H92 RAINSCREEN CLADDING

To be read with Preliminaries/General conditions.

TYPE(S) OF RAINSCREEN CLADDING

120 RAINSCREEN CLADDING TO EXTERNAL WALLS AS NOTED ON ELEVATIONS

- Drawing reference(s): Architect Elevations, sections, and detail drawings
- Primary support structure: Lightweight steel framing
- Rainscreen cladding system: ULTRALITE Natural Limestone
  Manufacturer and reference: Dynamic Facades ULTRALITE Rainscreen as supplied by Tiles International Ltd, West View House, Devro Campus, Gartferry Rd, Moodiesburn, Glasgow G69 0JE, Tel:0870 050 0981
  Type: Ventilated
- Rainscreen panel: Dynamic Facades Ultralite Limestone rainscreen panel
  Manufacturer and reference: 27mm thick panel comprising a 20mm fully encased aluminium honeycomb filled cassette panel with a 7mm limestone veneer epoxy bonded. The panels will come complete with a patented aluminium extruded locating channel
  Panel sizes: Mechanically preformed floor to floor column encasements 2970mm max in height c/w 50mm to 200mm returns TBC
  Stone orientation: Landscape/Portrait TBC
  Stone coursing lay-out: TBC
  Oversized stones: Leave selected Aerolite panels oversized to accommodate deviations in build
  Tolerances in height: +/-1mm, length: +/-1mm, thickness +/-1.5mm on preformed units +/- 2mm in h
  Height and lengths and +/- 1.5 degrees in angle
  Pre-formed units: available in dims as above but restricted to 200mm max returns filled & dressed
  Thickness: 54mm +/-1,5mm o/a - Ti-tracking horizontal carrier rail and Ultralite panel
  Finish/colour: CSV (L) CB Limestone Honed as per previous store requirements

  Fasteners and carrier system: Ti-tracking “Generic” horizontal carrier system c/w EPDM safety movement gaskets powder coated black c/w panel dividers 6, 8 or 10mm TBC
  Number and location of carriers: to project specific design and confirmation
  Joint type: Horizontal closed / Vertical open
  Joint width: vertical and horizontal 8mm min 10mm +/-1mm max
- Air gap: minimum 30 mm
- Secondary support/framing system: Helping hand bracket and T-rail assembly or similar
  Manufacturer and reference: GIP Facades DE or similar
  Material: Aluminium
  Fasteners: To project specific design requirements
  Number and location of fasteners: As manufacturers instructions and project specific design requirements
- Backing wall: Lightweight steel framing
  Breather membrane: Tyvec or similar N/A
  Thermal insulation: **As clause 776.**
- Accessories: Colour coated cill and head flashings
- Incorporated components:
  Integral co-ordination with windows and abutments with rendering panels, aluminium flashings/ panels, and curtain walling. Refer to Architect details.
  Flashings / cills or other ancillary flashings as noted on Architect detailed drawings.
  Anti-vermin mesh to openings as indicated on Architect’s details.
  Include all fixings to complete the system installations per manufacturer’s instructions.
  Fire barriers (horizontal along slab edges, vertical to coincide with part walls) per system manufacturer’s standard details and installation.
- Other requirements:

All sheeting rails as supplied as part of this system to be fully packed with insulation prior to fixing to eliminate cold pockets.

Air gap behind tiles to be maintained at all times – including at slab edge fire barriers – manufacturer's installation guide to be strictly followed to main such air gap.
Design of supports to take in account of tolerances to ensure setting out of tiles per Architect's drawings is achieved.
Any preformed soffit, cill, copping or corner details may require supplementary fixation Tweha Bond adhesion.

GENERAL REQUIREMENTS/PREPARATORY WORK

210 DESIGN
- Complete the detailed design of the rainscreen cladding and associated features shown on the preliminary design drawings to meet the requirements of this specification
- Co-ordinate detailed design with that for all related works.

215 DESIGN PROPOSALS: The preliminary design drawings indicate design intent but do not preclude submission with tender of reasonable alternative proposals for consideration.

220 SPECIFICATION:
- Comply with the latest edition of the Centre for Window and Cladding Technology (CWCT) 'Standard for walls with ventilated rainscreens' and 'Standard for testing of ventilated rainscreens' unless specified otherwise in this section.
- Keep a copy of the CWCT 'Standard for walls with ventilated rainscreens' and 'Standard for testing of ventilated rainscreens' together with other CWCT publications invoked by these documents, at the design office, workshop and on site, readily accessible for reference at all times during the course of the works.

225 INFORMATION TO BE PROVIDED WITH TENDER: Submit to the Client's Representative the following rainscreen cladding particulars:
- Typical plan, section and elevation drawings at suitable scales.
- Typical detailed drawings at large scales, including typical plan elevation and sectional details, typical abutments/ interface (plan-wise and section-wise) to other building elements, opening details for windows and doors, specification of all components and measures to ensure water-tight and wind-tight installation.
- Technical information and certification demonstrating compliance with the specification of proposed incorporated products and finishes, including tiles, fixing system, flashings performance/ durability.
- Certification, reports and calculations demonstrating compliance with the specification of the proposed rainscreen cladding.
- Proposals for connections to and support from the primary support structure.
- Proposals for any primary support structure additional to that shown on preliminary design drawings.
- Schedule of builder's work, special provisions and special attendance by others.
- Examples of standard documentation from which the project quality plan will be prepared.
- Preliminary fabrication and installation method statements and programme.
- Proposals for replacing damaged or failed products.
- Areas of non-compliance with the specification.

230 INFORMATION TO BE PROVIDED AFTER ACCEPTANCE OF TENDER: Submit to the Client's Representative within 4 weeks (to be confirmed) of appointment the following rainscreen cladding particulars:
- A schedule of detailed drawings and dates for submission for comment.
- A schedule of loads that will be transmitted from the rainscreen cladding to the structure.

- Proposed fixing details and systems relevant to the structural design and construction with methods of adjustment and tolerances.
- A schedule of all fabrication tolerances/size tolerances.
- A detailed testing programme in compliance with the Main Contract master programme.
- A detailed fabrication and installation programme in compliance with the Main Contract master programme.
- A quality plan in compliance with the CWCT 'Guide to good practice for facades', Section 6.
- Proposals to support any outstanding applications for Building Regulation consents or relaxations.

235 INFORMATION TO BE PROVIDED BEFORE COMMENCEMENT OF RAINSCREEN CLADDING WORK: Submit to the Client's Representative before testing or fabrication the following rainscreen cladding particulars:

- Detailed drawings to fully describe fabrication and installation.
- Detailed calculations to prove compliance with all design/performance requirements.
- Project specific fabrication, handling and installation method statements.
- Certification for all incorporated components manufactured by others confirming their suitability for all locations in the rainscreen cladding.
- Recommendations for spare parts for future repairs or replacements.
- Recommendations for safe dismantling and recycling or disposal of all products.

240 PRODUCT SAMPLES: Before commencing detailed design provide the Client's Representative with identified samples of:
Ultralite panel, Ti-tracking carrier rail
Obtain approval of appearance before proceeding.

250 SAMPLES OF FIXINGS: At an agreed stage during detailed design work provide the Client's Representative with identified samples of each type of fixing, together with manufacturers' recommended torque figures

270 MOCK-UP: At an agreed stage during detailed design work construct in an approved location a mock-up of: ULTRALITE Sandstone on Ti-tracking horizontal carrier cost and lead-in times TBC
[……]

Purpose(s) of mock-up:
to agree on quality of the rest of the installation; to resolve any interface details with the surrounding elements.
Arrange for inspection to be carried out jointly with the Client's Representative. Obtain approval of appearance before proceeding. Retain mock-up in undisturbed condition until completion of rainscreen cladding installation.

DESIGN/PERFORMANCE REQUIREMENTS

310 GENERALLY:

- Comply with CWCT as 'Standard for walls with ventilated rainscreens', Section 2 - Performance Criteria unless specified or agreed otherwise.
- Project performance requirements specified in this subsection are to be read in conjunction with CWCT performance criteria.

335 INTEGRITY OF VENTILATED RAINSCREEN CLAD WALLS: Determine, size(s) and thickness(es) of panels, the size(s), number and spacing of fixings, configuration and location of secondary support systems and incorporation of other accessories and fittings to ensure the cladding system, primary

support structure and other elements forming the rainscreen wall will resist all factored dead, imposed and design live loads, and accommodate all deflections and movements without damage.

- Calculate wind loads on rainscreen walls appropriate to location, exposure, height, building shape and size in accordance with BS 6399-2, taking full account of existing and known future adjacent structures.
- Impact load(s) in accordance with BS 8200:
  Location and category: t.b.c. by structural engineer
- Temporary imposed loads: t.b.c. by structural engineer

350 DEFLECTION UNDER WIND LOAD: At positive and negative applications of the design wind pressure the maximum normal deflection for the listed components must not exceed:
to be confirmed by Structural Engineer

360 WIND RESISTANCE - CYCLIC LOADING: No reduction in the performance of the rainscreen cladding must occur after the maximum effective wind pressure has been applied for 10,000 cycles.

370 APPEARANCE AND FIT:

- Design rainscreen wall:
  - To ensure position and alignment of all parts and features as shown on the referenced drawings listed in Type(s) of rainscreen cladding clause(s).
  - To accommodate deviations in the primary support structure.
- Maximum permitted component and installation tolerances:
  +/- 2mm

380 GENERAL MOVEMENT: The rainscreen cladding must accommodate anticipated building movements as follows:
to be confirmed by Structural Engineer

390 AIR PERMEABILITY GENERALLY: The average air leakage rate through the listed wall(s) at a differential pressure of 50 Pascals must not exceed:
All external walls 10m³/hr/m²

420 WATER PENETRATION onto internal surfaces or into cavities not designed to be wetted must not occur when the rainscreen wall is subjected to a test pressure of 600 Pascals.

430 THERMAL PROPERTIES:

- Method for calculating the thermal transmittance (U-value) of the rainscreen wall: elemental method
- Average U-value of rainscreen wall: 0.3 W/m²K.

440 CONDENSATION: The psychometric conditions under which condensation must not form within or on the interior surface of the rainscreen wall or any surface of the wall that is on the warm side of any insulation are:

- Outdoor notional psychrometric conditions as BS 6229, table 6:

	Winter	Summer
Temperature	-5°C	18°C
Relative humidity	90%	65%
Vapour pressure	0.361 kPa	1.341 kPa
Duration	60 days	60 days

- Indoor notional psychometric conditions:
  Temperature: 20 °C
  Relative humidity: 55 %
  Vapour pressure: 1.285 kPa.

- Calculated amount of winter interstitial condensate must not exceed 0.5 kg/m². Calculated annual net retention must not exceed 5% of winter condensate.

450 VAPOUR CONTROL LAYER: Determine the interstitial condensation risk of the rainscreen wall using the method described in BS 5250 Appendix D. If necessary, provide a suitable vapour control layer to ensure that damage and nuisance from interstitial condensation does not occur.

480 FIRE RESISTANCE OF BACKING WALL: To BS 476- 21 and not less than 90 mins.

485 INTERNAL SURFACE SPREAD OF FLAME OF BACKING WALL: To BS 476-7, Class 0

490 CAVITY FIRE BARRIERS: To BS 476-20 and must resist the passage of flame and smoke for not less than 90 mins.

TESTING

510 COMPARISON (TYPE) TESTING: Fabrication and installation of rainscreen cladding must not commence until test results and reports showing compliance with this specification have been submitted to the Client's Representative.

515 PROJECT TESTING (LABORATORY):
- At an agreed stage in detailed design work arrange for laboratory testing of specimens of rainscreen cladding and components in accordance with relevant clauses of this specification.
- Fabrication and installation of rainscreen cladding must not commence until test results and reports showing compliance with this specification have been submitted to the Client's Representative.
- Alternative: Manufacturer/ Installer to submit a valid testing certificate from an United Kingdom Accreditation Service (UKAS) approved independent laboratory to the Client's Representative. Test Certificate MUST refer to test undertaken LESS than 10 years from site installation date.

520 PROJECT TESTING (SITE):
- At an agreed stage during preliminary installation on site arrange for testing of a section of rainscreen cladding in accordance with relevant clauses of this specification.
- Protect building structure, components and finishes from any damage consequent upon testing.
- Installation of general areas of rainscreen cladding must not continue until site test results and reports showing compliance with this specification have been submitted to the Client's Representative.

530 TESTING AUTHORITY: Project testing must be carried out by a United Kingdom Accreditation Service (UKAS) approved independent laboratory.

550 SMALL TEST SPECIMEN:
- Drawing references: Refer to Elevation Drawings.
- Overall dimensions m high x m wide
- Features: window opening, abutting elements
- Test sequence(s): As clause(s) 560

560 TEST SEQUENCE: To CWCT 'Standard for testing ventilated rainscreens', Table 2 as follows:

- Air permeability: As clause 595
- Weather-tightness/water penetration: As clause 615 N/A
- Wind-loading: As clause 625

595 AIR PERMEABILITY TESTS:
- To CWCT 'Standard for testing of ventilated rainscreens', clause(s) 3.3, 3.3.1
- Test pressure: As clause 410.
- Allowable leakage rates: As clause 390.

615 WEATHERTIGHTNESS/WATER PENETRATION TESTS, SMALL SPECIMEN:
- To CWCT 'Standard for testing of ventilated rainscreens', clause 3.4.
- Test pressure: As clause 410.
- Test method: Using test chamber to BS 5368

625 WINDLOADING TEST - RAINSCREEN:
- To CWCT 'Standard for testing of ventilated rainscreens', clause 3.5.2
- Test pressures: As clause 410.
- Loading directions: rainscreen panels to fixing rails

630 FATIGUE LOADING TEST, SMALL SPECIMEN - RAINSCREEN:
- To CWCT 'Standard for testing of ventilated rainscreens', clause 3.6.
- Test sequence: as clause 360
- Maximum design wind pressure: As clause 340

670 DESTRUCTIVE TESTING OF FIXINGS TO DETERMINE THE ULTIMATE LOAD:
- Number and location of test fixings: 5 number as agreed on site
- Test method: To BS 5080-1 and Construction Fixings Association guidance note 'Procedure for site testing construction fixings'.

672 SITE FIXINGS TEST:
- Number and location of test fixings: [……..]
- Test method: To BS 5080-1 and Construction Fixings Association guidance note Procedure for 'Site testing construction fixings'.

680 SITE SPARGE BAR TEST: To CWCT 'Standard for testing of ventilated rainscreens', clause 3.10.3.

685 SITE HOSEPIPE TEST: To 'Standard for testing of ventilated rainscreens', clause 3.10.4.
Joints to be tested:
Interface with windows

PRODUCTS

710 ALUMINIUM ALLOY FRAMING SECTIONS:
- To BS 1474, alloy 6063 and suitable for the specified finish.
- Structural members to comply with BS 8118.

712 ALUMINIUM ALLOY SHEET: To BS EN 485, BS EN 515 and BS EN 573 in an alloy, temper and thickness suitable for the application and specified finish.

715 MILD STEEL FRAMING SECTIONS/ REINFORCEMENT: To the relevant parts of BS 7668, BS EN 10029, BS EN 10113, BS EN 10137, BS EN 10155 and BS EN 10210, in a thickness suitable for the application, and for galvanizing or other protective coating.

717 MILD STEEL SHEET: To the relevant parts of BS 1449-1, BS EN 10048, BS EN 10051, BS EN 10111, BS EN 10131, BS EN 10139, BS EN 10140, BS EN 10149, BS EN 10209, and BS EN 10268 in a grade and thickness suitable for the application, and suitable for galvanizing or other protective coating.

720 STAINLESS STEEL SHEET: To the relevant parts of BS EN 10029, BS EN 10048, BS EN 10051, BS EN 10095, BS EN 10258, BS EN 10259 and BS EN 10088-2, austenitic, grade 1.4301 (304) generally, grade 1.4401 (316) when used externally or in severely corrosive environments, and in a thickness suitable for the application.

725 TIMBER BATTENS:
- Regularised softwood free from decay, insect attack (except ambrosia beetle damage) and with no knots wider than half the width of the section.
- Preservative treatment: CCA as section Z12 and British Wood Preserving and Damp-proofing Association Commodity Specification C8.
- Moisture content at time of fixing: Not exceeding 19%.

730 MECHANICAL FIXINGS:
- Stainless steel to BS EN ISO 3506 grade A2 generally, grade A4 when used in severely corrosive environments, or
- Mild steel to BS 4190 and suitable for galvanizing or other protective coating, or
- Aluminium complying with BS 1474 and BS EN 755.

732 ADHESIVES must not be degradable by moisture or water vapour.

735 FIXINGS AND FASTENERS must be:
- Of dimensions not less than recommended by their manufacturers.
- Capable of adequate three dimensional adjustment to accommodate primary support structure and rainscreen cladding fabrication/installation tolerances.

760 GASKETS:

- Non-cellular rubber to BS 4255-1
- Cellular rubber to ASTM-C509.
- Resistant to oxidation, ozone and UV degradation.

765 WEATHERSTRIPPING of opening units:
- Non-cellular rubber to BS 4255-1.
  Cellular rubber to ASTM-C509
  Polypropylene woven pile, silicone treated.
- Weather-stripping must be fixed in undercut grooves in framing sections and have preformed corners with any joints in the length.

770 GENERAL SEALANTS: Must be stable and compatible with all contact products and finishes and be selected in accordance with BS 6213 from:
Silicone to BS 5889
One part polysulfide to BS 5215
Two part polysulfide to BS 4254
One or two part polyurethane.

776 THERMAL INSULATION:
- Material: TBC
  Manufacturer and reference: TBC
  Thickness: TBC
- Attached to the outer face or supported within the backing wall so as not to bulge, sag, delaminate or detach during installation or in situ during the life of the rainscreen cladding.
- Keep dry during installation.
- all board joints to be fully sealed to retain integrity of vapour control. Tape joints over all secondary supports (ie, between the horizontal sheeting rails and vertical tile clad-rails) to prevent bi-metallic corrosion. N/A

FINISHES

810 PROTECTIVE COATING OF MILD STEEL FRAMING SECTIONS/ REINFORCEMENT: All surfaces must be:
- Hot dip galvanized to BS EN ISO 1461, or
- Treated with an appropriate equivalent coating to BS 5493, BS EN ISO 12944 and BS EN ISO 14713.

820 PROTECTIVE COATING OF MILD STEEL MECHANICAL FIXINGS: All surfaces must be:
- Hot dip galvanized to BS EN ISO 1461, or
- Sherardized to BS 4921, class 1 coating thickness and passivated, or
- Zinc plated to BS 1706, coating classification Fe/Zn 12 and chromate conversion class 2C or 2D.

830 POWDER COATING: As section Z31.

FABRICATION AND INSTALLATION

910 GENERALLY:
- Fabricate and install rainscreen cladding in accordance with this specification and the final detailed drawings.
- Fabricators and installers must employ competent rainscreen cladding operatives. Records of their experience are to be provided to the Client's Representative on request.
- Select and align all products to ensure uniformity of appearance.
- Joints must only occur at positions indicated on final detailed drawings.
- Isolate dissimilar metals to prevent electrolytic corrosion.
- Machine cut and drill all products in the workshop wherever possible.
- Mark or tag all products to facilitate identification during assembly, handling, storage and installation. Do not mark surfaces visible in the complete installation.

912 METALWORK: As section Z11, unless specified otherwise in this section.

915 TIMBER TREATMENT:
- As section Z12, unless specified otherwise in this section.
- Treat surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.

920 GLAZING:
- As section L40, unless specified otherwise in this section.
- Fix directional patterned/wired glass generally parallel to surround and align adjacent panes where seen together at close quarters.

922 FIXINGS/ADHESIVES APPLICATION: As section Z20, unless specified otherwise in this section.

925 SEALANT APPLICATION: As section Z22, unless specified otherwise in this section.

930 ASSEMBLY:
- Carry out as much assembly as possible in the workshop.
- Joints, other than movement joints and designed open joints, must be rigidly secured, reinforced where necessary and fixed with hairline abutments.
- Take precautions to prevent displacement of components in assembled units. Obtain approval for any reassembly on site.

935 INSPECTION:
- All fabrications and assembled units must be carefully inspected for match with approved samples and for compliance with this specification and the final detailed drawings before dispatch to site.
- Give adequate notice of inspection arrangements to enable the Client's Representative and/or other affected parties to be present.
- Installation of rainscreen cladding to include provision for regular site inspection from technical representative from manufacturer to ascertain the installation of rainscreen system in general.

940 PROTECTION:
- All fabrications and assembled units must be protected against damage, corrosion and disfigurement during handling, installation and subsequent site operations.
- Protective coverings must be applied before dispatch to site and must not be detrimental to rainscreen cladding products, finishes or installation procedures.

945 HANDLING AND STORAGE:
- Do not deliver to site any rainscreen cladding products and units which cannot be installed immediately or unloaded into a suitable well protected storage area.
- Store products and units on level bearers clear of the ground and separate with resilient spacers.

950 SUITABILITY OF STRUCTURE:

- Not less than 4 weeks (to be agreed on site) before commencement of rainscreen cladding installation carry out a geometric survey of the supporting structure, checking line, level and fixing points. Report immediately to the Client's Representative if structure will not allow the required accuracy or security of erection.
- Coordinate geometric survey for rainscreen cladding with any other survey(s) for adjacent cladding.
- Set out erection datum points, lines and levels for a complete elevation at a time unless otherwise agreed with the Client's Representative.

960 PRELIMINARY RAINSCREEN CLADDING INSTALLATION: Complete a preliminary area of rainscreen cladding as set out below for inspection and approval of appearance by the Client's Representative.
Full height panel (one floor) including window to one apartment flat; and full height (one floor) to one stair/lift core - Location to be confirmed on site
(also see clause 270)

970 RAINSCREEN CLADDING INSTALLATION:
- Set out straight, parallel and truly aligned.
- Tighten all mechanical fixings to manufacturer's recommended torque figures. Do not overtighten fixings intended to permit differential movement.
- Remove protective coverings only where necessary to facilitate installation and from surfaces which will be inaccessible on completion.

975 IN SITU WELDING is not permitted.

980 INTERFACES: Ensure that flashings, closers, etc. (specified in another section) are located correctly and neatly overlap the rainscreen cladding to form a weathertight junction.

985 DAMAGE:
- Do not repair rainscreen cladding without approval. Such approval will not be given where products and units are badly damaged or where the proposed repair will impair performance or appearance.
- Repairs may require additional site testing at the discretion of the Client's Representative.
- Schedule repairs or record on drawings for inclusion in the maintenance manual.
- Allow for minimum of 3% of spares for the duration of site installation – per manufacturer's recommendations. Any surplus tiles to be handed to Client upon completion.

990 CLEANING: At Practical Completion or when otherwise agreed with the Client's Representative, remove any protective coverings and thoroughly clean rainscreen cladding areas. Cleaning agents for the purpose must be approved by the rainscreen cladding manufacturer and incorporated products manufacturers.

995 MAINTENANCE: Prepare a maintenance manual in accordance with CWCT 'Guide to good practice for facades', Section 10. Unless otherwise instructed or agreed the manual must be completed and handed over to the Client's Representative at Practical Completion.