SPECIFICATION

Icopal
ST Wildflower Mat System

FOREWORD

This model specification is designed for specifiers of Icopal Ltd's products who require National Building Specification (NBS) clauses, for section Q37 Green Roofs.

The model specification provided below is not designed to be exhaustive and is given in good faith.

The purpose/extent of the enclosed model specification is to provide an indicative outline of the general processes required to complete a successful Icopal Green Roof. It is not the intent of this model specification to provide step by step guidance covering all aspects and issues that may be relevant to the installation of the specific project.

IMPORTANT NOTES:
This specification is based on current information available at the time of writing, if any aspects are revised prior to construction please contact Icopal Limited to review the specification and to amend or update the information provided.

Installers must always follow Icopal's installation guidance (available at www.icopal.co.uk) or contact Icopal Limited's technical support team if in doubt.

Specification Overview
The green roof specification is for a wildflower blanket system comprising a regionally produced, 38 species, shade and sun tolerant, 12-18 months field established wildflower mat; with a blended crushed brick and green waste substrate, filtration layer, water retention and drainage layer, and a waterproofing protection layer.

Suitability
The standard specification covered in this document is suitable for use on roof slopes of up to 10°.

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PRELIMINARIES

Design and installation of the green roof system should follow the recommendations of the Green Roof Organisation (GRO) "*Green Roof Code*".

This Specification covers the Icopal standard pre-grown blanket. Other custom planting mixes of a bespoke nature can be grown, subject to contract, season and growth lead times.

ROOT BARRIER
Waterproofing system to be root inhibiting. Otherwise a separate root barrier must be installed prior to the application of the green roof system.

NON VEGETATION BORDERS
A vegetation free border should be provided at all perimeters, rooflights, vents, outlets etc. The border will improve the drainage of run off from vertical surfaces, separate the greenery from the waterproofing to prevent damage to the membrane during maintenance operations, prevent vegetation blocking outlets, and provide protection against wind action at roof edges. The border should be a minimum of 300 mm wide and comprise of 20/40 mm diameter round river washed pebbles, or pea shingle.

PREVENTION OF FIRE
If a green roof is kept moist (as is normal to keep plants alive) then it is likely to be very resistant to ignition. If it is allowed to dry out (such as in times of drought) then there will be an increase in fire risk. Therefore the designer/specifier should analyse the fire risk of the project and adapt the scheme as appropriate so that the functional requirements of the Building Regulations are not breached.

The width of non-vegetation borders should be increased to a minimum 500 mm where a fire break is required, such as around rooflights and next to fire walls or to walls with structural openings. For larger green roof areas a fire break 1 metre wide should be used every 40 m across the roof area.

For further information refer to guidance as outlined in "*Fire Performance of Green Roofs and Walls*". Dept. for Communities and Local Government. 2013. Available from http://www.gov.uk/dclg

STRUCTURAL LOADING
Prior to the installation of the green roof system, the client/contractor is advised to confirm the structural capabilities (checked by a structural engineer) of the roof deck, particularly with regard to the additional imposed loadings attributed to the green roof elements. Structural loadings to be considered are: usage and foot traffic; design features / water features; future usage; snow / ice loading; roof mounted equipment; maintenance; vehicles access and egress points; planters; safety barriers, etc.

WIND ACTION
Landscaped roofs provide additional dead weight to the roof structure. This mass must be adequate to resist the action of the wind which will vary over the whole roof area. Wind uplift pressures are normally greater towards the perimeter of the roof where additional ballast may need to be used.
Consideration shall be given to the action of 'wind scour' which can cause movement of soil and ballast resulting in a redistribution of loading. Ballast size should be increased accordingly. In exposed locations, or on sloping roofs, it may be necessary to protect / mechanically secure soil and vegetation until well established.

ROOF SAFETY
A green roof will require regular safe access for maintenance and it is important that adequate fall protection measures are put in place to allow for the safe inspection and maintenance of the roof.

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Q37 GREEN ROOFS

To be read with Preliminaries/ General Conditions.

GENERAL

130 EXTENSIVE GREEN ROOF

- Roof Type: [Warm / Cold / Inverted].
- Waterproofing: See waterproofing specification [J31 / J41 / J42].
- Roof Slope: [Up to 10° slope (recommended minimum 1:60 fall)].

- Supplier: [Icopal Limited. Barton Dock Road. Manchester. M32 0YL].
- Protection: As clause 330 and 750.
- Moisture Control: As clause 350 and 770.
- Filtration Layer: As clause 365 and 780.
- Planting Medium: Extensive Biodiverse Substrate, as clause 390 and 790.
  - Depth : [100 mm + settlement factor]
- Vegetation: Pre-grown vegetation mat, as clause 400 and 800.
- Accessories :
  - Anti-erosion Mat, as clause 410.
  - Edge Retaining Profile, as clause 420.
  - Inspection Chamber, as clause 430.
  - Vegetation barrier, as clause 445 and 448.

PERFORMANCE

210 GENERAL DESIGN

- Green roof and associated features: Complete the detailed design in accordance with GRO Green Roof Code and FLL guidelines.

220 ELECTRONIC TESTING OF WATERPROOFING SYSTEM

- An Icopal insured warranty is dependent upon the final Icopal waterproofing installation being electronically tested by an agreed specialist
- The testing should be carried out immediately before any surfacing is installed.
- Prior to testing, ensure the roofing work has been completed to a stage where integrity of the membrane can be tested, that all obvious defects have been made good, and that the roof is cleared of all materials, debris, dust, etc.
- If any leaks/defects are discovered; mark the location on the roof, prepare a report and submit to CA together with proposals for remedial measures.
- After making good any defects by the roofing contractor, retest locally to verify the integrity of the repair.
- On completion: Certify the waterproofing integrity of the roof.

250 CHARACTERISTIC LOADS

- The Specifier/Contractor is advised to confirm the load-bearing capabilities of the roof structure (checked by a structural engineer) particularly in regards to the additional imposed loadings attributed to the green roof elements above the normal static and dynamic loads associated with a roof structure.

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PRODUCTS

330 PROTECTION LAYER

- Product: [ICOPAL PROTECTION FLEECE].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
  - Material: [Polyester].
  - Thickness: [3.5 mm] .

350 DRAINAGE LAYER

- Product: [ICOPAL DRAINAGE BOARD 20FF].
  - Description: [Cuspated drainage board with integral filter layer].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
  - Material: [Board: HDPE; Fleece: Polypropylene].
  - Thickness: [20 mm].
  - Capacity: [7 Litres /m^2].
  - Infill: [Not required].

360 FILTRATION LAYER

- Filter layer is factory-bonded to the drainage board.
  - Material: [Non-woven polypropylene].
  - Thickness : [~ 1 mm].

365 FILTRATION LAYER FOR DETAILING

- Product: [ICOPAL FILTER FLEECE].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
- Material: [Non-woven polypropylene].
- Thickness: [~ 1 mm].

390 EXTENSIVE GROWING MEDIUM

- Product: [ICOPAL BIODIVERSE SUBSTRATE].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
- Material: [Special blended mix of recycled crushed brick and fine grade 10 mm top soilorganic material].
- Depth: [100 mm + settlement factor of 15%].
- Substrate Contouring: [Laid Level].
  - Variation: [Not applicable].
- Ameliorant/conditioner:
  - Coverage: Total.

400 VEGETATION BLANKET

- Product: [ICOPAL WILDFLOWER MAT].
  - Thickness: [30 mm + planting (20 – 50 mm)].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
- Planting Mix: [34 wildflower and 4 grass species].
- Vegetation Coverage: ~90 %.

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410 ANTI-EROSION MAT [FOR USE IN EXPOSED LOCATIONS]

- Product: [ICOPAL STABLISATION MESH].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
  - Material: [Coir / Jute matting].
  - See clause 810.

420 EDGE RETAINING PROFILE (to exposed edges of greenery)

- Product: [ICOPAL EDGE RESTRAINT STRIP].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
  - Material: [Aluminium].
  - Height: [100 mm].
- Product is slatted to allow drainage path for water runoff.

430 INSPECTION CHAMBERS (to all internal outlets)

- Product: [ICOPAL TERRACE GRATE].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
  - Material: [Aluminium].
  - Shape: [Square].
  - Dimensions: [200 mm x 200 mm].
  - Height: [to suit scheme depth].

445 VEGETATION BORDERS (GENERALLY)

- Material: [Ø20 – 40 mm river washed stones].
  - Supplier: Icopal Limited. Barton Dock Road. Manchester. M32 0YL.
- Border Width (minimum) : [300 mm]
- Location: Around all penetrations, upstands etc. to provide vegetation free edges to allow for maintenance etc

448 VEGETATION BORDERS (FIREBREAKS)

- Non-vegetative strips.
- Width: 500 mm
- Location: At all openings (eg skylights/rooflights; walls with windows).
  - Provide breaks in vegetation of 1 metre widths every 40 m across roof area.

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EXECUTION

710 INSTALLATION GENERALLY

- Preparation: Clear all surfaces of debris.
- Timing: After certification of waterproofing membrane integrity.
- Unfinished work: Secure from damage, and effects of wind uplift.
- Faults in waterproof membrane: Report.
- Storage: Do not overload
  - Point Loads: Avoid.
- Outlets: Do not block.
  - Outlet Grilles: Installed.

720 ADVERSE WEATHER

- Unfinished work: Secure from damage, and effects of wind uplift.
- Conditions: Do not install or work with frozen materials.

750 PROTECTION LAYER INSTALLATION

- Joints: Minimise.
- Overlaps (minimum): 100 mm.
- Upstands: Extend to top of growing medium.

770 DRAINAGE LAYER INSTALLATION

- Extent: Continuous over roof area.
- Fitting: Loose-laid and closely butt-jointed. Dress geotextile overlap flap to adjacent board.
- Upstands: Fit closely around penetrations and outlets.
  - Cutting: Use protection board beneath to avoid damage to membranes.

780 FILTER LAYER INSTALLATION

- Ensure filtration layer is continuous around outlets, details and up the sides of all upstands to contain substrate and limit the amount of fines particles reaching the drainage layer and rainwater outlets.
- Joints: Minimise
- Fitting: Loose-laid.
- Overlaps (minimum): 100 mm.
- Upstands: Extend to top of growing medium.

790 GROWING MEDIUM INSTALLATION

- Handling: Minimise.
- Installation: Handle in the driest condition possible. Do not handle or install wet or frozen.
- Depth: Install to specified depth.
- Pour onto roof and rake level.
- Sequence: Gently firm each layer before spreading the next.

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800 VEGETATION BLANKET INSTALLATION

- Handle with care to avoid damage.
- Handle in the driest condition possible. Do not handle or install wet or frozen.
  - Timing: Where possible install on day of arrival.
- Ensure substrate is raked level before the mats are unrolled.
- Unroll mat with loose end firmly up against starting edge.
  - Ensure no gaps between mats: butt joint or slightly overlap.
  - Joints: Staggered. Do not stretch blankets.
  - Consolidation: Firm as laying proceeds to ensure contact with growing medium.
- Watering: Thorough, immediately after laying and dressing. Keep growing medium moist until plants are established (typically **25** weeks following installation).
- Delays: If mats are unable to be installed on day of arrival, unroll mats to avoid overheating.
- While unrolled keep moist, by natural rainfall or by irrigation.
  - If in doubt, seek advice from Icopal Limited.

810 ANTI-EROSION MAT INSTALLATION

- Joints: Minimise.
  - Overlaps (minimum): 150 mm.
- Fixing: Larger pebble ballast or tied to edge restraint/secured by perimeter pebble channel, as appropriate.
- Mat durability: Until vegetation is firmly rooted to growing medium.

820 EDGE RETAINING PROFILE INSTALLATION

- Cutting: Neat, accurate and without spalling.
- Junctions: Vertical, secured using proprietary connectors.
- Position: True to line and level. Smooth continuous lines.
- Fixing:
- Generally: Strapped with strip of roofing membrane, or system ballast.
- All open roof verge or eaves: Mechanically fastened to the roof structure.

830 INSPECTION CHAMBER INSTALLATION

- Location: Install centrally over roof outlet.
  - Orientation: Align parallel with adjacent features.
- Bedding: Position flanges onto drainage board.
- Surround:
- Ballast flanges with pebbles.
- Surround with 300 mm wide border of 20–40 mm diameter round pebbles.

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EXECUTION

910 INSPECTION

- Timing: Before handover.
- Give notice (minimum): 3 days.
- Faults in waterproof membrane: Report.
- Storage: Do not overload
  - Point Loads: Avoid.
- Outlets: Do not block.
  - Outlet Grilles: Installed.

920 COMPLETION

- General: Leave the works in a clean tidy condition.
- Surfaces: Clean immediately before handover.
- Outlets: Clean and clear of obstructions.
- Completed green roof: Protect from adjacent or high level working.

930 DOCUMENTATION TO CLIENT

- Timing: Submit at handover.
- Contents may include:
  - Procedures for maintenance of green roof.
  - Record drawings showing location of planting and associated features.
  - Aftercare agreement.
  - Aftercare guidelines.
  - O&M Manual.
  - Irrigation guidelines.
  - Number of copies: [as required].

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CLOSING

The species of plants are chosen to provide visual interest with a wide range of flowering periods and food sources to attract a diverse range invertebrates.

The majority grow naturally in arid, well drained areas, often on shallow substrate depths. Therefore they are drought tolerant, and able to survive in extremes of conditions. They generally flower from early summer to autumn and provide a mixture of colours.

A green roof is a living roof. The species within the Icopal standard systems are a range of drought tolerant species chosen for their suitability for a roof location in the UK and Eire.

Not all species are suitable in partial or full shade, and there will be significant variation in growth/colour compared to those growing in full sunlight. Species have been selected to include a mix of shade tolerant species. Roof conditions and location may cause more dominant species to thrive. This means that no one roof will be the same. Systems with deeper substrates will encourage a wider variety of plant species.

The weather during the flowering period in late spring and summer will determine which species will come to prominence in a given year.

A pregrown [Wildflower] blanket system provides an instant 'greening' effect, however it can take some months for the plant roots to fully establish into the growing substrate. This could be a period of up to [25 weeks].

Irrigation
Once installed, it is important that the plants are kept moist until the roots are fully established.

Once established, an extensive system will need little irrigation. It may however be necessary to irrigate in prolonged periods of low rainfall and warm temperatures.

It is therefore important that there is a method to get water onto the roof for irrigation.

A roof top water source is recommended to connect a temporary irrigation system if required.

The provision of a roof top water source should deliver a recommended pressure of 2.5 – 3 bar, and a flow rate of 60 L/min, or otherwise sufficient pressure and flow rate to suit the irrigation system used.

Sloping roofs retain less water and therefore a permanent irrigation system should be considered.

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Maintenance

Extensive roofs are designed to be low maintenance, however they will still require some maintenance during the year.

The maintenance schedule should be planned at the design stage.

The free-draining substrate used in an extensive living roof will generally limit the growth of invasive species, however after periods of warm wet weather weeds may appear.

An Extensive Wildflower System can be managed more heavily to produce a controlled “wildflower meadow” type environment. Less management input may lead to the development of vegetation which progresses naturally relating to the prevailing site conditions.

Roofs of any type should have an annual maintenance schedule, with visits twice a year; in early spring and late autumn, to inspect and clear gutters and outlets, and check flashings etc. The green roof maintenance can be planned to coincide with this scheduling.

Roofs incorporating wild flowers and grasses should have all dead vegetation strimmed off.

The management programme during the first year will be important for success. During this period the vegetation should be cut down to 5-7 cm whenever the sward reaches 10-20 cm high. The number of cuts required will depend upon the prevailing conditions and can range from 1 to 4 in number. This cutting regime has the purpose of eliminating any annual weeds by not allowing them to flower.

All dead vegetation and debris from the roof surface should be removed, checking all outlets and gutters are free and clear of cuttings.

For more detailed guidance and recommendations, please consult the relevant green roof support documentation.

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