15735 - Twickenham East Stand

09 December 2016

This document includes:

Code	Section	Revision	Dated
H11	Curtain walling	T5	9 Dec 2016

H11 Curtain walling

TENDERING

10 INFORMATION TO BE PROVIDED WITH TENDER

- Submit the following curtain walling particulars:
  - Typical plan, section and elevation drawings at suitable scales.
  - Typical detailed drawings at large scales, including TBA .
  - Technical information and certification demonstrating compliance with specification of proposed incorporated products and finishes, including TBA .
  - Certification, reports and calculations demonstrating compliance with specification of proposed curtain walling.
  - Proposals for connections to and support from the building structure and building components.
  - Proposals for amendments to primary supporting structure and for secondary supporting 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 project quality plan will be prepared.
  - Preliminary fabrication and installation method statements and programme.
  - Schedule of products and finishes with a design life expectancy less than that specified in clause 440, with proposals for frequencies and methods of replacement.
  - Proposals for replacing damaged or failed products.
  - Areas of non-compliance with the specification.

TYPES OF CURTAIN WALLING

110A CURTAIN WALLING EXTERNAL EAST FACADE

- Supporting primary structure: Steel to structural engineer's details .
- Curtain walling system:
  - Manufacturer: Schuco or equivalent. Refer to requirement notes.
    Product reference: FW60XR thermally insulated aluminium facade.
  - Type: Capped stick system, zone drained . Note: Tender drawings wil be revised to capture the amended specification.
- Internal framing member:
  - Material: Aluminium as clause 710 .
  - Finish: Standard RAL 7022 Metallic..
    Colour/ texture: TBA .
    Minimum film thickness: 40 - 70 microns .
- External cover cap:
  External East Elevation:
  - Material: Standard and bespoke aluminium bullet shaped where indicated. Refer to elevations.
  - Finish: Powder coating .
    Colour/ texture: Standard RAL 7022 Metallic to standard cover caps. Standard RAL 9007 Metallic to bullet shaped cover caps .
    Minimum film thickness: 40 - 70 microns .
- Glazing: Insulating glass units .
  - Inner pane types: Laminated Heat Strengthend with 1.52mm PVB interlayer as per blast consultant QCIC recommendations.
  - Outer pane: Toughened Monolithic or Laminated pane .
- Maximum external reflectance value: VARIES. Refere to drawing 346 T1. Refelctance range 10% - 12%, <7%, <5%
- Sound Reduction: Refer to clause 410
- Glazing system: Gaskets, cover plate fixed.
- g-value - 0.4 (Increased g-value for <5% reflectance is acceptable)
- U Value: 1.5 W/M²K.
- Panel/ facing type: refer to clause 434A .
- Accessories: Purpose made powder coated aluminium reveals trimming the opening contained within the rainscreen cladding. Standard RAL 9007 Metallic
- Incorporated components: PPC Aluminium projecting fins, fixed through cover plate zone, refer to clause 731A .
- OTHER REQUIREMENTS:
  - Glazing system must meet loading requirement of 1.5kN as per BS 6399
  - System to allow for structural movement joint on Grid E20 as indicated on drawings.
- QCIC RECOMMENDATIONS & CLARIFICATION: Curtain wall and glazing should meet QCIC Blast Vulnerability Assessment recommendations below.
  - Laminated glass to be incorporated into all glazing units and include a 1.52mm thick polyvinyl butyral (pvb) interlayer. In double glazed units the laminated glass should be provided for the innermost pane.
  - Glazing should be supported on all four edges by a robust aluminium framing system that is fixed back to the primary structure at regular intervals.
  - Glass should be held in frames that provide a 35mm deep clamped rebate.

  The requirements are not to design the structure/façade against a specific threat, but to improve the resilience against a series of possible attack vectors. QCIC have confirmed that the 35mm rebate could be reduced to 25mm if the curtain wall system specified has been tested for blast resistance and the robustness of the curtain wall frame has been enhanced to the same standard and specification as the Schueco System FW60XR. .

110B CURTAIN WALLING TO LEVEL 4A BOWL SIDE

- Supporting structure: Steel to structural engineer's details .
- Curtain walling system:
  - Manufacturer: Schuco .
    Product reference: FWS60 thermally insulated aluminium facade system .
  - Type: Stick system Pressure equalised Zone drained .
- Internal framing member:
  - Material: Aluminium as clause 710 .
  - Finish: Powder coated.
    Colour/ texture: RAL 7022 Matt .
    Minimum film thickness: 40 - 70 microns .
- External cover cap:
  - Material: Standard.
  - Finish: Powder Coated .
    Colour/ texture: RAL 7022 .
    Minimum film thickness: 40 - 70 microns .
- Glazing: Insulating glass units .
  - Inner pane types: Laminated glass
  - Outer pane: Thermally toughened glass .
- Sound Reduction: refer to clause 410
- Glazing system: Gaskets, cover plate fixed.
- g-value - N/A.
- U Value: 1.5 W/M²K.
- Spandrel Panel types: .
  - External material: Aluminium sheet .
  - External finish: Powder coating - RAL 7022 .
  - Internal material: Aluminium sheet.
  - Internal finish: Not required
  - Core insulation: Mineral wool board to BS EN 13162, to suit thickness and acheive the same U-value as glazing. .
- Accessories: Purpose made powder coated aluminium reveals trimming the opening. Colour RAL 7022
- Incorporated components: Doors as drawing .
- Other requirements: Glazing system must meet loading requirements of 1.5kN as per BS 6399 .

110C CURTAIN WALLING TO LEVEL 1 & 2 COVERED CONCOURSE
Supporting primary structure: [Steel to structural engineer's details] .
Curtain walling system:
- Manufacturer: [Schuco or equivalent]. Refer to requirement notes.
  Product reference: [FW60XR thermally insulated aluminium facade].
- Type: [Capped stick system, zone drained] . Note: Tender drawings wil be revised to capture the amended specification.
  Internal framing member:
- Material: [Aluminium as clause 710] .
- Finish: Pwder Coating.].
  Colour/ texture: [Standard RAL 7022 Metallic] .
  Minimum film thickness: [40 - 70 microns] .
  External cover cap:
  External East Elevation:
- Material: [Standard aluminium].
- Finish: [Powder coating] .
  Colour/ texture: [Standard RAL 7022 Metallic] .
  Minimum film thickness: [40 - 70 microns] .
  Glazing: [Insulating glass units] .
- Inner pane types: [Laminated Heat Strengthend with 1.52mm PVB interlayer as per blast consultant QCIC recommendations.]
- Outer pane: [Toughened Monolithic or Laminated pane] .
  Sound Reduction: Refer to clause 410
  Glazing system: [Gaskets, cover plate fixed].
  g-value - 0.4.
  U Value: 1.5 W/M²K.
  Panel/ facing type: [refer to clause 434A] .
  Accessories: [Purpose made powder coated aluminium reveals trimming the opening contained within the rainscreen cladding. Standard RAL 9007 Metallic]
  Incorporated components: [PPC Aluminium projecting fins, fixed through cover plate zone, refer to clause 731A] .
  OTHER REQUIREMENTS:
- Glazing system must meet loading requirement of 3kN as per BS 6399
  [QCIC RECOMMENDATIONS & CLARIFICATION: Curtain wall and glazing should meet QCIC Blast Vulnerability Assessment recommendations below.
- Laminated glass to be incorporated into all glazing units and include a 1.52mm thick polyvinyl butyral (pvb) interlayer. In double glazed units the laminated glass should be provided for the innermost pane.
- Glazing should be supported on all four edges by a robust aluminium framing system that is fixed back to the primary structure at regular intervals.
- Glass should be held in frames that provide a 35mm deep clamped rebate.
  The requirements are not to design the structure/façade against a specific threat, but to improve the resilience against a series of possible attack vectors. QCIC have confirmed that the 35mm rebate could be reduced to 25mm if the curtain wall system specified has been tested for blast resistance and the robustness of the curtain wall frame has been enhanced to the same standard and specification as the Schueco System FW60XR.] .

GENERAL REQUIREMENTS/ PREPARATORY WORK

210 DESIGN
- Curtain walling and associated features: Complete the detailed design. Submit before commencement of fabrication.
- Related works: Coordinate in the detailed design.

215 DESIGN PROPOSALS

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

220 SPECIFICATION

- Compliance standard: The Centre for Window and Cladding Technology (CWCT) 'Standard for systemised building envelopes'.
- Reference information: For the duration of the contract, keep available at the design office, workshop and on site copies of:
  - The CWCT 'Standard for systemised building envelopes'.
  - Publications invoked by the CWCT 'Standard for systemised building envelopes'.

230 INFORMATION TO BE PROVIDED DURING DETAILED DESIGN STAGE

- Submit the following curtain walling particulars:
  - A schedule of detailed drawings and dates for submission for comment.
  - A schedule of loads that will be transmitted from the curtain walling to the structure.
  - Proposed fixing anchor details relevant to structural design and construction.
  - 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 TESTING OR FABRICATION OF CURTAIN WALLING

- Submit the following curtain walling 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 curtain walling.
  - Recommendations for spare parts for future repairs or replacements.
- Recommendations for safe dismantling and recycling or disposal of products.

240 INFORMATION TO BE PROVIDED BEFORE COMMENCEMENT OF STRUCTURAL SEALANT GLAZING

- Submit structural bonding sealant manufacturer's project specific approval for:
  - Compatibility and adhesion of products and finishes.
  - Full details of structural sealant glazing design.
  - Structural sealant dimensions.
  - Project specific sealant application method statement.

250 PRODUCT SAMPLES

- General: Before commencing detailed design, submit labelled samples of: Mullion & Transom with double glazing 400x400mm .

260 SAMPLES OF FIXINGS

- General: During detailed design, submit labelled samples of each type of fixing anchor, including casting-in restraints and shims, together with manufacturers' recommended torque figures.

DESIGN/ PERFORMANCE REQUIREMENTS

305 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 criteria.

312A INTEGRITY

- Requirement: The curtain walling must resist wind loads, dead loads and design live loads, and accommodate deflections and movements without damage.
- Design wind pressure: Calculate in accordance with BS 6399-2, Standard Method:
  - Basic wind speed (Vb):
  - Altitude factor (Sa):
  - Direction factor (Sd):
  - Seasonal factor (Ss):
    - Probability factor (Sp):
    - Terrain and building factor (Sb):
    - Size effect factor (Ca):
    - External pressure coefficients (Cpe):
    - Internal pressure coefficients (Cpi):
    - Dominant Opening:
- Hard Body Impact Loads
  - Location & Category: Contactor's proposal.
- Soft Body Impact Loads – Curtain Walling to BS EN 14019
  - Location & Classification:
- Soft Body Impact Loads – Glass to BS EN 12600
  - Location & Classification:
- Permanent imposed loads:
- Temporary imposed loads:

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320 DEFLECTION UNDER DEAD LOADS

- Requirement: Framing members parallel to the curtain walling plane must not:
  - Reduce glass bite to less than 75% of design dimension.
  - Reduce edge clearance to less than 3 mm between members and immediately adjacent glazing units, panel/ facing units or other fixed units.
  - Reduce clearance to less than 2 mm between members and movable components such as doors and windows.

325A DEFLECTION UNDER WIND LOAD

- Requirement: To CWCT 'Standard for systemised building envelopes' clause 3.5 2. Additional stiffness to CWCT 'Standard for systemised building envelopes' clause 3.5 4.2.

330 GENERAL MOVEMENT

- Requirement: Curtain walling must accommodate anticipated building movements as follows: Structural engineer to provide details .

332 APPEARANCE AND FIT

- Requirement: Design curtain walling system:
  - 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 curtain walling 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: Contractor to provide details.
- Curtain wall envelope zone tolerances:
  - Width: Manufacturer's specification.
    Critical reference location: Manufacturer's specification.
- Maximum permitted component and installation tolerances: Manufacturer's specification.

335 THERMAL MOVEMENT - SERVICE TEMPERATURE RANGES

- Requirement: To CWCT 'Standard for systemised building envelopes' clause 2.7.2 amended and/ or with the addition of the following: Manufacturer's specification.

340 AIR PERMEABILITY

- Requirement: Permissible air leakage rates of 1.5m³/hr/m² for fixed lights and 2.0 m³/hr/lin.m for opening lights must not be exceeded when the curtain walling is subjected to the peak test pressure.
- Permeability class to BS EN 12152: A4.
  - Peak test pressure: 600 Pa.

345 AIR PERMEABILITY EXFILTRATION

- Requirement: The maximum permissible air exfiltration rate through the curtain walling system must not exceed: 3m3/hr/m2 @ 50Pa.

350 WATER PENETRATION

- Watertightness class to BS EN 12154: R7.
  - Peak test pressure: 600 Pa.
- Additional requirements: Underside of any transom not to be wetted at peak test pressure.

370 THERMAL PROPERTIES

- Method of calculating the thermal transmittance (U-value) of curtain walling/ each zone of curtain walling: Weighted U-value.
- Average U-value of curtain walling: 1.5 W/mK.
- Curtain wall zone interfaces: Co-ordinate to achieve required average U-value.
- Method for assessing thermal transmittance (U-value) of assemblies: By calculation.

380 SOLAR AND LIGHT CONTROL

- Total solar energy transmission:
  - Maximum g-value - glazing only: 0.4.
  - Maximum effective g-value - glazing with shading devices: Not applicable.
- Visible light transmission:
  - Minimum light transmission - glazing only: 70%.
  - Minimum effective light transmission - glazing with shading devices: Not applicable.

385 THERMAL STRESS IN GLAZING

- Glass panes/ units: Must have adequate resistance to thermal stress generated by orientation, shading, solar control and construction.

410 SOUND TRANSMITTANCE

- Minimum weighted sound reduction index (Rw) to BS EN ISO 717-1:
  - Between internal and external surfaces of curtain walling: 37dB.
- Minimum weighted standardized level difference (DnTw) to BS EN ISO 717-1:
  - Between adjacent floors abutting curtain walling: 57dB..
  - Between adjacent rooms on same floor abutting curtain walling: N/A.

425 INTERNAL SURFACE SPREAD OF FLAME OF CURTAIN WALLING

- Standard: To BS 476-7.
  - Class 0.

430 FIRE STOPPING

- Locations: At junctions of curtain walling with compartment walls and floors.
- Materials and methods of fixing: To ensure fire resistance not less than that specified for compartment walls and floors.

434A GLAZED SPANDREL PANELS

- Glazing:
  - Inner pane types: Laminated foil faced insulated Ceramic glass or alternatively metal panel to back of 8mm toughened foil faced insulated Ceramic glass inner pane to standard RAL, Colour : TBC.
  - Cavity: 20mm wide Argon filled.
  - Outer pane: 8mm thick toughened glass.
  - Core insulation: [Mineral wool board to BS EN 13162, to suit thickness and acheive the same U-value as glazing] .
- Glazing system: As per the curtain walling with cover plates to suite.
  Other requirements: Supply samples colours for approval.

434B METAL SPANDREL PANEL
Spandrel Panel: .
- External material: Aluminium Sheet
- External finish: [Powder coating - RAL 7022] .
- Internal material: [Aluminium sheet].
- Internal finish: [Not required]
- Core insulation: [Mineral wool board to BS EN 13162, to suit thickness and acheive the same U-value as glazing.] .

434C PORCELAIN SPANDREL PANEL
Spandrel Panel: .
- External material: Tile - Shannon range ecofriendly tiles by E H Smith Specialist Facades. Tel: 07971175262.
- Material: Ceramic Granite.
- Thickness: 12mm.
- Finish/ Colour: XL15.
  Other panel requirements:
- Fibre glass mesh to be applied as standard to the back of the porcelain panel
  Tile performances: [Water absorption ISO 10545-3 Average value 0.1% (<0.3%)
  Resistance to deep abrasion ISO 10545-6 =175mm3
  Chemical Water absorption ISO 10545-3 Average value 0.1% (<0.3%)al resistance ISO 10545-13 No visible effect
- External finish: Consisting horizontal pressure jet textured lines. These would consist of 10mm wide x 8mm deep lines at 80mm centres. Porcelain panel dimensions to the centre for the pressure jet textures tiles = 790mm x 1690mm and bespoke trapezoidal cut to the interface with the arch profile (refer to drawing 1302).
- Internal material: [Aluminium sheet].
- Internal finish: [Not required]
- Core insulation: [Mineral wool board to BS EN 13162, to suit thickness and acheive the same U-value as glazing.] .

436 DOORS AND OTHER ACCESS FACILITIES
- Performance criteria: To CWCT 'Standard for systemised building envelopes' Part 3.
- Access facilities designated for use by disabled persons: As schedule.
- Strength and durability: To CWCT 'Standard for systemised building envelopes' clause 4.3.3.
  - Forces and tests: No additional requirements.
- Security:
  - Applicable doors: As schedule.
  - Security rating: TBA.

437A LOUVRES

Manufacturer: Gilberts Integrated Louvre Systems.

- Product reference: WH38/IS High Performance Weathered Louvre.
  Material: 16 SWG Aluminium..
- Finish as delivered: Polyester powder coated to RAL number..
  Fire resistance rating: Not applicable..
  Number of louvre banks: One.
  Louvre blade pitch and angle: Pitch: 75mm, Angle: 45°.
  Accessories/ Other requirements:
  Aluminium Internally mounted Insect screen painted same colour as louvres.
- Aluminium blanking plates painted same colour as louvres.
  Opening to be cut on site once the duct has been installed.
- Manufactured to suit structural opening sizes. Angles or channels to be developed and agreed prior to manufacture.
- Supplied with a channel type frame, to fit inside the opening and fix via rear fixing cleats.
- Installed with silicone seals to head and base flanges and surrounds.
- Rear mounted support mullions.
  Fixing: To Manufacturer's details.

440 DURABILITY

- Relevant agents or degradation mechanisms: TBA.
- Design life of the curtain walling system: Not less than 30 years.
- Secondary components: Submit details together with required maintenance regime, replacement periods and methods of replacement.

445 LIGHTNING PROTECTION SYSTEM

- Curtain wall components used as part of lightning protection system: As listed in NBS Engineering Services section W60.

450 SAFETY

- Finished surfaces of curtain walling: Accessible internal and external areas must not:
  - Have irregularities capable of inflicting personal injury.
  - Release irritant or staining substances.

460 STRUCTURAL SEALANT GLAZING REQUIREMENTS

- Structural sealant glazing units: Installable, removable and replaceable without site application of structural bonding sealant.
- Structural sealant glazing design: Must limit design tensile stress of sealants to 138 kPa.

BREEAM PERFORMANCE REQUIREMENTS

475 DAYLIGHT PERFORMANCE

- Daylight calculations: In accordance with BS 8206-2, CIBSE 'Lighting guide LG10' and BRE 'Site layout guide'.
- BREEAM requirements:
  - Submit the following: Design plans for each floor in the building with each room/ area labelled for use.
  - Calculations showing: Average daylight factor expressed as a percentage for each room/ area.

480 VIEW OUT
- Glazed areas/ opening sizes and position: Designed to meet BREEAM 'View out' criteria for relevant building type.
- Submit design plan and elevation drawings showing the following:
  - All BREEAM defined 'relevant areas' dependant on building type and room depths.
  - Actual or notional workstation/ desk layouts.
  - Glazed areas/ open areas.
- Submit site plan showing: Building location and proximity to external obstructions.

TESTING

510 COMPARISON (TYPE) TESTING
- Requirement: To CWCT 'Standard for systemised building envelopes', Part 8.
- Test results and reports: Before commencement of curtain walling fabrication and installation, submit proof of compliance with this specification.

515 PROJECT TESTING (LABORATORY)
- Test results and reports: Before commencement of curtain walling fabrication and installation, submit proof of compliance with this specification.

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

660 STRUCTURAL SEALANT GLAZING TESTS
- Product samples: Provide the structural bonding sealant manufacturer with framing profiles, glass, gaskets, assembly/ weathering sealants and other curtain walling products that are proposed for contact with structural bonding sealant.
- Testing: By sealant manufacturer to determine compatibility and adhesion of structural bonding sealant under specified design loadings.
- Modification of product to enable compliance with test criteria: Details must be recorded in the sealant manufacturer's project specific approval.

PRODUCTS

710 ALUMINIUM ALLOY FRAMING SECTIONS
- Standard: To relevant parts of BS EN 515, BS EN 573, BS EN 755 and BS EN 12020.
- Alloy, temper and thickness: Suitable for the application and specified finish.
- Structural members: To BS 8118.

712 ALUMINIUM ALLOY SHEET
- Standards: To relevant parts of BS EN 485, BS EN 515 and BS EN 573.
- Alloy, temper and thickness: Suitable for the application and specified finish.

715 CARBON STEEL FRAMING SECTIONS/ REINFORCEMENT
- Standards: To relevant parts of BS 7668, BS EN 10029, and BS EN 10210.
- Thickness: Suitable for the application, and for galvanizing or other protective coating.

717 CARBON STEEL SHEET

- Standards: To relevant parts of BS 1449-1, BS EN 10048, BS EN 10051, BS EN 10111, BS EN 10131, BS EN 10132, BS EN 10139, BS EN 10140, BS EN 10149, BS EN 10209 and BS EN 10268.
- Grade and thickness: Suitable for the application, and for galvanizing or other protective coating.

720 STAINLESS STEEL SHEET

- Standards: To relevant parts of BS EN 10029, BS EN 10048, BS EN 10051, BS EN 10095 and BS EN ISO 9445.
- Grade: To BS EN 10088-2, austenitic 1.4301 (304) generally, 1.4401 (316) when used externally or in severely corrosive environments.
- Thickness: Suitable for the application.

730 MECHANICAL FIXINGS

- 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 brackets, rivets and shear pins: To relevant parts of BS EN 755.

731A VERTICAL FINS CENTRAL ELEVATION

Drawing: Refer to 1302.

- Supporting structure: Fixed back with proprietary support brackets to curtain wall mullions. Refer to Clause 110A.
- Vertical Fin system:
  - Manufacturer: Maple .
  - Product reference: Strata Corona .
  - Type: Rectangular.
  - Material: Grade 6063 T6 pressed metal blades.
  - Finish: Powder coated. To match curtain walling.
  - Colour: TBA.
  - Minimum film thickness: 40- 70 microns.

  Fixings: All fasteners to be A2 stainless steel with bi-metallic corrosion protection. Aluminium brackets to be provided

732 ADHESIVES

- General: Not degradable by moisture or water vapour.

735 FIXING ANCHORS

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

737 GLASS GENERALLY

- Standards: To BS 952 and relevant parts of:
  - BS EN 572 for basic soda lime silicate glass.
  - BS EN 1096 for coated glass.
  - BS EN 1748 for borosilicate glass.
  - BS EN 1863 for heat strengthened soda lime silicate glass.
  - BS EN 12150 for thermally toughened soda lime silicate glass.
  - BS EN 13024 for thermally toughened borosilicate glass.
  - BS EN ISO 12543 for laminated glass.
- Selection of glass type and thickness in accordance with recommendations of CIRIA publication 'Guidance on glazing at height'.
- Glass quality: Clean and free from obvious scratches, bubbles, cracks, ripplings, dimples and other defects.
- Glass edges: Generally undamaged. Shells and chips not more than 2 mm deep and extending not more than 5 mm across the surface are acceptable if ground out.

739 DIMENSIONAL TOLERANCES ON GLASS GENERALLY

- Measurement of tolerances: Before any thermal toughening/ heat strengthening.
- Pane dimensions less than 1500 mm:
  - For 3 to 6 mm thick glass: ± 1.0 mm.
  - For 8 to 12 mm thick glass: ± 1.5 mm.
  - For 15 mm thick glass: ± 2.0 mm.
  - For 19 mm and 25 mm thick glass: ± 2.5 mm.
- Pane dimensions more than 1500 mm:
  - For 3 to 6 mm thick glass: ± 1.5 mm.
  - For 8 to 12 mm thick glass: ± 2.0 mm.
  - For 15 mm thick glass: ± 2.5 mm.
  - For 19 mm and 25 mm thick glass: ± 3.0 mm.
- Pane squareness: Not more than 4 mm difference in diagonal measurements.

741 DISTORTIONAL TOLERANCES ON GLASS CURTAIN WALLING

- Measurement of tolerances: After any thermal toughening/ heat strengthening.
- Maximum bow: 0.2% of pane dimension.
- Maximum roller wave:
  - For 3 to 5 mm thick glass: 0.5 mm.
  - For 6 to 10 mm thick glass: 0.3 mm.
  - For 12 mm and thicker glass: 0.15 mm.
- Maximum edge dip:
  - For 3 to 5 mm thick glass: 0.8 mm.
  - For 6 to 10 mm thick glass: 0.5 mm.
  - For 12 mm and thicker glass: 0.25 mm.

745 INSULATING GLASS UNITS

- Standard and labels for hermetically sealed units: To BS EN 1279.
- Label: Each pane.
- Colour of aluminium perimeter spacers: Black.
- Perimeter taping: Not to be used.
- Perimeter seals:
  - Resistant to UV light degradation on exposed edges.
  - Compatible with structural, assembly and weather sealants.

750 INFILL PANELS/ FACINGS

- Tolerances:
  - Deviation in size (maximum): ± 1 mm.
  - Deviation in flatness from plane per 2 m length (maximum): ± 1 mm.
- Rigidity: Adequate to comply with design/ performance requirements.

760 GASKETS

- Material:
  - Noncellular rubber to BS 4255-1.
  - Cellular rubber to ASTM-C509-06.
- Continuity: Outer gaskets of single front sealed curtain walling systems and inner gaskets of drained and ventilated or pressure equalized curtain walling systems must be formed in a complete frame with sealed joints. Vulcanized rubber gaskets must have factory moulded corner joints.
- Durability: Resistant to oxidation, ozone and UV degradation.

765 WEATHERSTRIPPING OF OPENING UNITS

- Material:
  - Noncellular rubber to BS 4255-1.
  - Cellular rubber to ASTM-C509-06.
  - Polypropylene woven pile, silicone treated.
- Attachment: Fixed in undercut grooves in framing sections using preformed corners, with any joints in the length.

770 GENERAL SEALANTS

- Selection: In accordance with BS 6213 from:
  - Silicone.
  - One part polysulfide.
  - Two part polysulfide.
  - One or two part polyurethane.
- Classification and requirements: To BS EN ISO 11600.
- Reaction to contact products and finishes: Stable and compatible.

772 CURTAIN WALLING JOINT ASSEMBLY SEALANTS

- Material: One part, low modulus silicone to BS EN ISO 11600, type F or G. Neutral curing where in contact with or close proximity to other products that may be adversely affected by acetoxy curing.
- Manufacturer: Contractor's choice.
  - Product reference: Provide Proposals.

780 THERMAL INSULATION

- Material: Mineral wool boards.
  - Recycled content: Not applicable.
  - Properties: Durable, rot and vermin proof and not degradable by moisture or water vapour.
- Fixing: Attached to or supported within the curtain walling so as not to bulge, sag, delaminate or detach during installation or in situ during the life of the curtain walling.

785 VAPOUR CONTROL LAYER
- Acceptable materials:
  - Aluminium alloy.
  - Carbon steel, galvanized or protective coated.
  - Stainless steel.
  - Reinforced membranes: Foil, plastics or rubbers, protected both sides by rigid facings/ linings.
- Location: Warm side of thermal insulation.
- Integrity: Continuous, free from gaps and sealed at joints.

FINISHES

810 PROTECTIVE COATING OF CARBON STEEL FRAMING SECTIONS/ REINFORCEMENT
- Treatment: One of the following to all surfaces:
  - Hot dip galvanized to BS EN ISO 1461.
  - An appropriate equivalent coating to BS EN ISO 12944-5 or BS EN ISO 14713-1, -2 and -3.

820 PROTECTIVE COATING OF CARBON STEEL MECHANICAL FIXINGS
- Treatment: One of the following to all surfaces:
  - Hot dip galvanized to BS EN ISO 1461.
  - Sherardized to BS 4921, class 1 coating thickness and passivated.
  - Zinc plated to BS EN ISO 2081, coating designation Fe//Zn//C for an iridescent (yellow passivate) chromate conversion coating or Fe//Zn//D for an opaque (olive green) chromate conversion coating.

830 POWDER COATING
- Requirement: As section Z31.

840 ANODIZING
- Requirement: As section Z33.

FABRICATION AND INSTALLATION

910 GENERALLY
- Electrolytic corrosion: Prevent. Submit proposed methods.
- Fixings: Concealed unless indicated on detailed drawings. Where exposed they must match material and finish of the products fixed.
- Fabrication: Machine cut and drill products in the workshop wherever possible.
- Identification of products: Mark or tag to facilitate identification during assembly, handling, storage and installation. Do not mark surfaces visible in the completed installation.

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

917 FIXINGS/ ADHESIVES APPLICATION
- Requirement: As section Z20, unless specified otherwise in this section.

920 SEALANT APPLICATION
- Requirement: As section Z22, unless specified otherwise in this section.

925 STRUCTURAL SEALANT GLAZING

- Working conditions: Prepare for and apply structural bonding sealant in a favourable workshop environment.
- Curing: Do not transport units until structural bonding sealant has adequately cured for the period stated in the project specific approval.

930 ASSEMBLY

- General: Carry out as much assembly as possible in the workshop.
- Joints (other than movement joints): Rigidly secured, reinforced where necessary and fixed with hairline abutments.
- Displacement of components in assembled units: Submit proposals for reassembly on site.

935 OPENABLE WINDOWS IN NATURALLY VENTILATED BUILDINGS

- Location: Over 10 m from sources of external pollution.

955 FIXING ANCHOR INSTALLATION

- Site drilling or cutting into structure: Submit proposals for positions other than shown on detailed drawings.
- Concrete supporting structure:
  - Cast-in inserts: Provide detailed locational information. Protect cavities in inserts from entry of concrete.
  - Edge fixing distances: Not less than recommended by fixing anchor manufacturers.
- Corrective fabrication: Minimize. Where necessary, submit proposals.

970 CURTAIN WALLING INSTALLATION

- Securing to fixing anchors: Through holes formed during fabrication only.
- 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 that will be inaccessible on completion.

975 WELDING

- In situ welding: Not permitted. .

980 INTERFACES

- Flashings, closers, etc: Locate and form correctly to provide weathertight junctions with the curtain walling.

982 IRONMONGERY

- Assembly and fixing: Accurately, using fasteners with matching finish supplied by ironmongery manufacturer.
- Completion: Check, adjust and lubricate as necessary to ensure correct functioning.

985A 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: TBA.