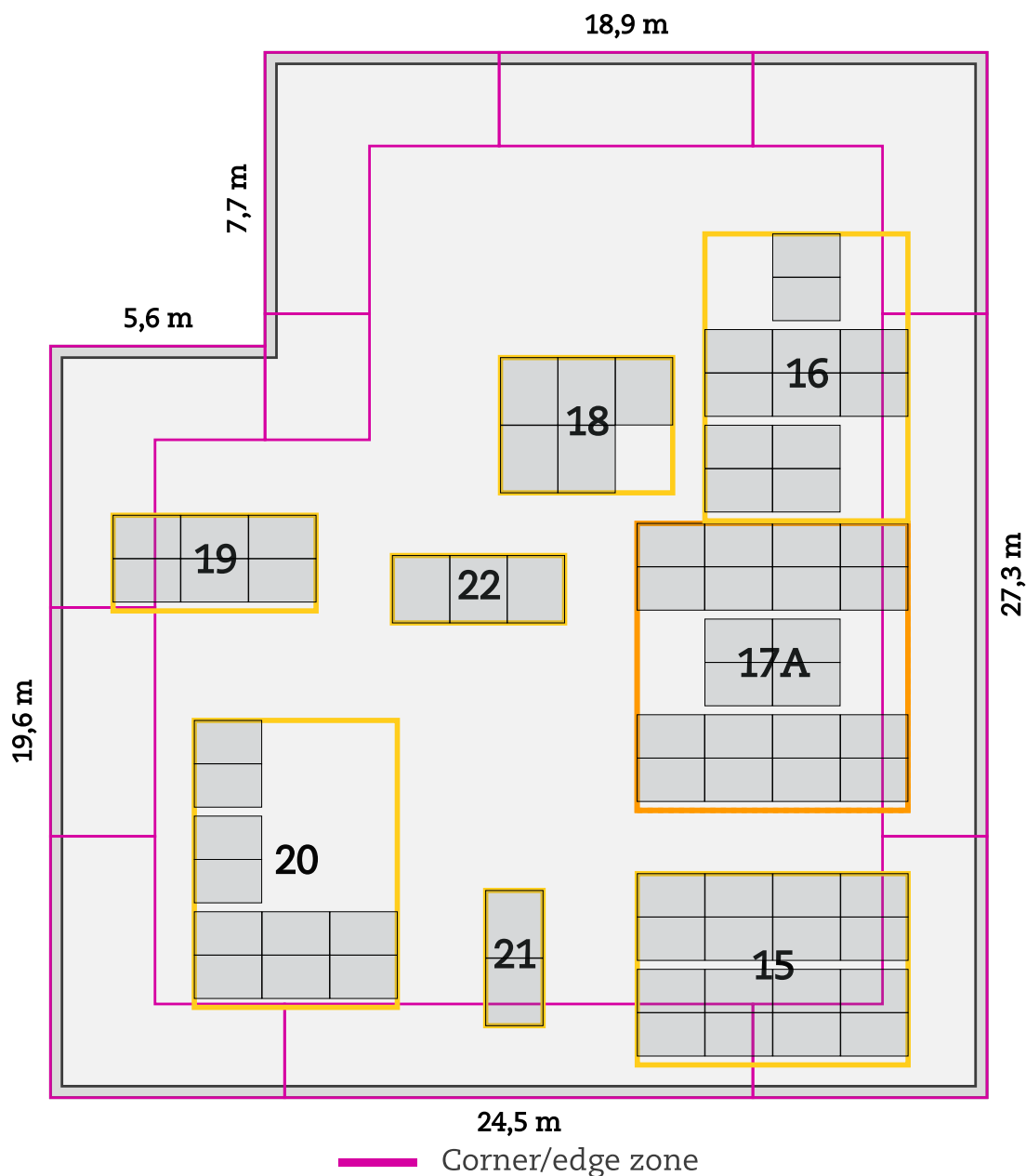
|                                       |        |                                         |        |
|---------------------------------------|--------|-----------------------------------------|--------|
| Module                                | 12 Pcs | Galv side plate ValkPro+ L10° universal | 12 Pcs |
| Alu rear foot ValkPro+ L10° middle    | 6 Pcs  | SS thread-forming bolt M6x20mm - T30    | 36 Pcs |
| Alu rear foot ValkPro+ L10° side      | 12 Pcs | Rubber tile carrier - click - ValkPro+  | 26 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 6 Pcs  | Rubber block - gravel roof - ValkPro+   | 26 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 12 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 4 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut | 5 Pcs  | Ballast full tiles                      | 16 Pcs |
| Galv roof carrier L=2500x1,5mm        | 9 Pcs  | Ballast half tiles                      | 15 Pcs |

## Roof F | Field 16 - part 16A | Solar panels





## Roof F | Field 17 | Solar panels

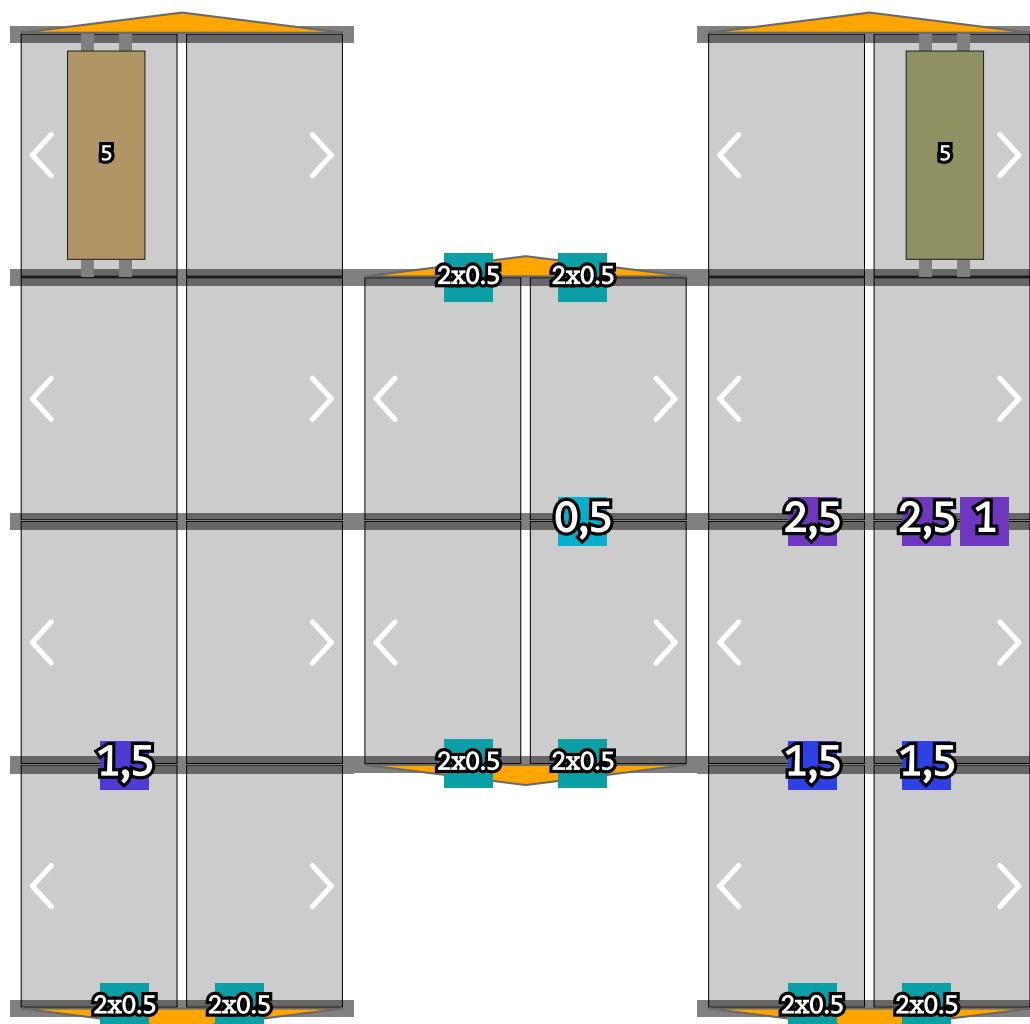


## Components

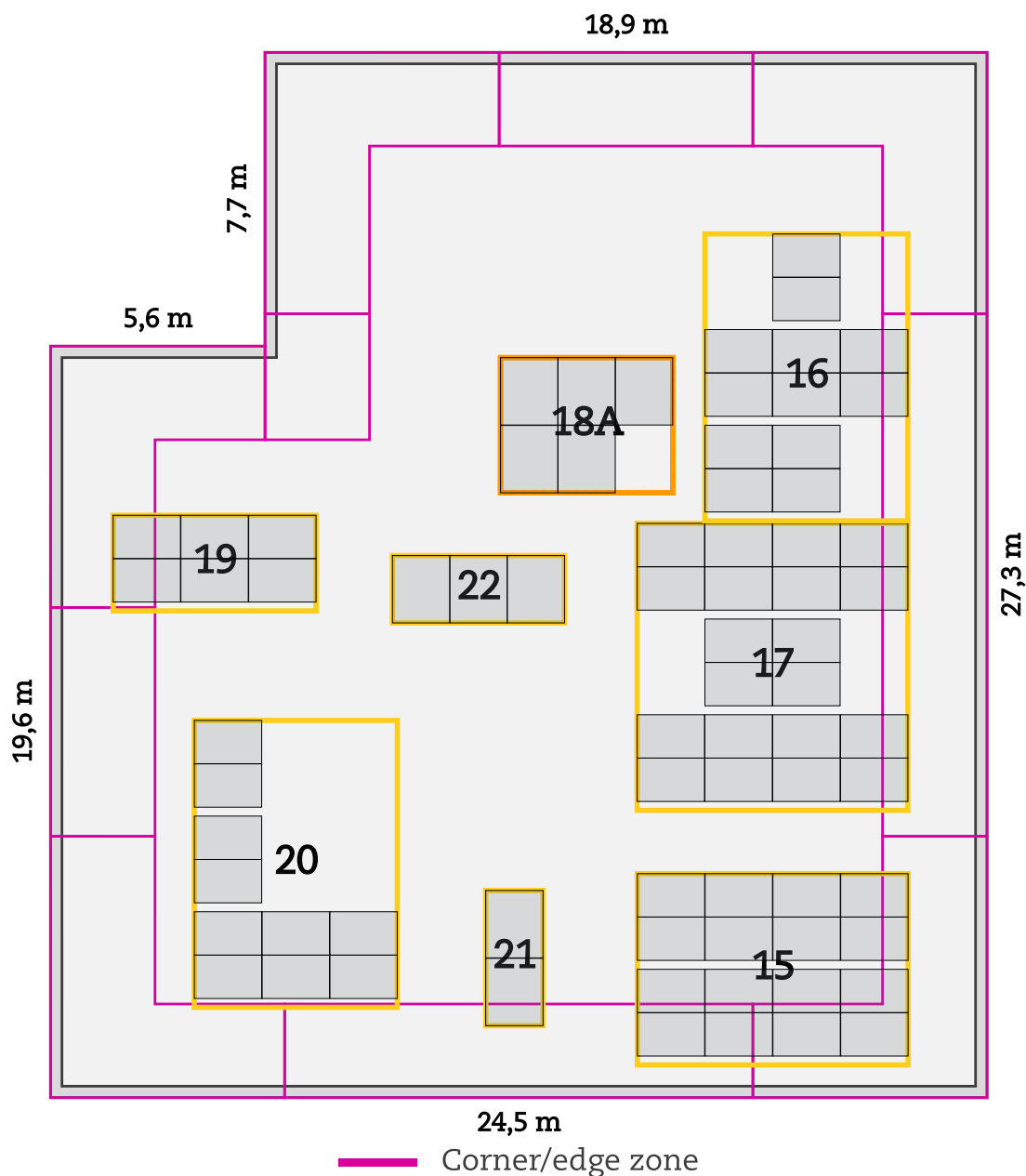
|                                         |        |                                         |        |
|-----------------------------------------|--------|-----------------------------------------|--------|
| Module                                  | 20 Pcs | SS thread-forming bolt M6x20mm - T30    | 36 Pcs |
| Alu rear foot ValkPro+ L10° middle      | 14 Pcs | Rubber tile carrier - click - ValkPro+  | 40 Pcs |
| Alu rear foot ValkPro+ L10° side        | 12 Pcs | Rubber block - gravel roof - ValkPro+   | 40 Pcs |
| Alu front foot ValkPro+ P/L10° middle   | 14 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 4 Pcs  |
| Alu front foot ValkPro+ P/L10° side     | 12 Pcs | Alu. ballast wing ValkPro+              | 1 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut   | 6 Pcs  | Ballast full tiles                      | 18 Pcs |
| Galv roof carrier L=2500x1,5mm          | 13 Pcs | Ballast half tiles                      | 22 Pcs |
| Galv side plate ValkPro+ L10° universal | 12 Pcs |                                         |        |



## Roof F | Field 17 - part 17A | Solar panels



## Roof F | Field 18 | Solar panels

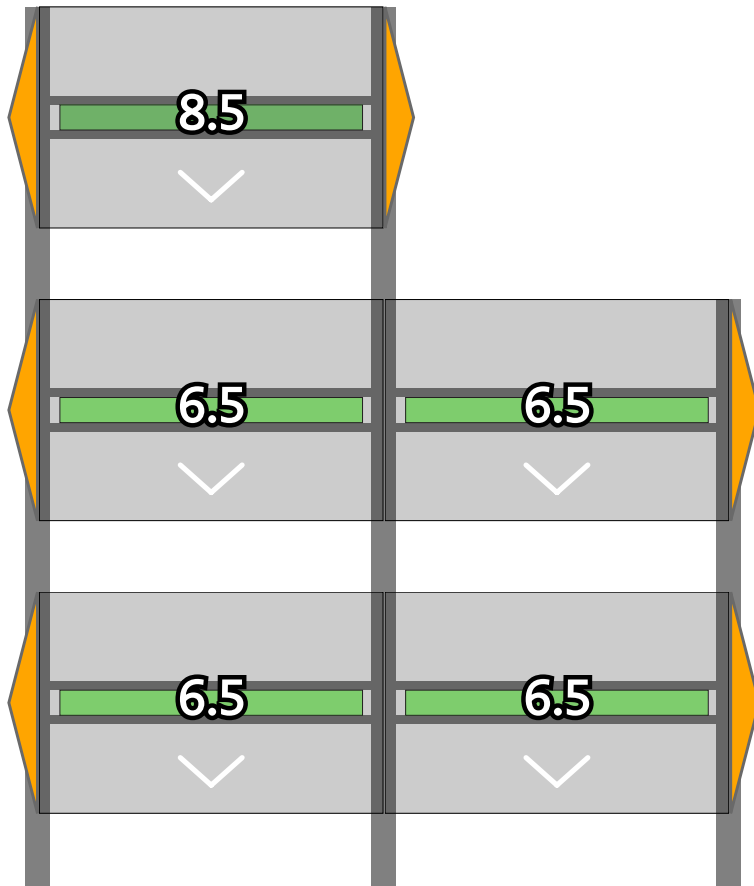


## Components

|                                         |        |                                         |        |
|-----------------------------------------|--------|-----------------------------------------|--------|
| Module                                  | 5 Pcs  | Rubber tile carrier - click - ValkPro+  | 14 Pcs |
| Alu rear foot ValkPro+ L10° side        | 6 Pcs  | Rubber block - gravel roof - ValkPro+   | 14 Pcs |
| Alu front foot ValkPro+ P/L10° side     | 6 Pcs  | Galv. ballast carrier ValkPro+ L=1979mm | 10 Pcs |
| SS hammerhead bolt M8x20mm + lock nut   | 5 Pcs  | Alu rear foot ValkPro+ L10° middle      | 2 Pcs  |
| Galv back plate ValkPro+ L10° L=1980mm  | 5 Pcs  | Alu front foot ValkPro+ P/L10° middle   | 2 Pcs  |
| Galv roof carrier L=1500x1,5mm          | 8 Pcs  | Ballast full tiles                      | 32 Pcs |
| Galv side plate ValkPro+ L10° universal | 6 Pcs  | Ballast half tiles                      | 5 Pcs  |
| SS thread-forming bolt M6x20mm - T30    | 26 Pcs |                                         |        |

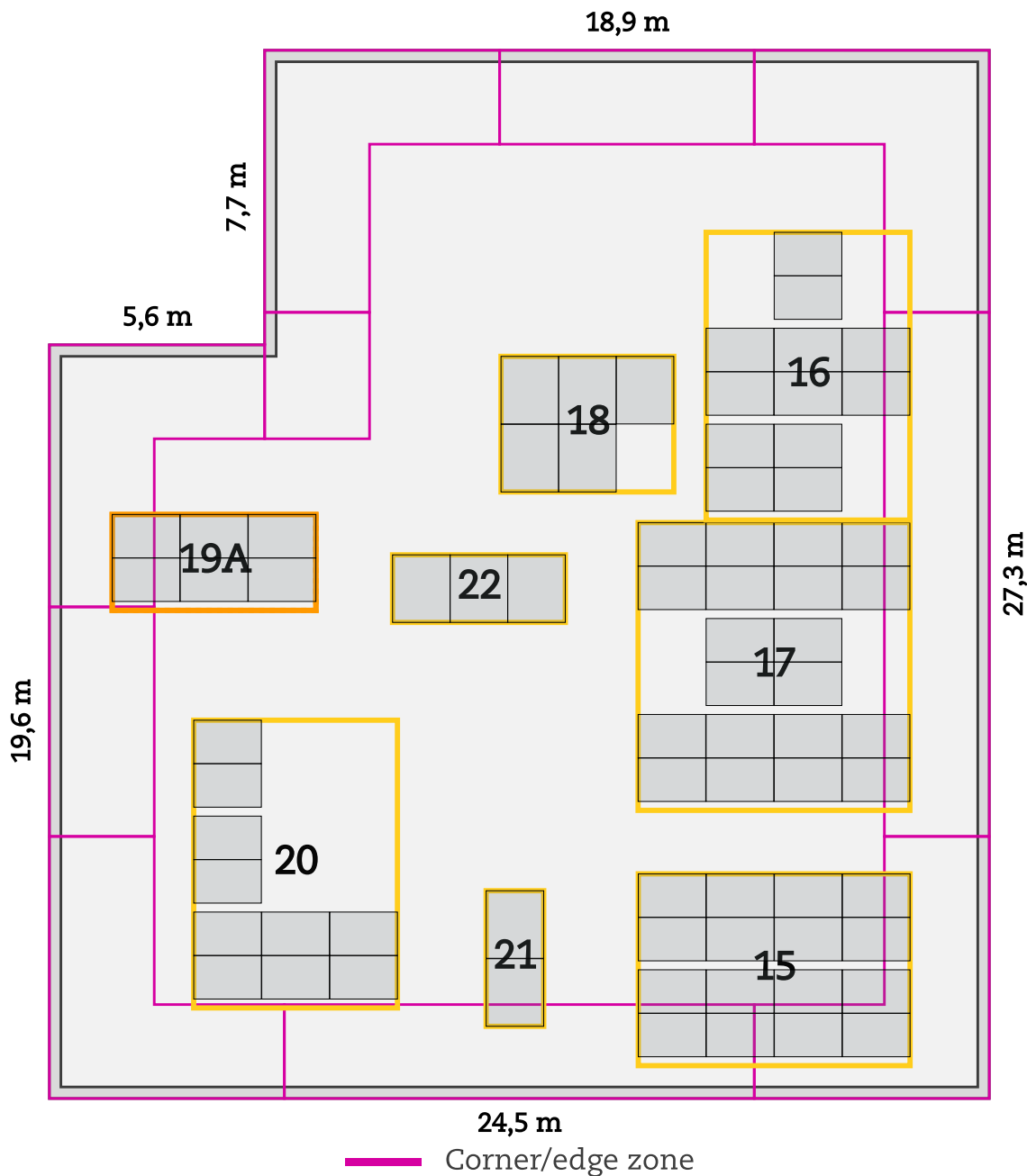


## Roof F | Field 18 - part 18A | Solar panels





## Roof F | Field 19 | Solar panels

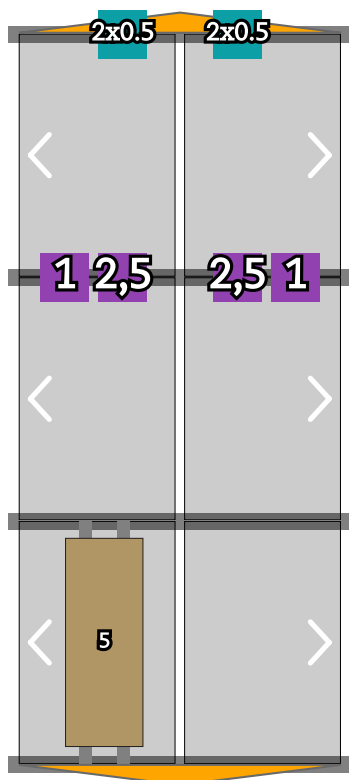


## Components

|                                         |       |                                         |        |
|-----------------------------------------|-------|-----------------------------------------|--------|
| Module                                  | 6 Pcs | SS thread-forming bolt M6x20mm - T30    | 12 Pcs |
| Alu rear foot ValkPro+ L10° middle      | 4 Pcs | Rubber tile carrier - click - ValkPro+  | 16 Pcs |
| Alu rear foot ValkPro+ L10° side        | 4 Pcs | Rubber block - gravel roof - ValkPro+   | 16 Pcs |
| Alu front foot ValkPro+ P/L10° middle   | 4 Pcs | Alu. ballast wing ValkPro+              | 2 Pcs  |
| Alu front foot ValkPro+ P/L10° side     | 4 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 2 Pcs  |
| Galv roof carrier L=2500x1,5mm          | 4 Pcs | Ballast full tiles                      | 11 Pcs |
| Galv side plate ValkPro+ L10° universal | 4 Pcs | Ballast half tiles                      | 6 Pcs  |

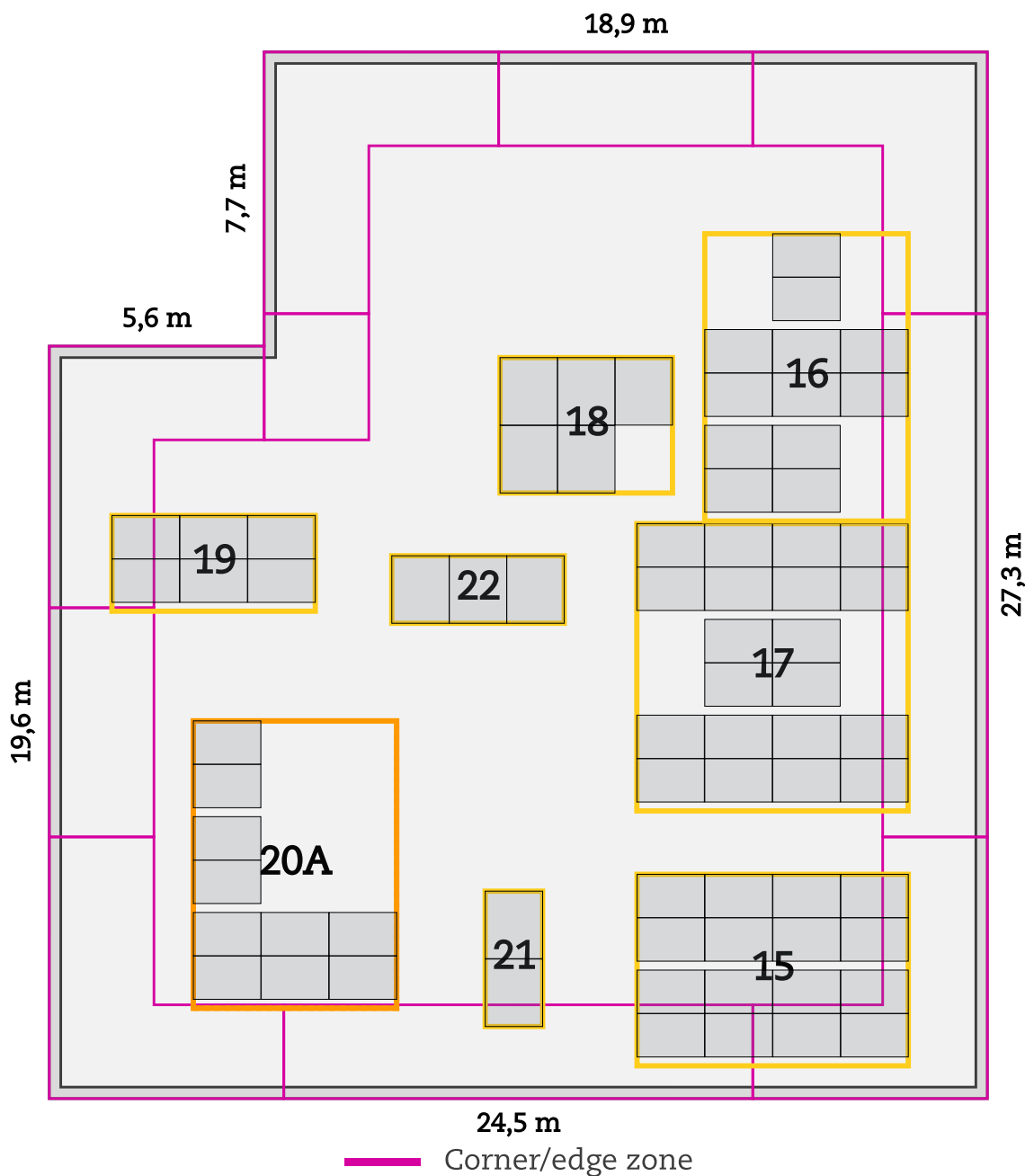


## Roof F | Field 19 - part 19A | Solar panels





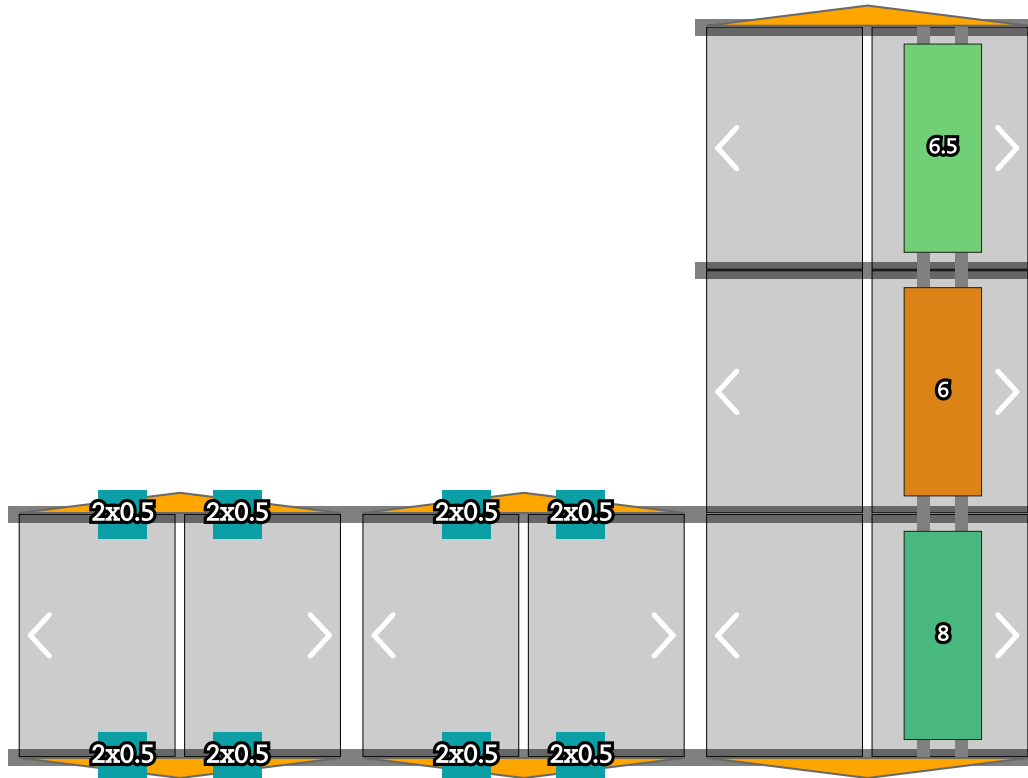
## Roof F | Field 20 | Solar panels



## Components

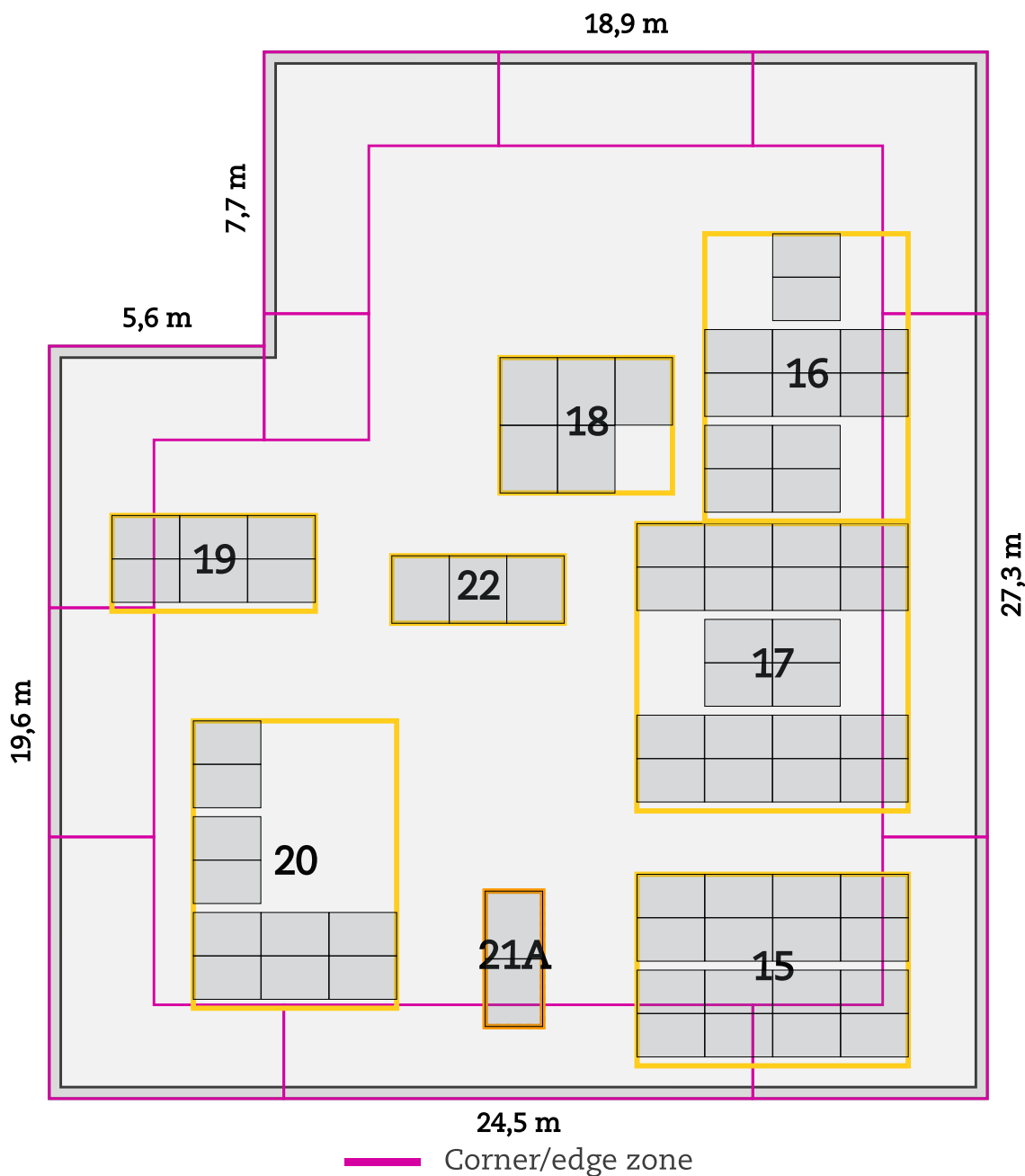
|                                         |        |                                         |        |
|-----------------------------------------|--------|-----------------------------------------|--------|
| Module                                  | 10 Pcs | SS thread-forming bolt M6x20mm - T30    | 36 Pcs |
| Alu rear foot ValkPro+ L10° middle      | 4 Pcs  | Rubber tile carrier - click - ValkPro+  | 24 Pcs |
| Alu rear foot ValkPro+ L10° side        | 12 Pcs | Rubber block - gravel roof - ValkPro+   | 24 Pcs |
| Alu front foot ValkPro+ P/L10° middle   | 4 Pcs  | Galv. ballast carrier ValkPro+ L=1979mm | 6 Pcs  |
| Alu front foot ValkPro+ P/L10° side     | 12 Pcs | SS hammerhead bolt M8x20mm + lock nut   | 4 Pcs  |
| Galv roof carrier L=2500x1,5mm          | 8 Pcs  | Ballast full tiles                      | 20 Pcs |
| Galv side plate ValkPro+ L10° universal | 12 Pcs | Ballast half tiles                      | 17 Pcs |

## Roof F | Field 20 - part 20A | Solar panels





## Roof F | Field 21 | Solar panels

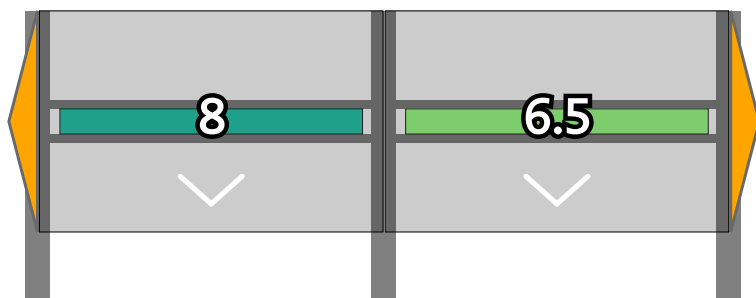


## Components

|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 2 Pcs | Galv side plate ValkPro+ L10° universal | 2 Pcs  |
| Alu rear foot ValkPro+ L10° middle     | 1 Pcs | SS thread-forming bolt M6x20mm - T30    | 9 Pcs  |
| Alu rear foot ValkPro+ L10° side       | 2 Pcs | Rubber tile carrier - click - ValkPro+  | 9 Pcs  |
| Alu front foot ValkPro+ P/L10° middle  | 1 Pcs | Rubber block - gravel roof - ValkPro+   | 9 Pcs  |
| Alu front foot ValkPro+ P/L10° side    | 2 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 4 Pcs  |
| Galv back plate ValkPro+ L10° L=1980mm | 2 Pcs | Ballast full tiles                      | 14 Pcs |
| Galv roof carrier L=1500x1,5mm         | 3 Pcs | Ballast half tiles                      | 1 Pcs  |

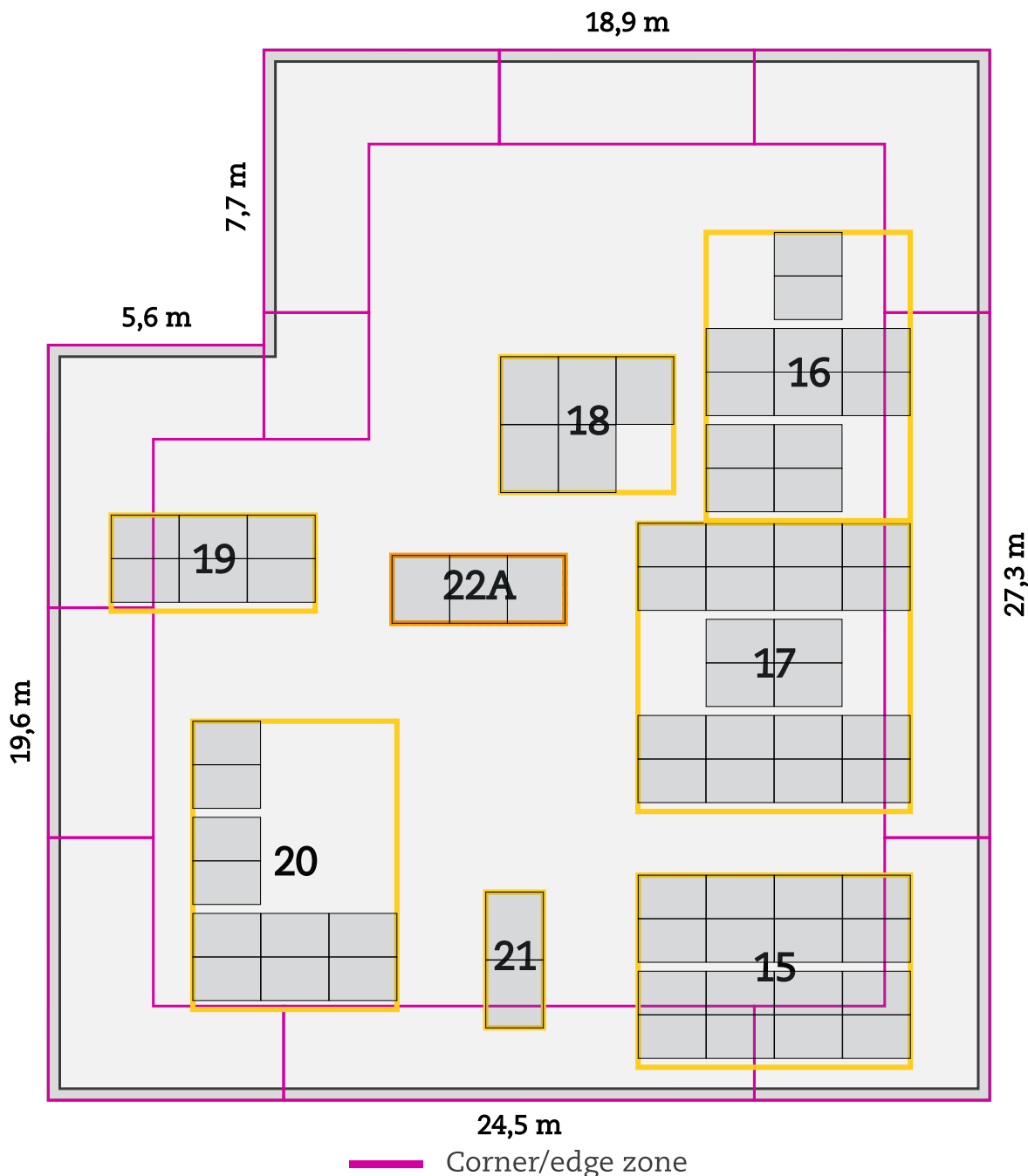


## Roof F | Field 21 - part 21A | Solar panels





## Roof F | Field 22 | Solar panels

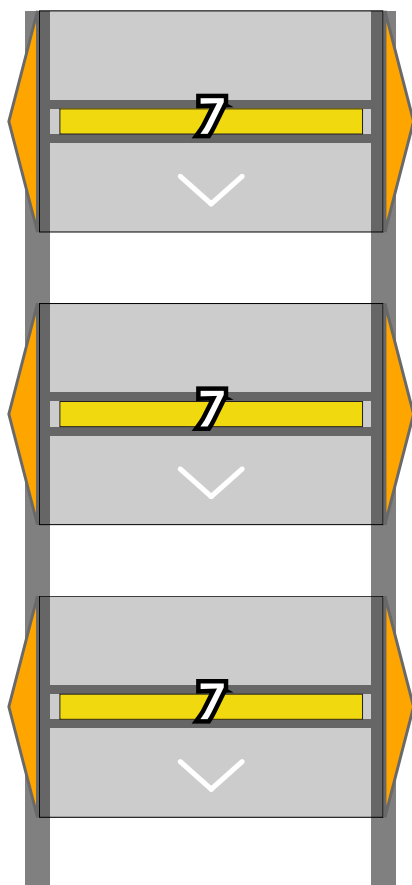


## Components

|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 3 Pcs | Galv side plate ValkPro+ L10° universal | 6 Pcs  |
| Alu rear foot ValkPro+ L10° side       | 6 Pcs | SS thread-forming bolt M6x20mm - T30    | 24 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 6 Pcs | Rubber tile carrier - click - ValkPro+  | 10 Pcs |
| SS hammerhead bolt M8x20mm + lock nut  | 4 Pcs | Rubber block - gravel roof - ValkPro+   | 10 Pcs |
| Galv back plate ValkPro+ L10° L=1980mm | 3 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 6 Pcs  |
| Galv roof carrier L=1500x1,5mm         | 6 Pcs | Ballast full tiles                      | 21 Pcs |



## Roof F | Field 22 - part 22A | Solar panels





## Roof F | Bill of materials

| Item no.          | Panel type | Qty    |
|-------------------|------------|--------|
| DM450M10RT-B54HBT | DMEGC      | 74 pcs |

| Item no.  | Mounting system                         | Calc. Qty |
|-----------|-----------------------------------------|-----------|
| 724650    | Alu rear foot ValkPro+ L10° middle      | 43 Pcs    |
| 724651    | Alu rear foot ValkPro+ L10° side        | 62 Pcs    |
| 724660    | Alu front foot ValkPro+ P/L10° middle   | 43 Pcs    |
| 724661    | Alu front foot ValkPro+ P/L10° side     | 62 Pcs    |
| 742512    | Galv back plate ValkPro+ L10° L=1980mm  | 10 Pcs    |
| 774221    | SS hammerhead bolt M8x20mm + lock nut   | 29 Pcs    |
| 741801500 | Galv roof carrier L=1500x1,5mm          | 17 Pcs    |
| 741802500 | Galv roof carrier L=2500x1,5mm          | 44 Pcs    |
| 742540    | Galv side plate ValkPro+ L10° universal | 62 Pcs    |
| 773320    | SS thread-forming bolt M6x20mm - T30    | 203 Pcs   |
| 729622    | Rubber tile carrier - click - ValkPro+  | 169 Pcs   |
| 729627    | Rubber block - gravel roof - ValkPro+   | 169 Pcs   |
| 742564    | Galv. ballast carrier ValkPro+ L=1979mm | 36 Pcs    |
| 725150    | Alu. ballast wing ValkPro+              | 3 Pcs     |

| Item no.   | Additional items                  | Calc. Qty |
|------------|-----------------------------------|-----------|
| 7506301545 | Tile 30 x 15 x 4,5cm - 4,5kg - NL | 85 pcs    |
| 7506303045 | Tile 30 x 30 x 4,5cm - 9kg - NL   | 142 pcs   |



## Roof G | Summary

### Roof properties

|                      |         |                    |                      |
|----------------------|---------|--------------------|----------------------|
| Height               | 25,00 m | Roof area          | 566 m <sup>2</sup>   |
| Slope                | 1°      | PV-system area     | 152,4 m <sup>2</sup> |
| Roof type            | Flat    | Cladding           | Gravel roof          |
| Parapet height       | 0,30 m  | Roof membrane type | CONCRETE             |
| Parapet width        | 0,30 m  | Number of panels   | 489 pcs              |
| Friction coefficient | 0,6     | Power              | 220,05 kWp           |

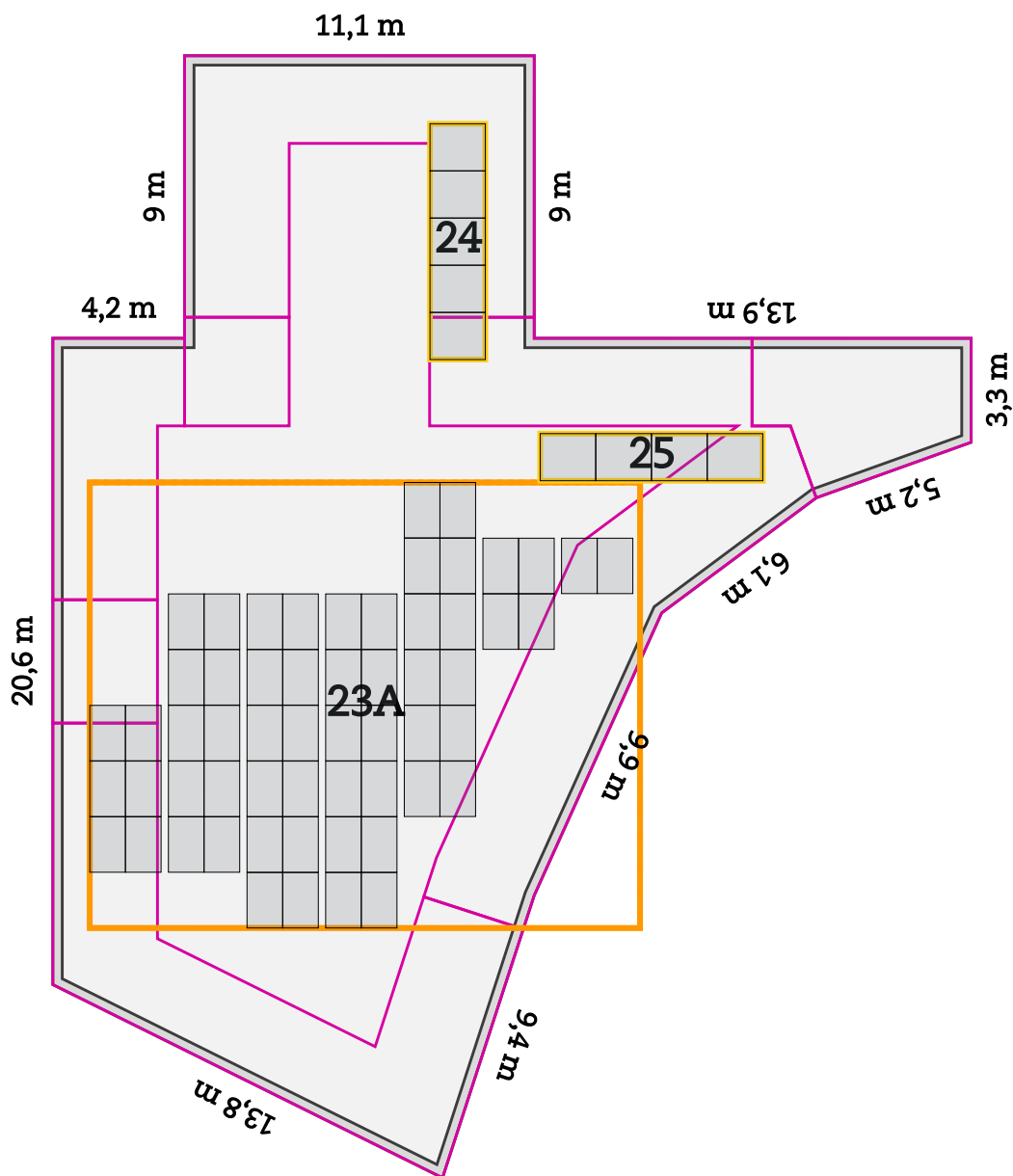
### Eurocode calculations

|                             |                                |                                  |     |
|-----------------------------|--------------------------------|----------------------------------|-----|
| Peak wind velocity pressure | 0,87 kPa                       | Combination factor for wind load | 0,5 |
| Characteristic snow load    | 0,47 kPa                       | Combination factor for snow load | 0,5 |
| Min. point load on roof     | 8 kPa                          |                                  |     |
| Max. point load on roof     | 24 kPa                         |                                  |     |
| Load case                   | Dead weight (system + ballast) |                                  |     |

### Weight calculations

|                           |          |                                  |                        |
|---------------------------|----------|----------------------------------|------------------------|
| Weight of solar panels    | 1.642 kg | Average weight on roof area      | 5,4 kg/m <sup>2</sup>  |
| Weight of mounting system | 582 kg   | Average weight on PV-system area | 19,9 kg/m <sup>2</sup> |
| Ballast weight            | 807 kg   |                                  |                        |
| Total weight              | 3.030 kg |                                  |                        |

## Roof G | Field 23 | Solar panels



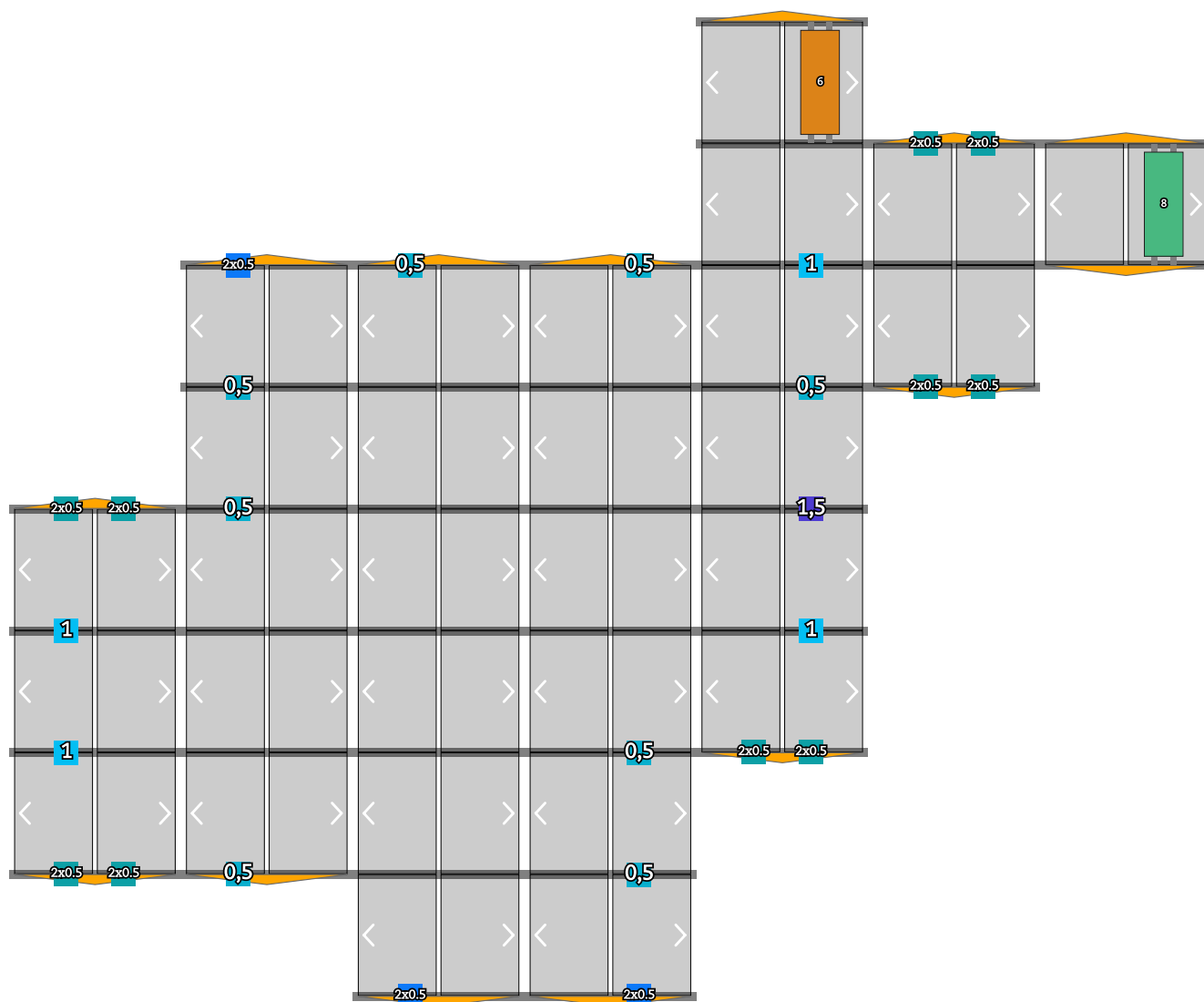
— Corner/edge zone

## Components

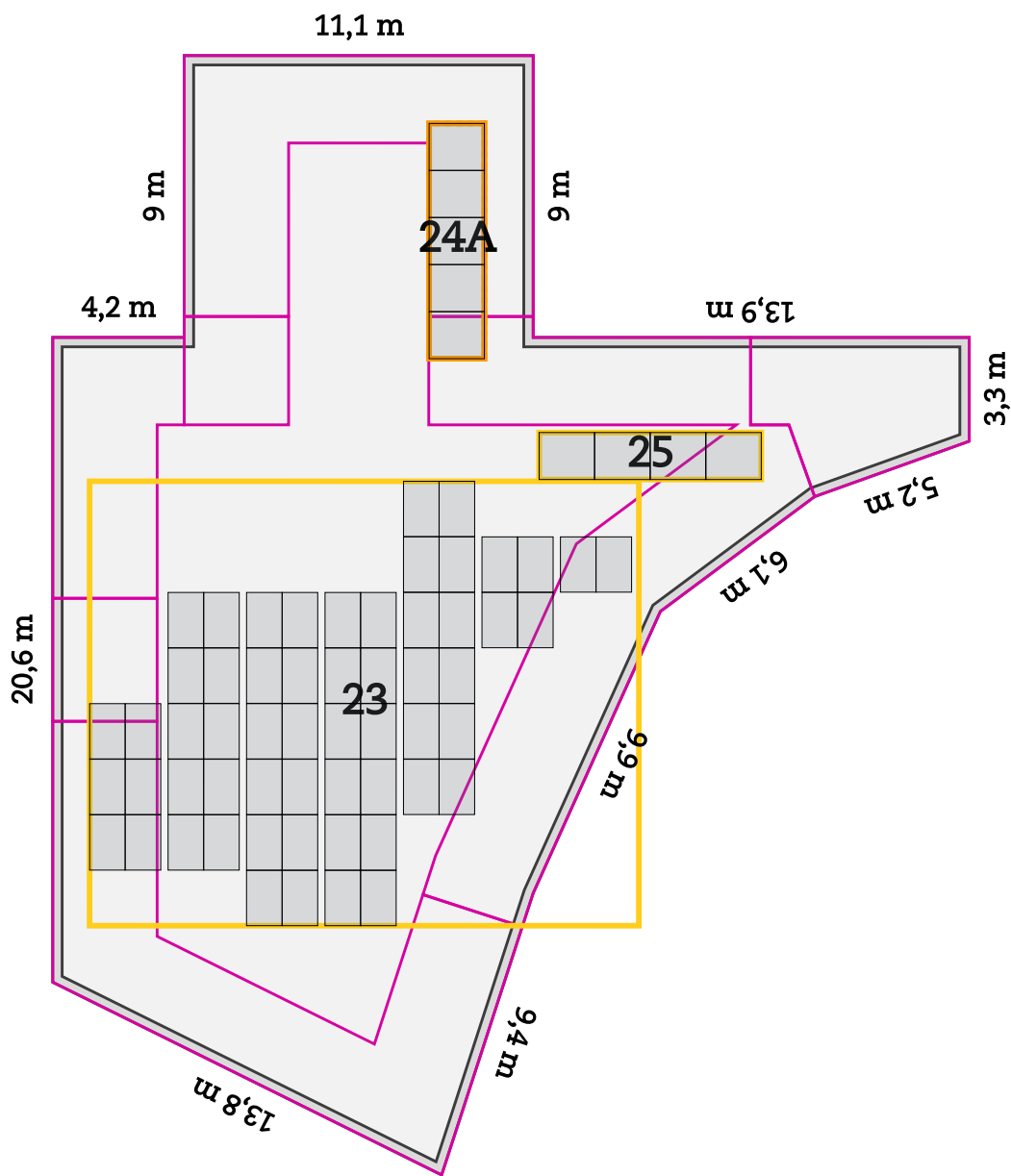
|                                       |        |                                         |        |
|---------------------------------------|--------|-----------------------------------------|--------|
| Module                                | 58 Pcs | Galv side plate ValkPro+ L10° universal | 28 Pcs |
| Alu rear foot ValkPro+ L10° middle    | 44 Pcs | SS thread-forming bolt M6x20mm - T30    | 84 Pcs |
| Alu rear foot ValkPro+ L10° side      | 28 Pcs | Rubber tile carrier - click - ValkPro+  | 90 Pcs |
| Alu front foot ValkPro+ P/L10° middle | 44 Pcs | Rubber block - gravel roof - ValkPro+   | 90 Pcs |
| Alu front foot ValkPro+ P/L10° side   | 28 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 4 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut | 27 Pcs | Ballast full tiles                      | 19 Pcs |
| Galv roof carrier L=2500x1,5mm        | 36 Pcs | Ballast half tiles                      | 35 Pcs |



# Roof G | Field 23 - part 23A | Solar panels



## Roof G | Field 24 | Solar panels



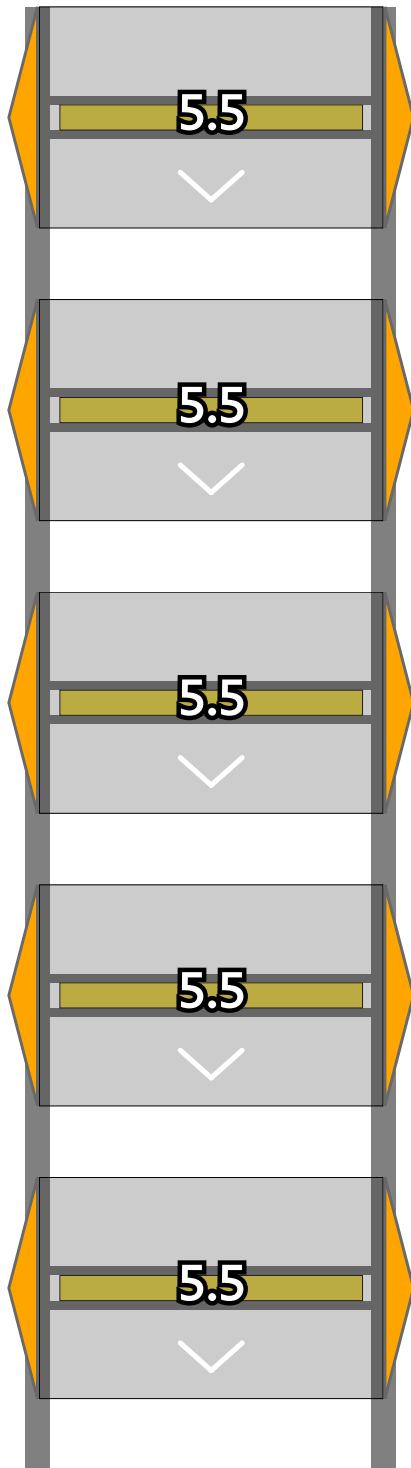
— Corner/edge zone

## Components

|                                         |        |                                         |        |
|-----------------------------------------|--------|-----------------------------------------|--------|
| Module                                  | 5 Pcs  | SS thread-forming bolt M6x20mm - T30    | 40 Pcs |
| Alu rear foot ValkPro+ L10° side        | 10 Pcs | Rubber tile carrier - click - ValkPro+  | 14 Pcs |
| Alu front foot ValkPro+ P/L10° side     | 10 Pcs | Rubber block - gravel roof - ValkPro+   | 14 Pcs |
| SS hammerhead bolt M8x20mm + lock nut   | 8 Pcs  | Galv. ballast carrier ValkPro+ L=1979mm | 10 Pcs |
| Galv back plate ValkPro+ L10° L=1980mm  | 5 Pcs  | Ballast full tiles                      | 25 Pcs |
| Galv roof carrier L=1500x1,5mm          | 10 Pcs | Ballast half tiles                      | 5 Pcs  |
| Galv side plate ValkPro+ L10° universal | 10 Pcs |                                         |        |

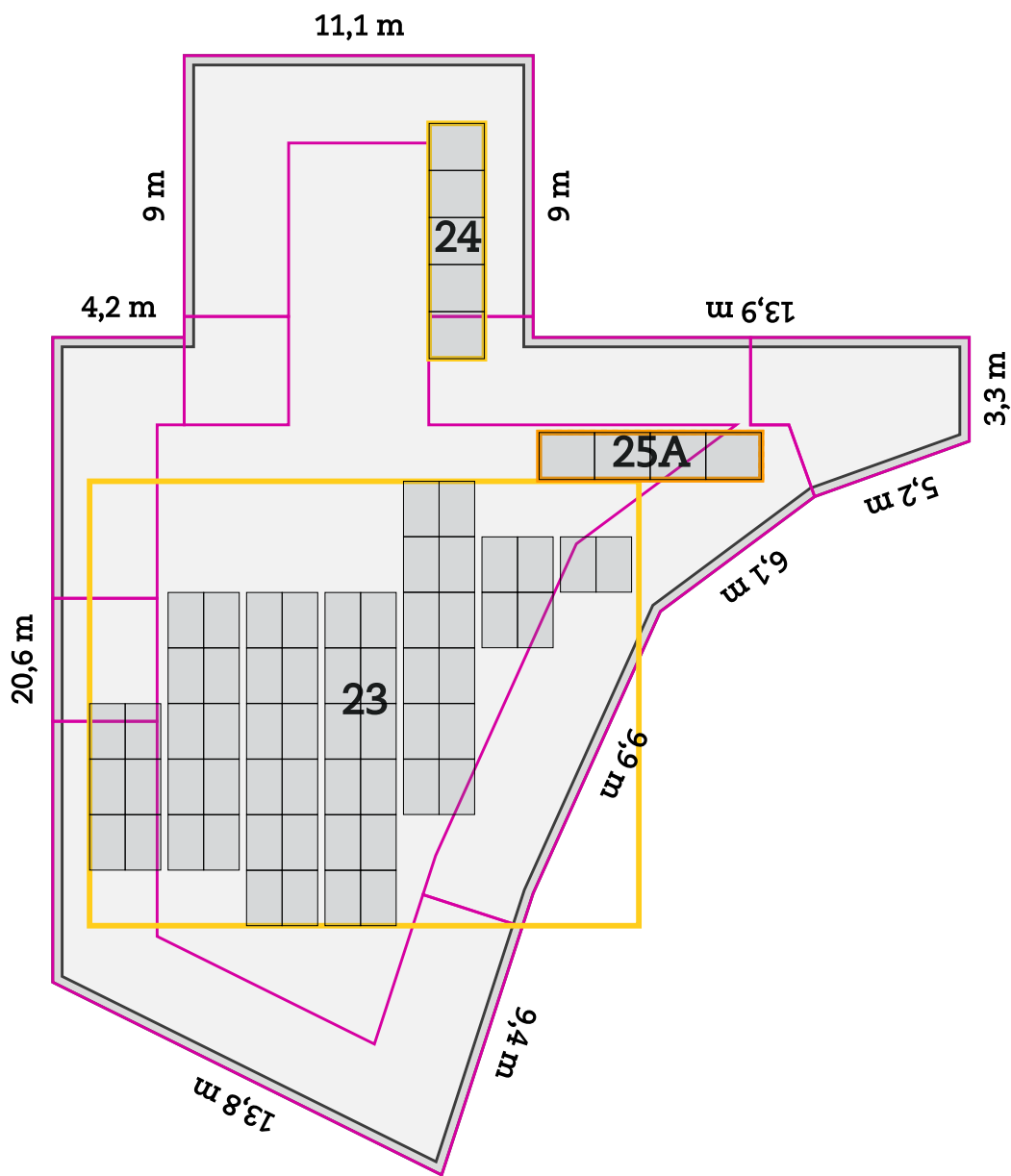


## Roof G | Field 24 - part 24A | Solar panels





## Roof G | Field 25 | Solar panels



— Corner/edge zone

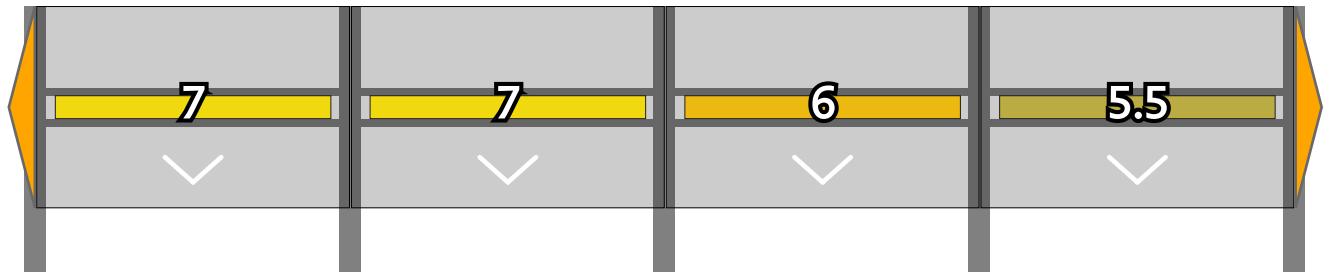
## Components

|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 4 Pcs | Galv side plate ValkPro+ L10° universal | 2 Pcs  |
| Alu rear foot ValkPro+ L10° middle     | 3 Pcs | SS thread-forming bolt M6x20mm - T30    | 11 Pcs |
| Alu rear foot ValkPro+ L10° side       | 2 Pcs | Rubber tile carrier - click - ValkPro+  | 15 Pcs |
| Alu front foot ValkPro+ P/L10° middle  | 3 Pcs | Rubber block - gravel roof - ValkPro+   | 15 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 2 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 8 Pcs  |
| Galv back plate ValkPro+ L10° L=1980mm | 4 Pcs | Ballast full tiles                      | 25 Pcs |
| Galv roof carrier L=1500x1,5mm         | 5 Pcs | Ballast half tiles                      | 1 Pcs  |





## Roof G | Field 25 - part 25A | Solar panels





Printworks, Manchester - Gen Fit

## Roof G | Bill of materials

| Item no.          | Panel type | Qty    |
|-------------------|------------|--------|
| DM450M10RT-B54HBT | DMEGC      | 67 pcs |

| Item no.  | Mounting system                         | Calc. Qty |
|-----------|-----------------------------------------|-----------|
| 724650    | Alu rear foot ValkPro+ L10° middle      | 47 Pcs    |
| 724651    | Alu rear foot ValkPro+ L10° side        | 40 Pcs    |
| 724660    | Alu front foot ValkPro+ P/L10° middle   | 47 Pcs    |
| 724661    | Alu front foot ValkPro+ P/L10° side     | 40 Pcs    |
| 742512    | Galv back plate ValkPro+ L10° L=1980mm  | 9 Pcs     |
| 774221    | SS hammerhead bolt M8x20mm + lock nut   | 35 Pcs    |
| 741801500 | Galv roof carrier L=1500x1,5mm          | 15 Pcs    |
| 741802500 | Galv roof carrier L=2500x1,5mm          | 36 Pcs    |
| 742540    | Galv side plate ValkPro+ L10° universal | 40 Pcs    |
| 773320    | SS thread-forming bolt M6x20mm - T30    | 135 Pcs   |
| 729622    | Rubber tile carrier - click - ValkPro+  | 119 Pcs   |
| 729627    | Rubber block - gravel roof - ValkPro+   | 119 Pcs   |
| 742564    | Galv. ballast carrier ValkPro+ L=1979mm | 22 Pcs    |

| Item no.   | Additional items                  | Calc. Qty |
|------------|-----------------------------------|-----------|
| 7506301545 | Tile 30 x 15 x 4,5cm - 4,5kg - NL | 41 pcs    |
| 7506303045 | Tile 30 x 30 x 4,5cm - 9kg - NL   | 69 pcs    |



## Roof H | Summary

### Roof properties

|                      |         |                    |                      |
|----------------------|---------|--------------------|----------------------|
| Height               | 25,00 m | Roof area          | 804,6 m <sup>2</sup> |
| Slope                | 1°      | PV-system area     | 43,4 m <sup>2</sup>  |
| Roof type            | Flat    | Cladding           | Gravel roof          |
| Parapet height       | 0,30 m  | Roof membrane type | CONCRETE             |
| Parapet width        | 0,30 m  | Number of panels   | 489 pcs              |
| Friction coefficient | 0,6     | Power              | 220,05 kWp           |

### Eurocode calculations

|                             |                                |                                  |     |
|-----------------------------|--------------------------------|----------------------------------|-----|
| Peak wind velocity pressure | 0,87 kPa                       | Combination factor for wind load | 0,5 |
| Characteristic snow load    | 0,47 kPa                       | Combination factor for snow load | 0,5 |
| Min. point load on roof     | 9 kPa                          |                                  |     |
| Max. point load on roof     | 31 kPa                         |                                  |     |
| Load case                   | Dead weight (system + ballast) |                                  |     |

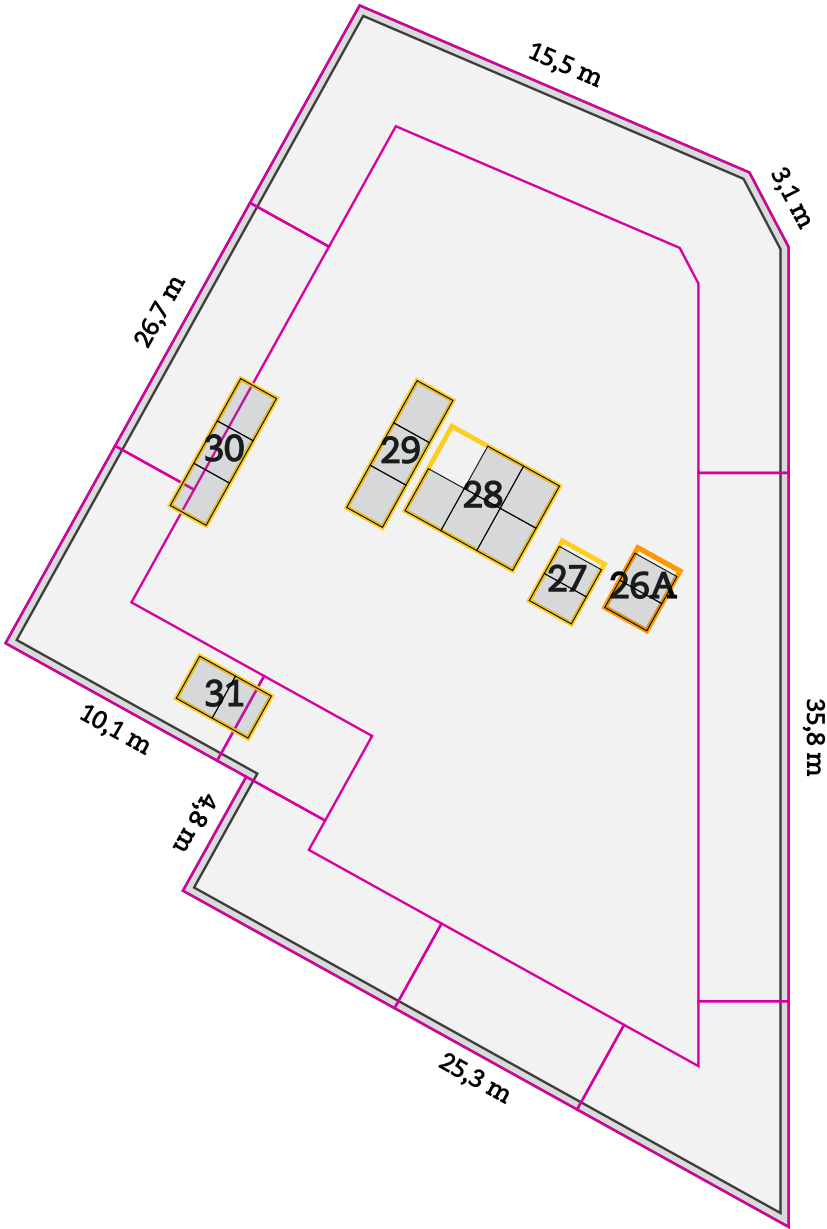
### Weight calculations

|                           |          |                                  |                        |
|---------------------------|----------|----------------------------------|------------------------|
| Weight of solar panels    | 417 kg   | Average weight on roof area      | 2,1 kg/m <sup>2</sup>  |
| Weight of mounting system | 313 kg   | Average weight on PV-system area | 38,8 kg/m <sup>2</sup> |
| Ballast weight            | 956 kg   |                                  |                        |
| Total weight              | 1.685 kg |                                  |                        |





Roof H | Field 26 | Solar panels



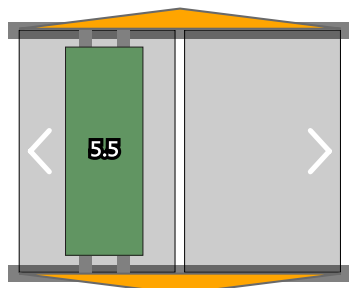
— Corner/edge zone

Components

|                                         |        |                                         |       |
|-----------------------------------------|--------|-----------------------------------------|-------|
| Module                                  | 2 Pcs  | Rubber tile carrier - click - ValkPro+  | 8 Pcs |
| Alu rear foot ValkPro+ L10° side        | 4 Pcs  | Rubber block - gravel roof - ValkPro+   | 8 Pcs |
| Alu front foot ValkPro+ P/L10° side     | 4 Pcs  | Galv. ballast carrier ValkPro+ L=1979mm | 2 Pcs |
| Galv roof carrier L=2500x1,5mm          | 2 Pcs  | Ballast full tiles                      | 5 Pcs |
| Galv side plate ValkPro+ L10° universal | 4 Pcs  | Ballast half tiles                      | 1 Pcs |
| SS thread-forming bolt M6x20mm - T30    | 12 Pcs |                                         |       |

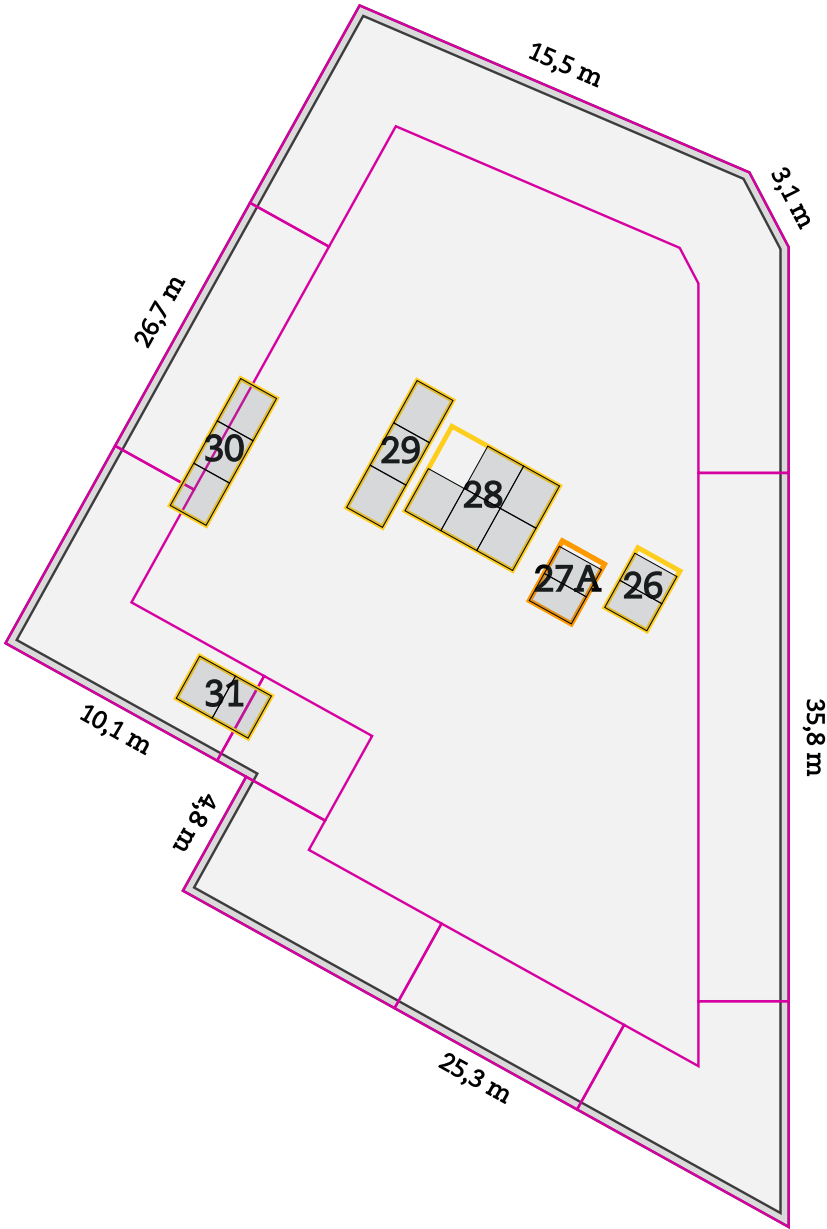


## Roof H | Field 26 - part 26A | Solar panels





Roof H | Field 27 | Solar panels



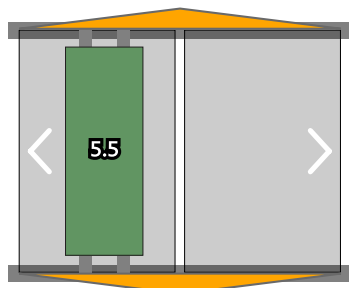
— Corner/edge zone

Components

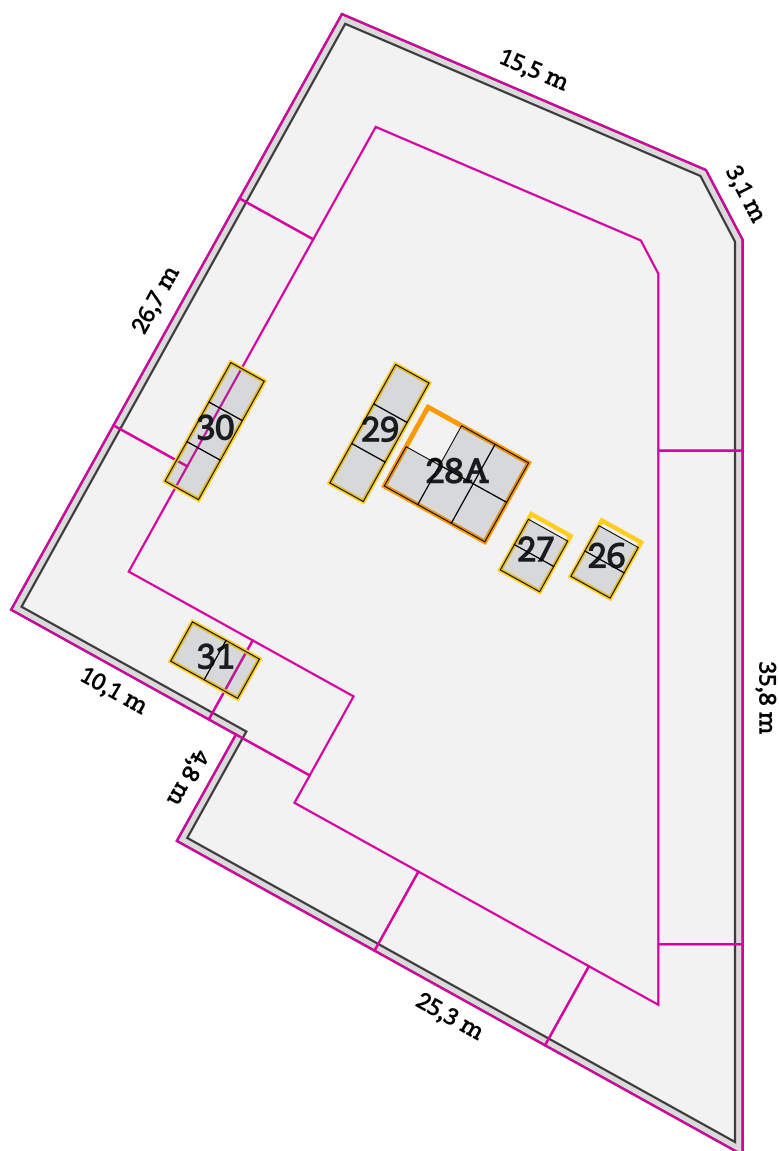
|                                         |        |                                         |       |
|-----------------------------------------|--------|-----------------------------------------|-------|
| Module                                  | 2 Pcs  | Rubber tile carrier - click - ValkPro+  | 8 Pcs |
| Alu rear foot ValkPro+ L10° side        | 4 Pcs  | Rubber block - gravel roof - ValkPro+   | 8 Pcs |
| Alu front foot ValkPro+ P/L10° side     | 4 Pcs  | Galv. ballast carrier ValkPro+ L=1979mm | 2 Pcs |
| Galv roof carrier L=2500x1,5mm          | 2 Pcs  | Ballast full tiles                      | 5 Pcs |
| Galv side plate ValkPro+ L10° universal | 4 Pcs  | Ballast half tiles                      | 1 Pcs |
| SS thread-forming bolt M6x20mm - T30    | 12 Pcs |                                         |       |



## Roof H | Field 27 - part 27A | Solar panels



## Roof H | Field 28 | Solar panels



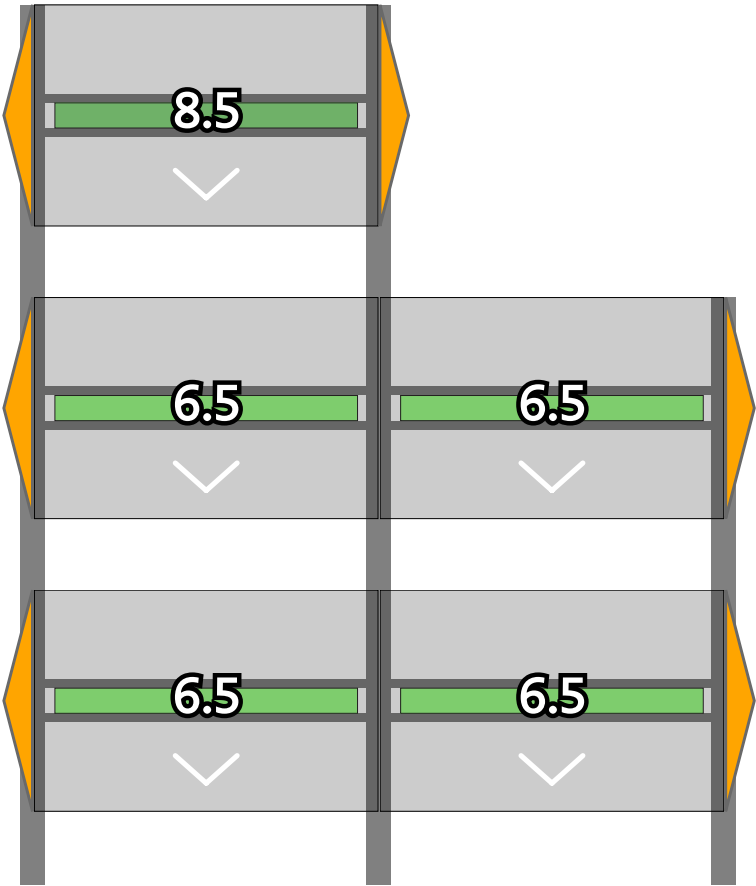
— Corner/edge zone

## Components

|                                         |        |                                         |        |
|-----------------------------------------|--------|-----------------------------------------|--------|
| Module                                  | 5 Pcs  | Rubber tile carrier - click - ValkPro+  | 14 Pcs |
| Alu rear foot ValkPro+ L10° side        | 6 Pcs  | Rubber block - gravel roof - ValkPro+   | 14 Pcs |
| Alu front foot ValkPro+ P/L10° side     | 6 Pcs  | Galv. ballast carrier ValkPro+ L=1979mm | 10 Pcs |
| SS hammerhead bolt M8x20mm + lock nut   | 5 Pcs  | Alu rear foot ValkPro+ L10° middle      | 2 Pcs  |
| Galv back plate ValkPro+ L10° L=1980mm  | 5 Pcs  | Alu front foot ValkPro+ P/L10° middle   | 2 Pcs  |
| Galv roof carrier L=1500x1,5mm          | 8 Pcs  | Ballast full tiles                      | 32 Pcs |
| Galv side plate ValkPro+ L10° universal | 6 Pcs  | Ballast half tiles                      | 5 Pcs  |
| SS thread-forming bolt M6x20mm - T30    | 26 Pcs |                                         |        |

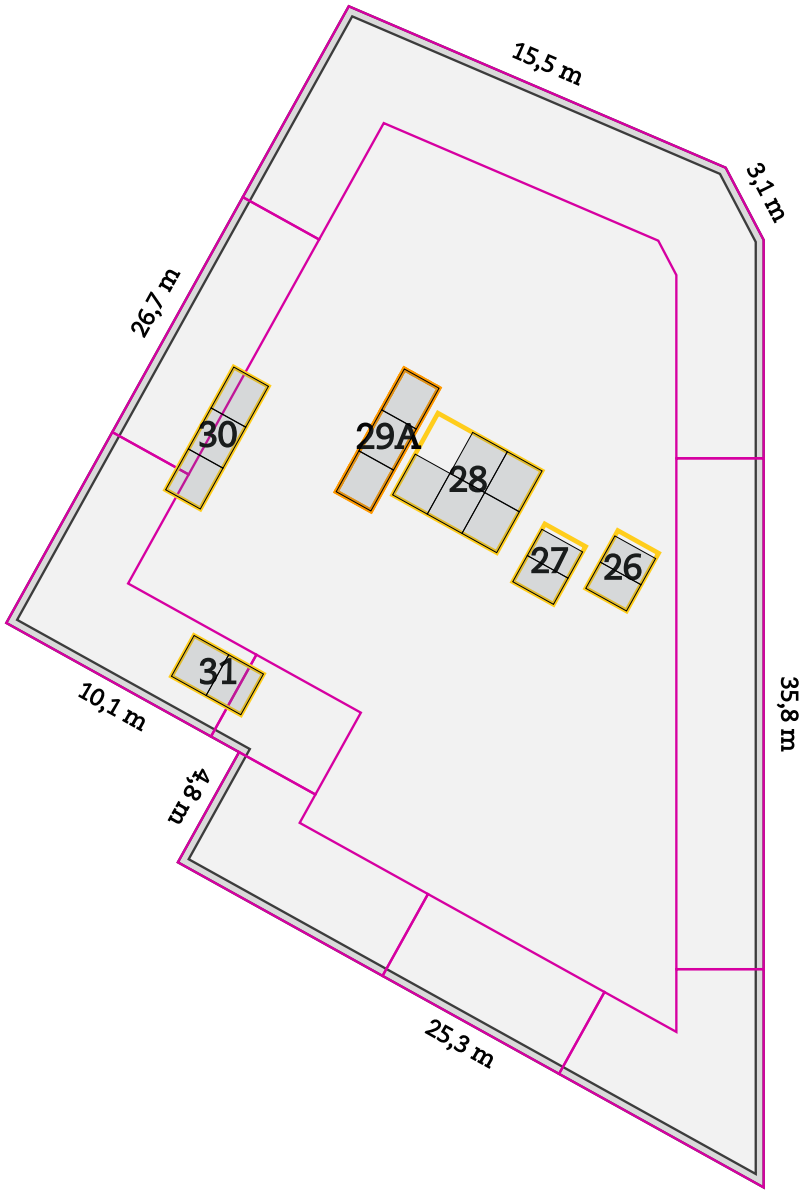


Roof H | Field 28 - part 28A | Solar panels





Roof H | Field 29 | Solar panels

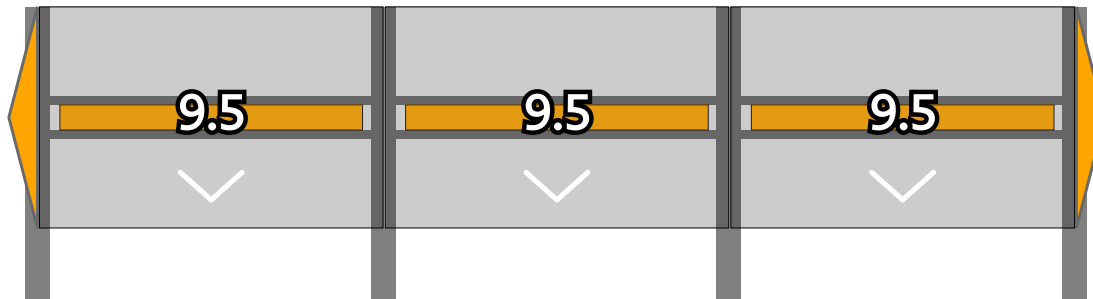


— Corner/edge zone

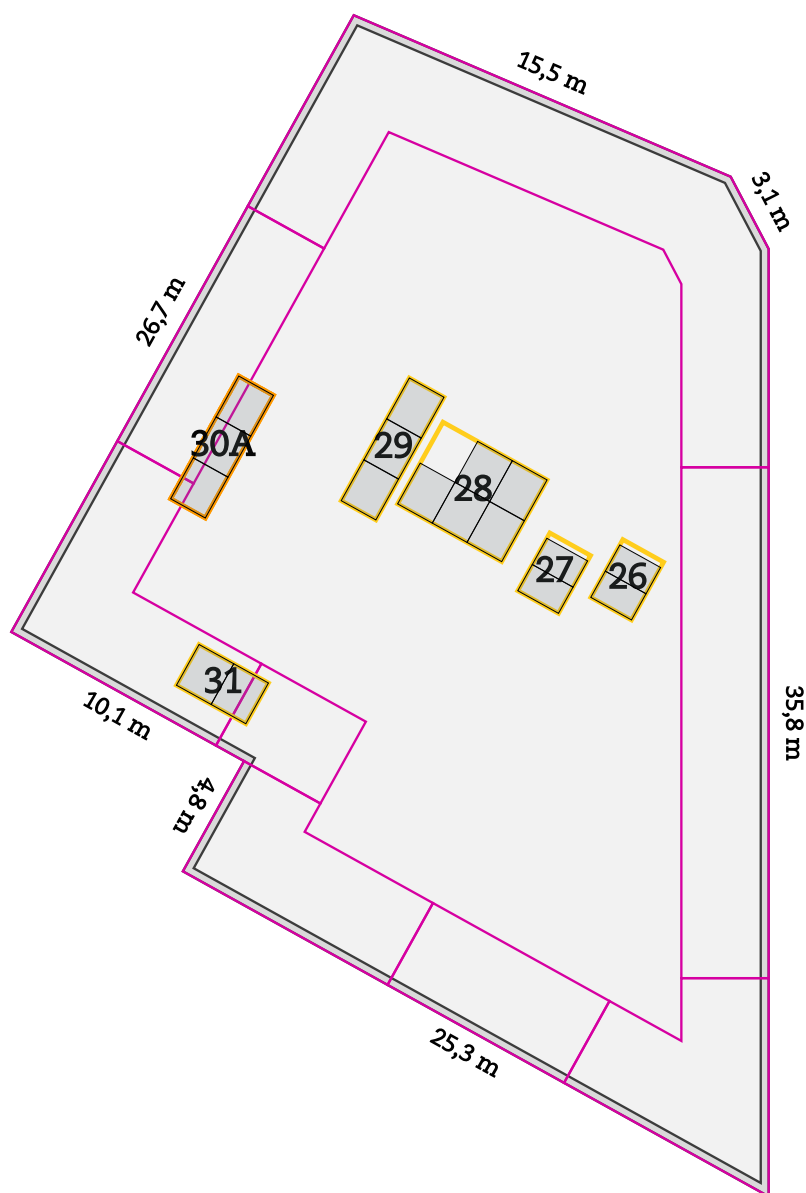
Components

|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 3 Pcs | Galv side plate ValkPro+ L10° universal | 2 Pcs  |
| Alu rear foot ValkPro+ L10° middle     | 2 Pcs | SS thread-forming bolt M6x20mm - T30    | 10 Pcs |
| Alu rear foot ValkPro+ L10° side       | 2 Pcs | Rubber tile carrier - click - ValkPro+  | 12 Pcs |
| Alu front foot ValkPro+ P/L10° middle  | 2 Pcs | Rubber block - gravel roof - ValkPro+   | 12 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 2 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 6 Pcs  |
| Galv back plate ValkPro+ L10° L=1980mm | 3 Pcs | Ballast full tiles                      | 27 Pcs |
| Galv roof carrier L=1500x1,5mm         | 4 Pcs | Ballast half tiles                      | 3 Pcs  |

## Roof H | Field 29 - part 29A | Solar panels



## Roof H | Field 30 | Solar panels



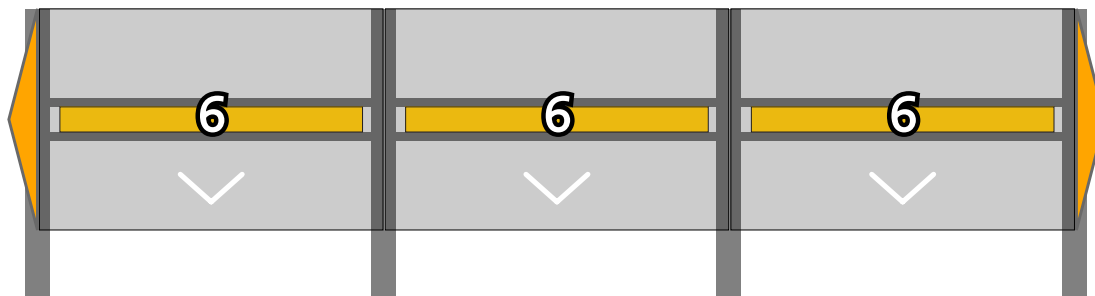
— Corner/edge zone

## Components

|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 3 Pcs | Galv side plate ValkPro+ L10° universal | 2 Pcs  |
| Alu rear foot ValkPro+ L10° middle     | 2 Pcs | SS thread-forming bolt M6x20mm - T30    | 10 Pcs |
| Alu rear foot ValkPro+ L10° side       | 2 Pcs | Rubber tile carrier - click - ValkPro+  | 12 Pcs |
| Alu front foot ValkPro+ P/L10° middle  | 2 Pcs | Rubber block - gravel roof - ValkPro+   | 12 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 2 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 6 Pcs  |
| Galv back plate ValkPro+ L10° L=1980mm | 3 Pcs | Ballast full tiles                      | 18 Pcs |
| Galv roof carrier L=1500x1,5mm         | 4 Pcs |                                         |        |

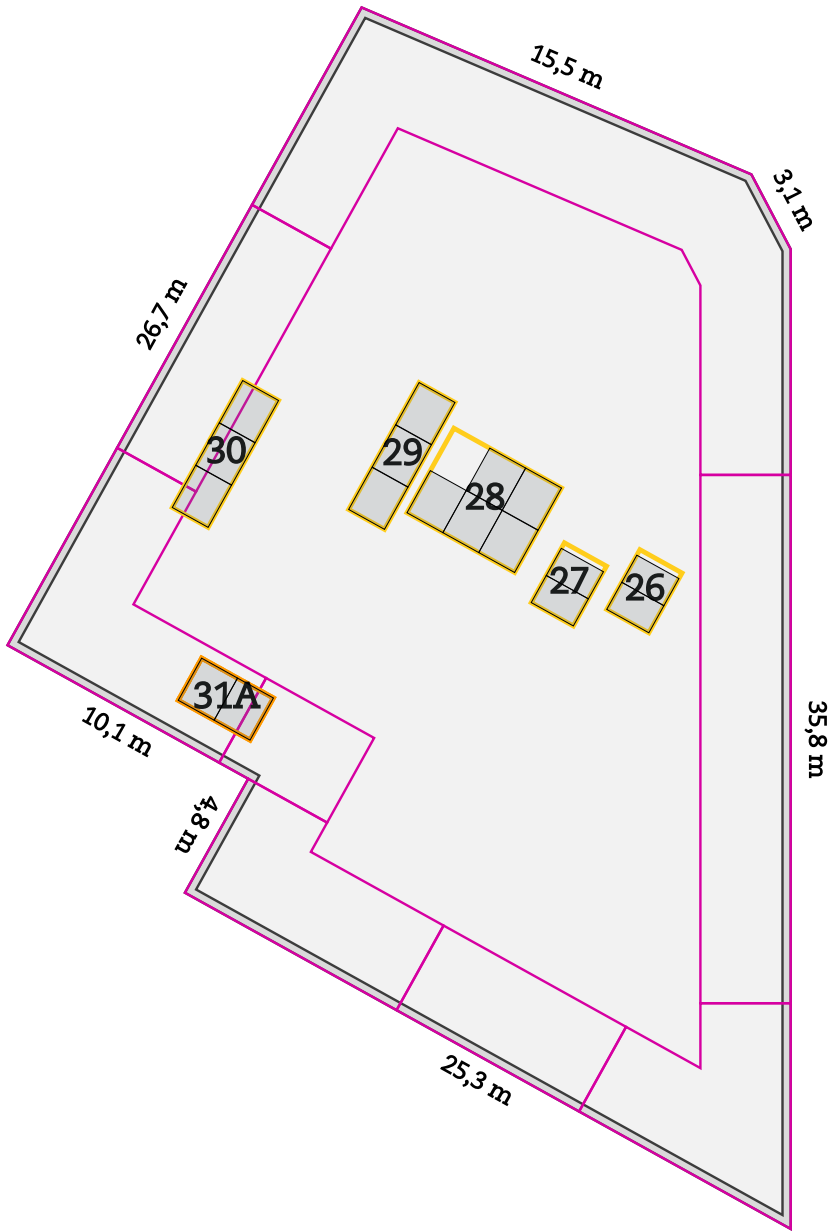


## Roof H | Field 30 - part 30A | Solar panels





Roof H | Field 31 | Solar panels



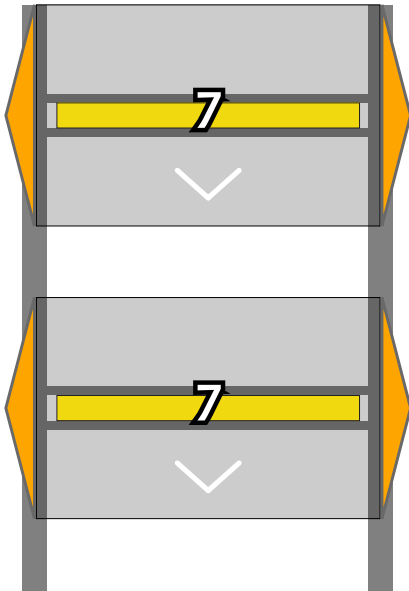
Components

|                                        |       |                                         |        |
|----------------------------------------|-------|-----------------------------------------|--------|
| Module                                 | 2 Pcs | Galv side plate ValkPro+ L10° universal | 4 Pcs  |
| Alu rear foot ValkPro+ L10° side       | 4 Pcs | SS thread-forming bolt M6x20mm - T30    | 16 Pcs |
| Alu front foot ValkPro+ P/L10° side    | 4 Pcs | Rubber tile carrier - click - ValkPro+  | 8 Pcs  |
| SS hammerhead bolt M8x20mm + lock nut  | 2 Pcs | Rubber block - gravel roof - ValkPro+   | 8 Pcs  |
| Galv back plate ValkPro+ L10° L=1980mm | 2 Pcs | Galv. ballast carrier ValkPro+ L=1979mm | 4 Pcs  |
| Galv roof carrier L=1500x1,5mm         | 4 Pcs | Ballast full tiles                      | 14 Pcs |





## Roof H | Field 31 - part 31A | Solar panels





## Roof H | Bill of materials

| Item no.          | Panel type | Qty    |
|-------------------|------------|--------|
| DM450M10RT-B54HBT | DMEGC      | 17 pcs |

| Item no.  | Mounting system                         | Calc. Qty |
|-----------|-----------------------------------------|-----------|
| 724651    | Alu rear foot ValkPro+ L10° side        | 22 Pcs    |
| 724661    | Alu front foot ValkPro+ P/L10° side     | 22 Pcs    |
| 774221    | SS hammerhead bolt M8x20mm + lock nut   | 7 Pcs     |
| 741802500 | Galv roof carrier L=2500x1,5mm          | 4 Pcs     |
| 742512    | Galv back plate ValkPro+ L10° L=1980mm  | 13 Pcs    |
| 742540    | Galv side plate ValkPro+ L10° universal | 22 Pcs    |
| 773320    | SS thread-forming bolt M6x20mm - T30    | 86 Pcs    |
| 741801500 | Galv roof carrier L=1500x1,5mm          | 20 Pcs    |
| 729622    | Rubber tile carrier - click - ValkPro+  | 62 Pcs    |
| 729627    | Rubber block - gravel roof - ValkPro+   | 62 Pcs    |
| 742564    | Galv. ballast carrier ValkPro+ L=1979mm | 30 Pcs    |
| 724650    | Alu rear foot ValkPro+ L10° middle      | 6 Pcs     |
| 724660    | Alu front foot ValkPro+ P/L10° middle   | 6 Pcs     |

| Item no.   | Additional items                  | Calc. Qty |
|------------|-----------------------------------|-----------|
| 7506301545 | Tile 30 x 15 x 4,5cm - 4,5kg - NL | 10 pcs    |
| 7506303045 | Tile 30 x 30 x 4,5cm - 9kg - NL   | 101 pcs   |



## Project total | Project summary

| Field number | Panel Quantity (pcs) | DC power (kWp) | System Weight (kg/m <sup>2</sup> ) | Max. pressure/support (kPa) |
|--------------|----------------------|----------------|------------------------------------|-----------------------------|
| 1            | 4                    | 1.800          | 34,4                               | 15                          |
| 2            | 66                   | 29.700         | 17,3                               | 16                          |
| 3            | 54                   | 24.300         | 19,7                               | 16                          |
| 4            | 68                   | 30.600         | 16,9                               | 16                          |
| 5            | 8                    | 3.600          | 32,1                               | 15                          |
| 6            | 2                    | 900            | 41,3                               | 14                          |
| 7            | 24                   | 10.800         | 17,8                               | 15                          |
| 8            | 4                    | 1.800          | 36,2                               | 13                          |
| 9            | 9                    | 4.050          | 35,7                               | 19                          |
| 10           | 8                    | 3.600          | 22,5                               | 12                          |
| 11           | 12                   | 5.400          | 23,8                               | 17                          |
| 12           | 12                   | 5.400          | 24,8                               | 14                          |
| 13           | 18                   | 8.100          | 22                                 | 15                          |
| 14           | 42                   | 18.900         | 18,1                               | 15                          |
| 15           | 16                   | 7.200          | 19,5                               | 12                          |
| 16           | 12                   | 5.400          | 23,5                               | 16                          |
| 17           | 20                   | 9.000          | 20,8                               | 15                          |
| 18           | 5                    | 2.250          | 39,2                               | 31                          |





## Project total | Project summary

| Field number | Panel Quantity (pcs) | DC power (kWp) | System Weight (kg/m <sup>2</sup> ) | Max. pressure/support (kPa) |
|--------------|----------------------|----------------|------------------------------------|-----------------------------|
| 19           | 6                    | 2.700          | 25,1                               | 11                          |
| 20           | 10                   | 4.500          | 27,8                               | 16                          |
| 21           | 2                    | 900            | 41,4                               | 11                          |
| 22           | 3                    | 1.350          | 40,8                               | 28                          |
| 23           | 58                   | 26.100         | 16,8                               | 15                          |
| 24           | 5                    | 2.250          | 35,3                               | 24                          |
| 25           | 4                    | 1.800          | 37,4                               | 11                          |
| 26           | 2                    | 900            | 30                                 | 9                           |
| 27           | 2                    | 900            | 30                                 | 9                           |
| 28           | 5                    | 2.250          | 39,2                               | 31                          |
| 29           | 3                    | 1.350          | 48,4                               | 13                          |
| 30           | 3                    | 1.350          | 36,5                               | 10                          |
| 31           | 2                    | 900            | 41,3                               | 14                          |





## Project total | Bill of materials

| Item no.          | Panel type                              | Qty       |
|-------------------|-----------------------------------------|-----------|
| DM450M10RT-B54HBT | DMEGC                                   | 489 pcs   |
| Item no.          | Mounting system                         | Calc. Qty |
| 724650            | Alu rear foot ValkPro+ L10° middle      | 334 Pcs   |
| 724651            | Alu rear foot ValkPro+ L10° side        | 310 Pcs   |
| 724660            | Alu front foot ValkPro+ P/L10° middle   | 334 Pcs   |
| 724661            | Alu front foot ValkPro+ P/L10° side     | 310 Pcs   |
| 774221            | SS hammerhead bolt M8x20mm + lock nut   | 228 Pcs   |
| 742512            | Galv back plate ValkPro+ L10° L=1980mm  | 59 Pcs    |
| 741802500         | Galv roof carrier L=2500x1,5mm          | 276 Pcs   |
| 741801500         | Galv roof carrier L=1500x1,5mm          | 92 Pcs    |
| 742540            | Galv side plate ValkPro+ L10° universal | 296 Pcs   |
| 773320            | SS thread-forming bolt M6x20mm - T30    | 980 Pcs   |
| 729622            | Rubber tile carrier - click - ValkPro+  | 924 Pcs   |
| 729627            | Rubber block - gravel roof - ValkPro+   | 924 Pcs   |
| 725150            | Alu. ballast wing ValkPro+              | 3 Pcs     |
| 742564            | Galv. ballast carrier ValkPro+ L=1979mm | 148 Pcs   |
| Item no.          | Additional items                        | Calc. Qty |
| 7506301545        | Tile 30 x 15 x 4,5cm - 4,5kg - NL       | 441 pcs   |
| 7506303045        | Tile 30 x 30 x 4,5cm - 9kg - NL         | 645 pcs   |



## Project total | Bill of materials

| Item no. | Additional items                           | Calc. Qty |
|----------|--------------------------------------------|-----------|
| 732001   | SS cable clamp small                       | 978 pcs   |
| 732011   | Plastic cable clamp for back foot ValkPro+ | 644 pcs   |
| 732012   | Plastic multi-cable clip for roof carrier  | 489 pcs   |
| 738201   | Ss. Connector clamp                        | 489 pcs   |





## General Installation Guidelines

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### General

- This project report is based on the entered parameters and results of the calculator. The results of the calculations have been calculated with the greatest care. Always check carefully whether all values have been entered and displayed correctly in advance.
- During the installation of the mounting system, the instructions and safety regulations published in this project report and the installation manual of the chosen mounting system must be carefully followed. As shown in the general terms and conditions of sale and delivery of Van der Valk Solar Systems B.V., non-compliance with the regulations stated in this document means that the customer can no longer rely on any guarantees and Van der Valk Solar Systems is no longer liable for any form of damage.

### Safety

- The installation of the mounting system must be carried out by qualified technical personnel.
- Omitting parts may negatively affect performance and is therefore not allowed.
- Avoid carrying out installation work during bad weather conditions, especially in case of strong winds and a wet (slippery) roof surface.
- During the planning and execution of the installation, always take into account possible changing weather conditions, in particular strong winds or storms. Take the right measures and make sure that no situation can arise where solar panels have already been placed on the system, but other essential parts (such as ballast tiles, side or back plates) are still missing.
- Always wear appropriate protective clothing and gloves when carrying out the installation work.
- During installation work on the roof, always use fall protection and, if necessary, work with safety nets and roof edge protection.
- Carefully follow the instructions for installation of the mounting system, as shown in the current installation manual and online installation videos.
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### Environmental factors

- High neighbouring buildings or objects, such as windmills, can affect the wind pressure. In these cases, advice should always be obtained from Van der Valk Solar Systems before installation can take place.
- Indien voor, tijdens of na de installatie wordt vastgesteld, dat de gegevens en/of omgevingsfactoren niet volledig overeen komen met het projectrapport, moet het project eerst opnieuw worden gecalculeerd en eventueel worden aangepast.
- In kustgebieden, dient het systeem op minimaal 500 meter van open water te worden geplaatst, ter voorkoming van versnelde corrosie door inwerking van zout water. Wanneer er bebouwing aanwezig is tussen het open water en het dak mag een minimum afstand van 250 meter tot open water worden aangehouden.

## General Installation Guidelines

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### Standards and regulations

- For correct and safe installation and use of the solar mounting system, always observe the applicable standards and regulations:

EN 1990: Basis of structural design

EN 1991-1-3: General actions - snow loads

EN 1991-1-4: General actions - wind loads

IEC 60364: Electrical Installations for Buildings

IEC 62305: Protection against lightnings

EN 50110: Operation of electrical installations

NEN 7250: Solar energy systems - Integration in roofs and facades - Construction aspects

### Stability and condition of the roof and roof covering

- Placing a mounting system that uses ballast only, is only allowed in case the roof pitch is less than 5°. In case the roof pitch is 5° or more the mounting system always needs to be fixed mechanically to the roof.
- The condition of the roof must be checked upfront for sufficient strength to bear the weight of the mounting system including PV panels ballast and wind and snow loads. Make sure that the load reserve of the roof is not exceeded anywhere.
- Check the stability of the roof and adjust the roof/construction where necessary.
- Check prior to installation whether the roof covering and/or insulation is suitable for the pressure and thermal expansion of the solar mounting system. The maximum pressure is shown in this project report or can be requested at Van der Valk Solar Systems.
- Bulging of the roof membrane should be prevented. This can lift the solar mounting system and can cause displacement of the mounting system or ballast. It is the installer's responsibility to prevent the roof membrane from bulging.
- Factors such as overhead cranes inside the building, seismic activity and others that affect the stability of the roof and/or building can affect the installed solar mounting system. Van der Valk Solar Systems does not take these factors into account, unless confirmed in writing.
- The roof surface on which the solar mounting system is to be installed must be clean, dry and flat.
- The roof height must always correspond to the roof height in the project report. For installations on roofs higher than 50 meters, Van der Valk Solar Systems should always be contacted in advance.

### Roof zones

- During the installation of the mounting system, always take the applicable roof zones according to EN1991-1-4 into account. Installation in the edge zone of the roof is only possible if this has been explicitly taken into account in the calculation. The edge zone is automatically calculated by the ValkPVplannerPro based on the roof height and building perimeter, according to the applicable standards. It is possible to draw panels in the edge zone of the roof, on the basis of which the required additional ballast, parts or mounting points are automatically calculated.
- In case solar panels on the ValkPro+ system are fully or partially placed in the edge zone of the roof, it is mandatory to use side plates.



## General Installation Guidelines

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### Ballast

- After installation of the solar mounting system, it must be carefully checked whether the ballast has been placed in accordance with the ballast drawing. Ballast tiles must be neatly stacked, so that they are sufficiently supported by the tile carriers, mass carriers and/or ballast wings.

### Dilatations

- The maximum allowed dimensions of a coupled mounting system is a 30 meters in the aluminium direction and 60 meters in the steel direction. The maximum dimensions are based on the thermal expansion in case of a maximum temperature difference (Delta T) of 70 degrees Celsius. Follow the recommendations in the installation manual for the required gap between the systems.
- The coupled mounting system must not be placed over a gutter or ridge. In the mounting system is place over a gutter or ridge, the system must be split (dilatation), even if the change in roof pitch is minimal.
- When using the extra wide panel support feet for ValkPro+ with ballast, different dilatation rules apply: in such installations the coupled system may be a maximum of 30 meters in the steel/roof carrier direction and 15 meters in the aluminium direction.

### Solar panels

- It is the installer's responsibility to determine in advance whether the selected solar panel is compatible with the mounting system, in relation to the dimensions and allowable pressure loads. The calculated pressure loads on the solar panel are shown in this project report.

### Cable management

- In order to create a sound and durable electrical connection between the solar panels, it must be ensured that the cables from the junction box have sufficient length and thus do not cause any mechanical stress on the cable glands. Take into account thermal expansion and contraction of cables and the mounting system.
- Cables and connectors must be kept away from sharp and/or abrasive parts and the roof surface by using sufficient and appropriate cable and connector clamps and cable baskets.
- Components of the Van der Valk solar Systems mounting systems can be easily and completely disassembled at the end of their service life and separated for recycling. The systems only have nut-bolt, screw and click connections. No parts are glued or welded. All materials are fully recyclable. Disposal of the components always in accordance with the locally applicable laws and regulations.