

Vertical Meadow

Meadow Cladding Specification

Project
Client
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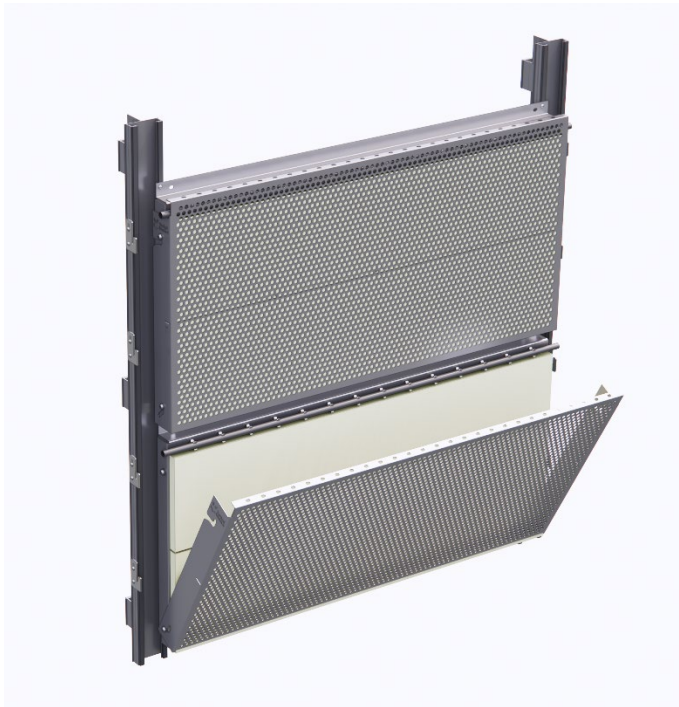
1 Scope

1.1 Vertical Meadow cladding panels

Drained and ventilated rainscreen cladding system. Two part aluminium cassette panel with solid back panel and perforated front panel, connected via stainless steel fixings. Front panel is operable via lift and tilt to allow access to the growing medium within the panel.

Typical panel dimensions: 600 H x 1200 W x 75 D

Typical joint between panels: 20mm vertically and horizontally



1.1.1 Components

The system includes:

- Folded and perforated aluminium front panel
- Aluminium stiffener angle fixed to front panel with stainless steel pop rivets
- Folded aluminium back panel with stainless steel terry clips and stainless steel anti lift fixing
- Stainless steel fixings connect panels together
- Planting substrate
- Seed insert
- Vertical aluminium cassette support rails with hook brackets, EPDM gaskets, EPDM tape and stainless steel fixings

1.1.2 Support/ fixing

Cassette panels are dead loaded and restrained to hook brackets from aluminium support rails which are mechanically fixed to project specific wall substrate. Cassette panels are secured against lift off with mechanical fixing from cassette panel to support rails.

Planting substrate and seed paper are supported in the cavity between the front and back panels.

1.1.3 Materials and finishes

Component	Material
Cassette front panel	2mm thick aluminium sheet - thickness based on panel size calculations Low carbon aluminium – 2.0tCO ₂ /tAL – Aludium Eco 2 or similar Mill finish
Aluminium stiffener angle	Aluminium 20mm x 20mm EA 1.5mm thickness
Cassette back panel	1.5mm / 2.0mm thick aluminium sheet – thickness based on panel size calculations Low carbon aluminium – 2.0tCO ₂ /tAL – Aludium Eco 2 or similar Mill finish
Terry clips	Stainless steel Grade 301 with diameter to match drip line requirements (typically 16mm diameter)
Planting substrate	25mm thick stone wool growing media – supplied by Vertical Meadow Non-combustible Class A1 material
Seed insert	Seed mix developed by Vertical Meadow and supplied by Vertical Meadow
Cassette support rails	Extruded aluminium proprietary support rails Calculations required to demonstrate loading capacity of rails to support Meadow Cladding panels Includes aluminium hook brackets EPDM gaskets EPDM separation tape
All fixings	Stainless steel Grade 1.4401

1.1.4 Additional design requirements

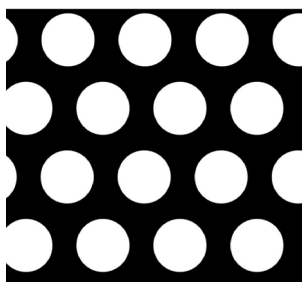
1.1.4.1 Perforation pattern

Hole diameter: 6.0mm

Pitch: 8.5mm offset between lines

Open area: 45%

Edge distance: 15mm



1.1.4.2 Connection to irrigation system

Drip lines to provide scheduled watering is connected across each panel as per system design schematics, with drip lines supported to terry clips at the top of each panel. Drip lines are connected to central irrigation system according to site specific design requirements. Refer to *irrigation specifications*.

1.1.4.3 Fire requirements

Fire stopping and cavity barriers to be provided by others as required by the Fire Engineer project specific strategy.

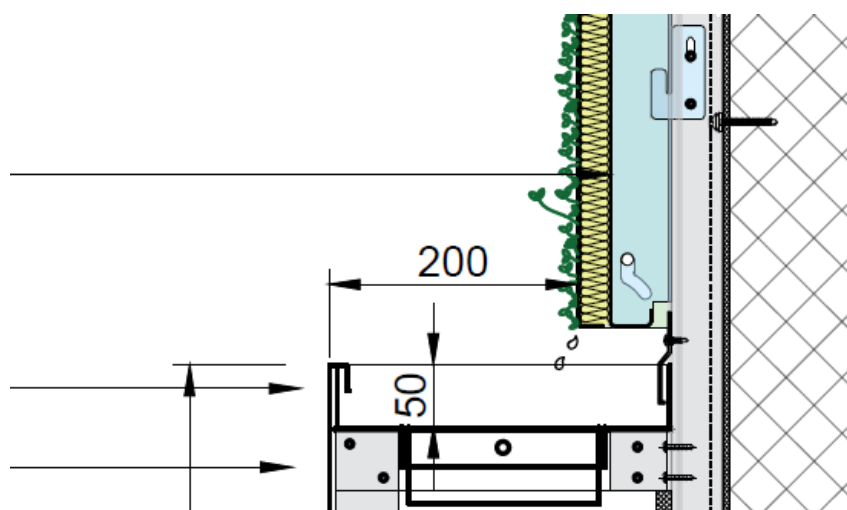
1.1.4.4 Planting requirements

Refer to seed mix specification by Vertical Meadow

1.2 Gutter and flashings

Continuous horizontal aluminium gutter at falls to gutter outlet.

H 50mm x W 275mm x L as per wall requirement



1.2.1 Components

The system includes:

- Folded and welded continuous gutter tray
- Circular outlet pipe welded to gutter tray at lowest point. 50mm depth collar for connection.
- Cladding for gutter box.

1.2.2 Support/ fixing

Gutter tray is supported to existing wall via aluminium bracketry.

1.2.3 Materials and finishes

Component	Material
Gutter tray	2mm thick aluminium sheet Low carbon aluminium – 2.0tCO ₂ /tAL Aludium Eco 2 or similar

	Mill finish
Gutter cladding panel	2mm thick aluminium sheet Low carbon aluminium – Aludium Eco 2 or similar Finish to architectural specification
Bracketry	Aluminum Grade to be confirmed through calculations
All fixings	Stainless steel Grade 1.4401

1.3 Interfacing trade packages

The cladding panels will interface with the following works packages:

- Existing building substrate – façade, roofing and ground level
- Irrigation system for living wall
- Building access systems
- Fire detection and extinguishing systems
- Other building services

1.4 Spares

Fixings and terry clips to be provided

1.5 Warranty and Design Life

The minimum warranty periods required for both the system as a whole and product specific warranties are listed below:

Element	Warranty	Design Life	Strategy	Service Life
Cassette panel	12	25 years	No maintenance	25 years
Planting substrate and seeds	2	25 years	Replaceable	5 years
Vertical support rails	12	25 years	No maintenance	25 years

No maintenance – Items will meet the Design Life without loss of performance under typical service conditions.

Maintainable – Items can meet the Design Life without loss of performance under typical service conditions but will require maintenance at the end of their Service Life.

Replaceable – Items are not capable of meeting the Design Life under typical service conditions. Items are accessible and methodology is required for replacement at the end of the Service Life.

1.5.1 Warranty inclusions

12 years For the structural performance of the panels

2 Performance requirements

2.1 Standards and Codes

Comply with current editions of relevant statutory requirements, recognised codes of practice and standards.

2.2 Structural design

Design the Works using limit state design codes to ensure all loads acting in combination, including temporary loading, are transmitted to the relevant support structure with margin of safety to ensure failure does not occur. Failure includes cracking, distortion, dislodgement, excessive deflection, movements which are not part of the intended design or any action that will cause damage to the adjacent works. Calculations to be provided to justify the thicknesses of all components,

2.2.1 Dead, Live and Seismic loads

Determine in accordance with the relevant Standards.

2.2.2 Panel loads

The Meadow Cladding is installed as a dry system and has a dry weight of approximately 12.5kg /m². The fully grown weight of the system has been tested at two levels of saturation:

1) **Operational Saturation** – Moisture content between 48% and 55%;

and

2) **Maximum Saturation** (based on opening up and hosing internally for 5mins with standard hose rather than drip irrigation system) – Moisture content between 55% and 59%. The moisture content drops very quickly as the water drains out.

Scenario 1: Operational Saturation

- Operational saturation (normal summer watering)
- Fully grown out, mature panel
- Saturation: between 48% and 55% across the panel
- Panel area with joints: 620mm x 1020mm
- Panel weight: 18.0kg
- Equivalent m² weight: 28.5kg/m²

Scenario 2: Maximum Saturation

- Full saturation (hosed for 5 mins across entirety of panel)
- Fully grown out, mature panel
- Saturation: between 55% and 59% across the panel

- Panel area with joints:: 620mm x 1020mm
- Panel weight: 22.1kg
- Equivalent m2 weight: 35kg/m2

2.2.3 Load from maintenance activities

Coordinate with system Access strategy.

2.2.4 Vibration and repetitive loading

System must not vibrate or work elements loose due to any cyclic effects.

2.3 Movement and deflection

2.3.1 Accommodation of movement

Design the Works to accommodate expected building movements and deflections due to loading and environmental conditions. Design all connections to ensure that movement is not locked in and any changes in dimensions are accommodated resulting from temperature variations.

2.3.2 Deflection Limits

Element		Deflection limit
General framing members	Out of plane load	Span/250 or Height/180 for cantilevers
	Dead loads	Span/360 or height/180 for cantilevers
Metal panels	Out of plane load	Span/60

2.3.3 Thermal movements

Temperature variation – should be reasonably accounted for in the movements and tolerances allowances according to local historic and future predicted weather conditions.

2.4 Fire Performance

Provide smoke stopping and cavity barriers as required by Fire Engineers

2.5 Durability

Materials must meet material specification requirements for external elements and each material must be selected to be compatible with adjacent materials. Separate materials to prevent bimetallic corrosion.

2.6 Access and maintenance

Ensure elements can be safely maintained and replaced without damaging components.

Proposed access methods:

Element	Access strategy
Cladding panels	From ground/elevated working platform. To be agreed for project
Planting substrate	By operable panel

Cladding rails	Access through gaps between panels
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2.7 Embodied carbon – A1-A5

This should be assessed and provided to Vertical Meadow for each project during design detailing and then re-assessed on the final delivered system if there are changes. Vertical Meadow will provide embodied carbon values for components delivered by them.

2.8 Sustainability

Packaging should be considered and where possible single use wrapping materials should be avoided. Strategy should be provided to Vertical Meadow during the design phase to be agreed.

Minimising carbon emissions during production is essential with assessments on waste and logistics associated carbon to be included in assessments

3 Materials

3.1 Aluminium alloy framing sections

Low carbon aluminium – 2.0tCO₂/tAL – Aludium Eco 2 or similar

Grade to XXX standard – based on calculation

3.2 Aluminium alloy sheet

Grade to XXX standard – based on calculation

3.3 Mechanical fixings

Stainelss steel Grade

Reviewed and approved by manufacturers. Submit confirmatory information on request.

3.4 Gaskets

Where required to avoid rattling and prevent water penetrating the rainscreen.

4 Fabrication and Installation

4.1 Samples

Prior to fabrication a sample is required for acceptance by Vertical Meadow to ensure it matches the standard details, quality control and robustness.

4.2 Quality

There will be first article sign off at the start of production to ensure the panels the Vertical Meadow quality. Data sheets must be provided for all components prior to fabrication for sign off by Vertical Meadow. Certificates of material sourcing must also be provided to Vertical Meadow.

4.3 Design verification

Vertical Meadow to sign off all drawings prior to issuing to the Main Contractor and prior to the first prototype being produced.

4.4 Fabrication

4.4.1 Protection

Panels should be handled, fabricated to avoid damage to the panels in terms of scratches or dents. See sustainability section for appropriate wrapping materials.

4.4.2 Storage and handling

Where the panels have the growing media and seed paper inserted in them they should be protected from damp environments, kept cool and avoid areas where rodents are which are attracted to eating seeds.

4.5 Installation

4.5.1 Method statement

To be in accordance with RAMS agreed with Vertical Meadow.

4.5.2 Inspection

Vertical Meadow team to inspect and commission installation.

4.5.3 Tolerances

+/- 2mm tolerance vertically and horizontally

4.5.4 Connection to irrigation system

By Vertical Meadow team

4.6 Practical completion

Sign off by Vertical Meadow team for the start of the maintenance period. Typically one year after Living Wall commissioning but based on agreement with the Client.

4.7 Maintenance

A maintenance period of 1 year, from the first commissioning of a living wall, will be provided to the main contractor as part of the contract.

Following the expiry of this the Client must have a follow up maintenance contract with us to continue the digital remote monitoring of the living wall essential for it's survival. This is the minimum essential for success of the living wall. More extensive maintenance contracts are available for annual pruning and routine maintenance checks.