

H92 Rainscreen cladding

DESIGN INTENT INFORMATION, TO BE READ WITH PRELIMINARIES/ GENERAL CONDITIONS AND GENERAL REQUIREMENTS SECTION B01

TYPE(S) OF RAINSCREEN CLADDING

111 GLAZED CERAMIC BAGUETTES

- 'Hit and miss' array of glazed ceramic baguettes, forming outer face of contractor-designed wall buildup. . ✓
- Substrate: Submit proposals for a fully designed external envelope buildup, including primary and secondary structure, insulating and other weather proofing layers, internal linings, fixings, substrates and all other elements..
- Rainscreen cladding system:
 - Type: Drained and back ventilated.
 - Requirement: Include products, fixings and interfaces necessary to complete the fabrication and installation. Performance criteria to comply with Design/ Performance Requirements and Testing subsections. Include all mullions, bracketry, fixings, infill strips, perimeter flashings and closers.
 - Material: Units to be natural clay, frost resistant with low soluble salt content and low water absorption as defined in BS3921. The units, including site cut units, are to be free from cracks, chips, surface blemishes or irregularity of shape, of consistent colour and surface texture. Where units exceed fabrication dimensions, form flush, tight-butted, seamless, colour-matched resin joint.
 - Supplier: N.B.K. Keramik GmbH & Co., Reeser Strasse 235, D-46446 Emmerich am Rhein. Tel ++49 (0)2822 / 81 11-0
(N.B.K. (U.K.) Contact: John Wimbush, Cattermole House, Markey Place, Codnor, Derbyshire, DE5 9QA . Tel: 01773 512 363)
- Rainscreen panel:
 - Type: Baguette.
 - Width: As design drawings
 - Thickness: As design drawings.
 - Fixed using THB back fixings, fixed to Horizontal Z backing rail
 - Finish/ Colour: Twice fired glaze. Refer to Finishes Schedule for colours.
- Fixing system, secondary support and fasteners:
 - Top hat and 'Z' rails, as indicated on design drawings, fixed to backing rail system on 'helping hand' brackets. Space rails as required to support head, base, all joints, and to provide buffer protection adjacent to trafficked areas. Wherever visible, rails shall be aligned continuously along vertical datums.
 - Joint width: As indicated on design drawings.
- Insulation: Submit proposals
- Accessories: PPC aluminium angle profiles around all openings. Non-orthogonal plates or angles to form sills..
- Incorporated components:
 - Powder-coated aluminium sheets, with all joints concealed behind baguettes, to protect insulation layer from abuse. Reference GA PAA21 by Gooding Aluminium, British Wharf, Landmann Way, London SE14 5RS
 - At the top and bottom of the cavity and above and below any obstructions, there shall be a continuous ventilation slot of an area equivalent to 100mm per m run.
 - All ventilation openings to be protected against the ingress of birds and vermin with a suitable mesh
 - Corners and returns to be cut and bonded tile units / Mitred
 - All cut tile edges to be glazed .
- Other requirements: None .

121 GLAZED CERAMIC TILES

- Rainscreen cladding of glazed ceramic tiles, forming outer face of contractor-designed wall buildup. Generally as clause 111, except:
- Rainscreen panel:
 - Type: Tile with 'fluted' front face.
 - Width: As design drawings
 - Thickness: Submit proposals. Maximum thickness 33mm. .
 - Tile Format: Vertical Laid Stack Bond
 - Vertical Joints : 12mm Wide Labyrinth
 - Horizontal Joints : 10mm Wide Open Joint
 - Finish/ Colour: TBC. Allow for 1no standard RAL, Pantone colour.
- Other requirements: .

122 GLAZED CERAMIC COPING

- Purpose-made capping tiles to form coping detail to tile wall cladding, clause 121.
- Generally as clause 121, except:
- Rainscreen panel:
 - Type: [Parallelogram profile shingle (note non-orthogonal edges)].
 - Width: As design drawings
 - Thickness: [As design drawings. Maximum profile 50mm].
 - Tile Format: Horizontal Laid Stack Bond
 - Joints : 12mm Wide Sealed Joint
 - Fixed to 2 nr Horizontal Top Hat section
 - Finish/ Colour: [To match tiles below].
- Accessories:
- Other requirements:
 - Align joints with tiles below
 - Provide concealed waterproof layer
 - Where balustrades are indicated (refer L30), provide robust capping piece, finished to match balustrade posts..

151 METAL CLADDING SYSTEM

- Primary support structure: Contractor's choice.
- Rainscreen cladding system:
 - Type: Proteus HR®, Honeycomb Metal Rainscreen System.
 - Requirement: Include products, fixings and interfaces necessary to complete the fabrication and installation. Performance criteria to comply with Design/ Performance Requirements and Testing subsections. Include all mullions, bracketry, fixings, infill strips, perimeter flashings and closers. Rainscreen panel:
 - Type: Proteus HR®, Honeycomb Metal Rainscreen Panel.
 - Material: Aluminium.
 - Thickness: Nominal 27mm to be determined by spans and load requirements as advised by manufacturer .
 - Finish/ Colour: As Finishes Schedule.
 - Core: Aluminium honeycomb bonded to external and internal facings.
 - Panel tolerances:
 - +/- 1.5mm permitted deviation for panels up to 2400mm long
 - +/-2mm permitted deviation for panels over 2400mm long
 - +/-1mm maximum permitted deviation in two opposite sides of panels
 - Squareness of panels +/- 1.5mm (when the longest of two adjacent sides is taken as the base line)
 - Honeycomb infill tolerance +/-0.2mm
 - Maximum deviation under a straight edge 1mm, when measured at factory at ambient temperatures and humidity
 - Tolerances on curved panels subject to Radii, please contact Proteus Façade Engineering®
 - Fixing system, secondary support and fasteners: Proteus HR® panels fixed to Proteus extruded aluminium rail system, set out to suit project specific loads and spans. Standard Proteus HR® system secret fix hook brackets or direct fixings to rear of cladding panels, number and locations to suit project specific loads and spans. Purpose made high grade aluminium rail support brackets to suit loads and cladding zone depth. Provide continuous mullion section around all openings to support panel edges. Contact Proteus Façade Engineering® for standard drawings or request meeting with architectural advisor.
 - Joint width: Nominal 15mm between panel edges, with recessed infill strip.
 - Joint type: Black PVC .
- Air gap: Not less than 38mm between rear of panel and substrate/insulation .
- Backing wall: .
 - Thermal insulation: Not required .
 - Breather membrane: Contractors choice .
- Accessories: None .
- Incorporated components:
 - Matching copings, with front edge flush with the panel system - Matching doors .
- Other requirements:
 - Provide matching, uninsulated, folded trims where indicated - Doors, overclad to match the wall panels. Front face of opening and fixed panels to align when doors are closed. Door frame to be concealed, and joints around door to match joints generally. Interface with Security scheme. Maglocks to be fully concealed. .

161 ACOUSTIC METAL CLADDING SYSTEM

- ✗ As clause 151, except:
- ✗ Primary support structure: Freestanding, acoustic wall system. Submit proposals.
- ✗ Incorporated components: Acoustic doors, overclad to match the wall panels. Front face of opening and fixed panels to align when doors are closed. Door frame to be concealed, and joints around door to match joints generally

162 INSULATED METAL CLADDING SYSTEM

- Substrate: Submit proposals for a fully designed external envelope buildup, including primary and secondary structure, insulating and other weather proofing layers, internal linings, fixings, substrates and all other elements..
- Rainscreen cladding system:
 - Type: Proteus HR®, Honeycomb Metal Rainscreen System.
 - Requirement: Include products, fixings and interfaces necessary to complete the fabrication and installation. Performance criteria to comply with Design/ Performance Requirements and Testing subsections. Include all mullions, bracketry, fixings, infill strips, perimeter flashings and closers. Rainscreen panel:
 - Type: Proteus HR®, Honeycomb Metal Rainscreen Panel.
 - Material: Aluminium.
 - Thickness: Nominal 27mm to be determined by spans and load requirements as advised by manufacturer .
 - Finish/ Colour: As Finishes Schedule.
 - Core: Aluminium honeycomb bonded to external and internal facings.
 - Panel tolerances:
 - +/- 1.5mm permitted deviation for panels up to 2400mm long
 - +/-2mm permitted deviation for panels over 2400mm long
 - +/-1mm maximum permitted deviation in two opposite sides of panels
 - Squareness of panels +/- 1.5mm (when the longest of two adjacent sides is taken as the base line)
 - Honeycomb infill tolerance +/-0.2mm
 - Maximum deviation under a straight edge 1mm, when measured at factory at ambient temperatures and humidity
 - Tolerances on curved panels subject to Radii, please contact Proteus Façade Engineering®
 - Fixing system, secondary support and fasteners: Proteus HR® panels fixed to Proteus extruded aluminium rail system, set out to suit project specific loads and spans. Standard Proteus HR® system secret fix hook brackets or direct fixings to rear of cladding panels, number and locations to suit project specific loads and spans. Purpose made high grade aluminium rail support brackets to suit loads and cladding zone depth. Provide continuous mullion section around all openings to support panel edges. Contact Proteus Façade Engineering® for standard drawings or request meeting with architectural advisor.
 - Joint width: Nominal 15mm between panel edges, with recessed infill strip.
 - Joint type: Black PVC .
- Air gap: Not less than 38mm between rear of panel and substrate/insulation .
- Backing wall: .
 - Thermal insulation: To match thermal model .
 - Breather membrane: Contractors choice .
- Accessories: None .
- Incorporated components: None .
 - Other requirements: - Provide matching, uninsulated, folded trims where indicated .

GENERAL REQUIREMENTS/PREPARATORY WORK

210 DESIGN

- Rainscreen cladding system and associated features: Complete detailed design in accordance with this specification and the preliminary design drawings and submit before commencement of fabrication.
- Related works: Coordinate in detailed design.

215 DESIGN PROPOSALS

- Submission of alternative proposals: Preliminary design drawings indicate intent. Other reasonable proposals will be considered.

221 SPECIFICATION

" Performance Testing:

- System testing to CWCT standards for water tightness & wind resistance.

System testing for wind resistance, 2400pa Serviceability & 3600pa Safety.

(Proteus HR® Test no N956/02/13029 by Taywood Engineering)

- System testing to BRE Digest 346, November 1989 – Part 7: Wind speeds for serviceability and fatigue assessments. Peak test pressure requirement of 2400Pa which covers a maximum design wind load in the UK, the test relates to a 50 year life cycle as explained in BRE Digest 346.

(Proteus HR® Test no R2790 by Wintech Engineering)

222 SPECIFICATION

" Fire Testing:

- System testing to BS476: Part 6: 1989 and BS 476: Part 7: 1997

(Proteus HR® Test no's 183632 and 183633 by Warrington Fire)

225 TERRACOTTA TECHNICAL PERFORMANCE SPECIFICATION

- Comply with CWCT as 'Standard for walls with ventilated rainscreens' Section 2- Performance criteria unless specified or agreed otherwise.
- Water absorption – less than 6.5%
- Bending tensile strength - greater than 20N/mm²
- Raw density - 2,09 – 2,16 kg/dm³
- Linear thermal expansion - 20 – 100 oC EN 150 10545 part 8 (replaces EN 103) < 0,4mm referring to a length of 1.000mm
- Compressive strength - 36.5 – 66.5 N/mm²
- Freeze/thaw resistance: To pass 100 freeze thaw cycles as BS3921: 1985 and EN 1501054 Part 12 (100 cycles)
- Soluble salts – DIN 105 part 1 – well below permitted maximum limit.
- Efflorescence- Nil (BS 3921)
- Chemical resistance – DIN 105 part 4 – fulfilled.
- Dimensions and tolerances:
 - Width – 400mm – 1.450mm centre in hole direction +/- 1,0mm for length
 - Height – 150mm – 500mm(colour M 6.01-0 & M 6.02-0 to a max 450mm)
 - Opposite to hole direction - +/- 1,5mm - 250mm
 - +/- 2,0mm – 400mm
 - +/- 3,0mm – 500mm
 - Thickness – 30mm or 40mm DINEN ISOP 10545-2 deviation if surface is honed +/- 1,5mm
- Straightness in hole direction – DIN EN ISOP 10545-2 +/- 0,25% of length
- Diagonal flatness – DIN EN ISOP 10545-2 +/- 0,25% of diagonal.
- Vertical flat cross – DIN EN ISOP 10545-2 +/- 1,0% of height.
- To hole direction torsion - DIN EN ISOP 10545-2 +/- 0,25% of diagonal
- Corner/Soffit/Angle Units: To be NBK factory produced as either
 1. Extruded lengthways (with drip channel on all soffit tiles)
 2. Metal reinforced bonded units.
- Sawn edges: Tiles to be supplied free from any significant edge/arris damage or chipping of the exposed faces.
- Terracotta Unit Removal / Replacement: All units likely to be subject to hard impact, Tiles should be easily replaceable in accordance with BS8200 without modification of replacement units or removal and disturbance of adjacent tiles.
- Fire performance :All materials class 'O' as defined in the Building Regulations.
- Fixing system:
 - Vertical Tiles fixed to Horizontal Top Hat Backing system fixed to vertical Rail
 - Vertical Rail fixed to backing wall using helping hand brackets
 - Tile holders are to conform to Almg S1oO, 5 Alloy.
- Movement: The fixing/framing members are to allow for movement and deformations of the building structure
- Fasteners
 - Tiles are secured by 4 aluminium holders positioned at the top and bottom at each end of the terracotta units.
- Joint type
 - Horizontal joints with PPC aluminium backing rail and labyrinth joints vertically
- Air gap – Not less than 50mm (if insulated wall)
- Backing Wall
 - Damp proof membrane (DPM), Thermal insulation, Breather membrane: Submit proposals
- Other requirements
 - The cavity is to be fully ventilated and drained with a minimum clear width of 40mm.
 - The system in combination with the inner leaf shall provide an effective barrier in order to prevent rainwater entry into the building envelope. Cavity trays are to be provided above any obstructions.

230 INFORMATION TO BE PROVIDED DURING DETAILED DESIGN

- Submit the following 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 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.
 - Proposals to support outstanding applications for Building Regulation consents or relaxations.

232 QUALITY PLAN

- Requirement: Submit during detailed design.
- Content: In accordance with BS EN ISO 9001 and including the following:
 - Name of the quality manager.
 - Quality assessment procedures.
 - Inspection procedures to be adopted in checking the work.
 - Stages at which check lists will be used and samples of the lists.
 - List of work procedures on the correct use of materials or components, both off site and on site.
 - List of product information with latest revisions.
 - Subcontractors involved in the work.
 - Subcontractors quality plans.
 - Storage, handling, transport and protection procedures.
 - Procedure for registering and reporting non compliances.
 - Maintenance procedures and calibration records.
 - Certification that completed work complies with specification.
 - Check list register to ensure all items have been inspected and non compliances discharged.

235 INFORMATION TO BE PROVIDED BEFORE COMMENCEMENT OF TESTING OR MANUFACTURE OF RAINSCREEN CLADDING SYSTEM

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

240 PRODUCT SAMPLES

- General: Before commencing detailed design, submit labelled samples of: Panels (to specified colour and maximum size required, including joints), external facings, fixings. Obtain approval of appearance before proceeding .

250 SAMPLES OF FIXINGS

- General: During detailed design, submit labelled samples of each type of fixing, together with manufacturers' recommended torque figures.

260 FABRICATION SAMPLES

- General: During detailed design, submit samples of: As preliminaries and section B01 . Obtain approval of appearance before proceeding.

270 **MOCK-UP**

- General: Construct during detailed design work in an agreed location. Satisfy purpose and obtain approval of appearance before proceeding. Retain undisturbed until completion of cladding installation.
- Extent: As preliminaries and section B01 .
- Purpose: Approval by Client's representative .

DESIGN/PERFORMANCE REQUIREMENTS

310 **CWCT 'STANDARD FOR SYSTEMISED BUILDING ENVELOPES'**

- General: Unless specified or agreed otherwise comply with:
Part 2 - Loads, fixings and movement.
Part 3 - Air, water and wind resistance.
Part 4 - Operable components, additional elements and means of access.
Part 5 - Thermal, moisture and acoustic performance.
Part 6 - Fire performance.
Part 7 - Robustness, durability, tolerances and workmanship.
- Project performance requirements specified in this subsection: Read in conjunction with CWCT performance requirements.

320 **HORIZONTAL ZONING OF WIND PRESSURE**

Reference heights: structural engineer to provide requirements and data.

340 **INTEGRITY OF VENTILATED RAINSCREEN CLAD WALLS**

- Determine size(s) and thickness 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-S Standard Method, taking full account of existing and known future adjacent structures.
Technical calculations to be provided for:
 - Basic wind speed.
 - Altitude factor
 - Direction factor
 - Seasonal factor
 - Probability factor
 - Terrain and building factor
- Metal panel dead load: Proteus Façade Engineering® to provide deadloads for particular external facing type and thickness
- External pressure coefficient (Cpe): Refer to Structural Engineer's information/ Preliminary sections
- Internal pressure coefficient (Cpi): Refer to Structural Engineer's information/ Preliminary sections
- Hard body impact loads to CWCT TN75 (BS EN 14019): Location and category: Refer to Structural Engineer's information/ Preliminary sections
- Soft body impact loads to CWCT TN75 (BS EN 14019)
Location and category: Refer to Structural Engineer's information/ Preliminary sections
- Temporary imposed loads: Refer to Structural Engineer's information/ Preliminary sections

342 CONTRACTOR'S DESIGN OF RAINSCREEN

- Design responsibility: Determine sizes and thickness of panels and types, sizes and numbers of fixings to suit the layout and details of supporting steelwork shown on drawings.
- Design standard: To CWCT 'Standard for systemised building envelopes'.
- Structural and fire requirements:
 - Generally: As section B50.
 - Modifications: None.
 - Design: Complete the design in accordance with the designated code of practice to satisfy specified performance criteria.
- Functional requirements: As specified in this section, with fire stopping to the requirements of the Building Regulations.
- Additional requirements: None.

350 DEFLECTION UNDER WIND LOAD

- Requirement: For listed components, at positive and negative applications of the design wind pressure, normal deflections are not to exceed: Refer to Structural Engineer's information/ Preliminary sections.
- Additional stiffness to CWCT 'Standard for systemised building envelopes' clause 3.5.4.2: Refer to Structural Engineer's information/ Preliminary sections.

370 APPEARANCE AND FIT

- Requirement: Design rainscreen wall:
 - To ensure position and alignment of all parts and features as shown on preliminary design drawings.
 - To accommodate deviations in the primary support structure.
- Primary support structure: Before commencing installation of rainscreen cladding system, carry out survey sufficient to verify that required accuracy of erection can be achieved.
 - Give notice: If the structure will not allow the required accuracy or security of erection.
 - Design tolerances: As sections G10 and F10.
- Rainscreen envelope zone tolerances:
 - Width: As indicated on design drawings.
 - Critical reference location: As indicated on design drawings.
- Maximum permitted component and installation tolerances: Panel tolerance ± 2 mm, installation tolerance ± 2 mm, overall = ± 4 mm.

380 GENERAL MOVEMENT

- Requirement: Rainscreen cladding must accommodate anticipated building movements as follows: to be calculated by structural engineer .

430 THERMAL PROPERTIES

- Method for calculating the thermal transmittance (U-value) of the rainscreen wall: Weighted U-value.
- Average U-value of rainscreen wall: $0.2 \text{ W/m}^2\text{K}$.
- Method for assessing thermal transmittance (U-value) of assemblies: By calculation.

440 AVOIDANCE OF CONDENSATION

- Requirement: Psychrometric 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 insulation are:
 - Notional outdoor psychrometric conditions as BS 6229, table A1.
 - Notional indoor psychrometric conditions:
 - Temperature: As MEP Engineer's information.
 - Relative humidity: As MEP Engineer's information.
 - Vapour pressure: As MEP Engineer's information.
- Winter interstitial condensate:
 - Calculated amount (maximum): 0.35 kg/m².
 - Calculated annual net retention: Nil.

450 VAPOUR CONTROL LAYER

- Interstitial condensation risk within rainscreen wall: Determine using the method described in BS 5250 Annex D. If necessary, provide a suitable vapour control layer to ensure that damage and nuisance from interstitial condensation does not occur.

460 SOUND TRANSMITTANCE

- Minimum weighted sound reduction index (R_w) to BS EN ISO 717-1:
 - Between internal and external surfaces of rainscreen clad wall: As Acoustic Engineer's information.
- Minimum weighted standardized level difference (D_{nTw}) to BS EN ISO 717-1.
 - Between adjacent floors abutting rainscreen clad wall: As Acoustic Engineer's information.
 - Between adjacent rooms on same floor abutting rainscreen clad wall: As Acoustic Engineer's information.

470 WALL FINISH MATERIALS SPECIFICATION

Minimum BRE 'Green Guide to Specification Online' rating: [A].

480 FIRE RESISTANCE OF BACKING WALL TO BS 476- 21

- Minimum periods and criteria: As Fire Strategy drawings and Fire Report .

490 CAVITY FIRE BARRIERS TO BS 476-20

- Requirement: To resist the passage of flame and smoke for not less than As Fire Strategy drawings and Fire Report .

TESTING

520 PROJECT TESTING (SITE)

- Timing of testing: 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.
- Continuation of installation of general areas of rainscreen cladding: Not until site test results and reports showing compliance with this specification have been submitted.

530 TESTING AUTHORITY

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

PRODUCTS

710 ALUMINIUM ALLOY FRAMING SECTIONS

- Standards: To BS EN 755 alloy EN AW-6063 and suitable for the specified finish.
- Structural members: To comply with BS EN 1999-1-1, -3 and -4.

712 ALUMINIUM ALLOY SHEET

- Standards: To BS EN 485, BS EN 515 and BS EN 573.
- Alloy, temper and thickness: Suitable for the application and specified finish.

730 MECHANICAL FIXINGS - MATERIAL REQUIREMENTS

- Stainless steel: To BS EN ISO 3506 grade A2 generally, grade A4 when used in severely corrosive environments.
- Carbon steel: To BS 4190 and suitable for galvanizing or other protective coating.
- Aluminium: To BS EN 755.

735 FIXINGS AND FASTENERS

- Type and use: Reviewed and approved by manufacturers. Submit confirmatory information on request.
- Dimensions: Not less than recommended by their manufacturers.
- Adjustment capability: Sufficient in three dimensions to accommodate primary support structure and rainscreen cladding fabrication/ installation tolerances.

755 THERMAL INSULATION & BREATHER MEMBRANE

- " Material: As drawings and Facade Engineers' specification.
- Properties: Durable, rot and vermin proof and not degradable by moisture or water vapour.
- " Recycled content: Submit proposals.
- " Fixing: Attached to the outer face or supported within the backing wall so as not to bulge,

775 THERMAL INSULATION

- Material: Mineral wool to BS EN 13162.
- Properties: Durable, rot and vermin proof and not degradable by moisture or water vapour.
- Recycled content: 50% (minimum) to BS EN ISO 14021.
- Fixing: 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.

FINISHES

830 POWDER COATING

- Requirement: As section Z31.

840 ANODIZING

- Requirement: As section Z33.

FABRICATION AND INSTALLATION

910 GENERALLY

- Electrolytic corrosion: Take necessary measures to prevent.
- Identification of products: Mark or tag to facilitate identification during assembly, handling, storage and installation. Do not mark surfaces visible in the complete installation.

912 METALWORK

- Requirement: As section Z11, unless specified otherwise in this section.

940 ASSEMBLY

- Location: Carry out as much assembly as possible in the workshop. Include installation of all maglocks, sensors and other accessories mounted on the finished units. Form holes and fixings in the workshop, to agreed fabrication drawings. Conceal accessories within frames unless agreed otherwise.
- Joints: Other than movement joints and designed open joints, must be rigidly secured, reinforced where necessary and fixed with hairline abutments.
- Displacement of components in assembled units: Submit proposals for reassembly on site.

961 PRELIMINARY RAINSCREEN CLADDING INSTALLATION

- Requirement: Complete an area of cladding as set out below for inspection and approval of appearance.

970 RAINSCREEN CLADDING INSTALLATION

- Tightening mechanical fasteners: To manufacturer's recommended torque figures. Do not overtighten fasteners intended to permit differential movement.
- Protective coverings: Remove only where necessary to facilitate installation and from surfaces which will be inaccessible on completion.

980 INTERFACES

- Installation: Locate flashings, closers etc. correctly and neatly overlap cladding to form a weathertight junction.

986 DAMAGE

- Repairs: Do not repair cladding without approval. Submit proposals for repair.
 - Approval: Will not be given where the proposed repair will impair performance or appearance; Replace element(s) with new.
- Record of repairs: Prepare schedule or record on drawings for inclusion in the maintenance manual.

995 MAINTENANCE

- Maintenance manual: Incorporate details within the Building Manual in accordance with CWCT 'Standard for systemised building envelopes', clause 7.6.1.
 - Materials certification and test reports to be included: As A37.