PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: General requirements for architectural framing systems.

1.02 CODES AND STANDARDS

A. Windloads
   1. BS 6399.2 Code of practice for windloads
   2. BS CP3 Ch5 Part 2:1972 windloads
   3. ASCE7 Design Loads for Buildings
   4. Or to be based on project wind tunnel test result

B. Aluminium
   1. ASTM B221 Aluminum-alloy extruded bars, rods, wire, shapes, and tubes.
   2. ASTM B308 Aluminum-alloy 6061-T6 standard structural shapes, rolled or extruded.
   3. BS EN 755-9 Aluminium Profiles – Tolerances on dimensions and form.

C. Glass and Glazing

D. Gaskets
   1. ASTM C509 Cellular elastomeric preformed gaskets
   2. ASTM C864 Dense preformed gaskets
   3. ASTM C1115 Silicone Gaskets
   4. BS 4255 Rubber for use in preformed gaskets for weather exclusion from buildings
   5. DIN-7863 Non Cellular Gaskets

E. Protective Coatings
   1. AAMA 2605 Specification for high performance organic coatings on architectural extrusions and aluminum.
   2. AAMA607.1 Specifications and inspection methods for clear anodic finishes for architectural aluminum.
   3. BS3987 Specification for anodic oxidation coatings on wrought aluminium for external architectural applications.
   4. BS4842 Specification for liquid organic coatings application on aluminium alloy extrusions, sheet, and preformed sections for external architectural purposes.
   5. BS6161 Method of test for anodic oxidation coatings on aluminium alloys.
   6. BS6496 Specification for powder organic coatings on aluminium extrusion, sheet and preformed sections for external architectural purposes.
   7. Qualicoat standards for painted surfaces

F. Performance Testing
   1. ASTM E283 Rate of air leakage through exterior windows, curtain walls, and doors.
2. ASTM E330 Structural performance of exterior windows, curtain walls, and doors by uniform static air pressure difference.
3. ASTM E331 Test method for water penetration of exterior windows, curtain walls, and doors by uniform static air pressure difference.
4. AAMA 501.2 Field check of metal curtain walls for water leakage.
5. BS6375 Performance of windows.

1.03 GENERAL DESIGN
1. Framework locations and sizes of all glazed works are to be as detailed in the contract drawings.
2. Perimeter conditions shall allow for building and installation tolerances, expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design.
3. All framework to be checked for structural stability.
4. Allow for expansion and contraction due to structural movement without detriment to appearance or performance. The extent of the movements are to be advised by the architect at design stage.
5. Incorporate the principle of Rain Screen or pressure equalization into the design. This principle is to be continued at the interface between the framework and the structure.
6. Water entering joints and condensation occurring within system shall drain to exterior face, by drain holes or gutters of adequate size to evacuate water without infiltration to interior.
7. Provide concealed fastening.
8. Metal faces are required to be visually flat under all lighting conditions, subject to acceptance of Architect.
9. Provide uniform color and profile appearance at components exposed to view.
10. All gaskets are to be EPDM except those in continuous contact with structural silicone are to be silicone.
11. Glazing gaskets are to be provided to the interior and exterior of the glass. The gasket should create a water and air seal.
12. Where structural silicone is being used, compatibility and adhesion tests are to be carried out by the sealant manufacturer on all substrates. In addition the sealant manufacturer is to check the loadings on the silicone to ensure that they stress levels are kept within the allowable. All structural and non structural sealant drawing details are to be checked by the sealant manufacturer to ensure compliance with sealant dimensional and movement requirements.
13. Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system are all not permitted.
14. A full time experienced factory quality controller is to check all fabrication, assembly, glazing and finishing works. All defective work is to be corrected or remade.
15. A full time experienced site quality controller is to check all erection, glazing, re-glazing and other works on site. All defective work is to be corrected.
16. The framework shall be capable of withstanding thermal movements resulting from an ambient temperature differential of 70 degree C, without causing
buckling, stresses on glass, failure of sealants, damaging loads on fasteners, reduction of performance or other detrimental effects. Calculate allowances based on the temperature at which the metal sections are fabricated.

17. As a minimum the curtain wall is to comply with the local authority Thermal Performance requirements or those specified by the architect.

18. Aluminium sections shall be thermally insulated where required by use of thermal break.

19. All parts of the window system shall be designed to accommodate the building frame's constructional tolerances. These are to be agreed at the design stage.

1.04 PERFORMANCE REQUIREMENTS - CURTAIN WALL SYSTEMS

1. The curtain wall system is to be designed to meet the following performance standards for the fixed areas:–
   a. Air Infiltration - Infiltration shall not exceed 1.08m³/h/m² of fixed area at a static test pressure of 300Pa in accordance with ASTM E283.
   b. Water penetration - There shall be no visible water on any inside surface at a test pressure of 600Pa when tested in accordance with ASTM E331.
   c. Structural performance – As per the structural requirement.

The performance of the proposed curtain wall is to be proven either by off site testing or proof (for air and water only) in the form of a test report carried out on a similar project.

2. On site testing in accordance with AAMA-501-2 should be carried out soon after the start of the installation to ensure that the installed system meets the performance requirements. Further tests should be carried out by the installers as the job progresses.

1.05 STRUCTURAL REQUIREMENTS:

1. Design to a basic windspeed of (To be specified) m/s (factors and coefficients according to BS CP3, BS6399 or ASCE7 to be applied)

2. Wind tunnel test results are to be provided by the architect for buildings that exceed the height limit of the above standards.

3. Maximum deflection under uniform loading at design wind pressure, shall not exceed L/175 of span or 20mm for spans up to 4.1m when tested in accordance with ASTM E330.

4. Parallel to wall deflection shall not exceed 3mm.

1.06 SUBMITTALS

1. Submit manufacturer's descriptive literature for each manufactured products.

2. Submit information for factory finishes, accessories and other required components.

3. Submit mock-up shop drawings and structural calculations where required.
4. Submit project shop drawings indicating: elevations, plans, sections plus detail design drawings, dimensions, joint locations, arrangement of units, member connections, drainage details, anchorage system, interfacing with building construction, provisions for system expansion and contraction, thermal breaks. Also indicate glazing details, methods, locations of various types and thickness of glass, emergency breakout locations (if required), sealant requirements. Clearly indicate locations of any exposed fasteners and joints for Architect's acceptance. Clearly show where and how manufacturer's system deviates from contract drawings and specifications.

5. Structural Calculations showing structural criteria, wind pressure analysis, design of framework and framework connections, calculations for anchor brackets and attachments to the framework and the structure.

6. Method Statement - A detailed method statement including all aspects of the works shall be submitted.

1.07 SAMPLES

1. Submit manufactures samples indicating quality of finish in required colors.
2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.
3. Submit samples of glazing gaskets, 300mm lengths.
4. Submit samples of sealants for color selection.
5. Submit manufacturer's certification stating that installed system is in compliance with specified requirements.

1.08 DELIVERY, STORAGE, AND HANDLING

1. Protect finished surfaces with tape to prevent damage. The tape is to remain in place until final cleaning.
2. Store materials on site in a way as to avoid damage.
3. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.
4. Do not leave coating residue on surfaces.
5. Sealants and other temperature sensitive materials are to be stored in an air conditioned area.
6. After installation.
7. Protect glass edges and corners to prevent chipping, cracking, and other similar damages.

1.09 PROJECT CONDITIONS

A. Ensure ambient and surface temperatures and joint conditions are suitable for installation of materials.
1.10 WARRANTY

A. Provide written warranty to the owner jointly signed by manufacturer, installer and contractor warranting work to be watertight, free from deflective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail within 5 years from date of substantial completion.

PART 2 - MATERIALS

2.01 MANUFACTURERS AND PRODUCTS

1. Subject to compliance with requirements indicated, provide Vistawall framing system as supplied by Vistawall International
2. Aluminum: ASTM B221, alloy 6063-T5 or T6 for framework extrusions and 6061-T6 for anchor brackets.
3. Internal Reinforcing to be ASTM A36 for carbon steel or aluminium alloys as specified in this document. Shop coat steel components after fabrication with zinc chromate primer complying with FS TT-P-645 or galvanize.
4. Fasteners to be 304 grade stainless steel.
5. Provide nuts or washers of design having means to prevent disengagement where necessary; deforming of fastener threads is not acceptable.
6. Shims: Non-staining, non-ferrous, type as recommended by system manufacturer.
7. Glazing Gaskets: Compression type design, exterior replaceable, extruded EPDM gasket complying with ASTM C509 or C864. Profile and hardness as necessary to maintain uniform pressure for watertight seal. Colour of all gaskets to be manufacturer’s standard black color.
8. Sealants to be Dow Corning, GE / Momentive, or Tremco silicone.
9. Firestop material is to be installed in accordance with the manufacturer’s specifications to comply with the required rating.

2.02 FINISH

1. Finish to be strictly in accordance with paint manufacturers and internationally recognized specification.

PART 3 - EXECUTION

3.01 SYSTEM FABRICATION

1. Fabricate components in accord with approved shop drawings. Burrs are to be removed. Shop fabricate to greatest extent practicable to minimize field cutting, splicing, and assembly. Disassemble only to extent necessary for shipping and handling limitations.
2. Fabricate components true to detail and free from defects impairing appearance, strength or durability.
3. Fabricate components to allow for accurate and rigid fit of joints and corners. Match components carefully ensuring continuity of line and design. Ensure joints and connections will be flush and weathertight.

4. Reinforce components as required at anchorage and support points, at joints, and at attachment points for interfacing work.

5. Provide structural reinforcing within framing members where required to maintain rigidity and accommodate design loads.

6. Allow for adequate clearance around perimeter of system to enable proper installation and for thermal movement within system.

7. Separate dissimilar metals with protective coating or preformed separators to prevent contact and corrosion.

3.02 INSTALLATION

1. Verify dimensions, tolerances, and method of attachment with other work.
2. Install in accordance with manufacturer's instructions.
3. Align assemblies plumb and level, free of warp or twist, aligning with adjacent work.
4. Tolerances:
   a. Limit variations from plumb and level:
      3mm in 6m vertically and horizontally.
      6mm in 12m in either direction.
   B. Step in face: 1.5mm maximum.
   C. Location: 6mm maximum deviation of any member at any location.
      (Tolerances are not accumulative.)
5. Provide attachments and shims to permanently fasten system to building structure.
6. Anchor securely in place, allowing for required movement, including expansion and contraction.
7. Separate dissimilar materials at contract points, including metal in contact with masonry or concrete surfaces, with protective coating or preformed separators to prevent contact and electrolytic action.
8. Set cill members in bed of sealant. Set other members with internal sealants and baffles to provide weathertight construction.
9. Install glazing gaskets and sealants in accordance with manufacturer's instructions including surface preparations.
10. Install fire safing and curtain wall insulation in accordance with manufacturers instructions.
11. Carry out field hose test for water penetration.
12. Clean surfaces in compliance with manufacturer's recommendations: remove excess mastic, mastic smears, and other foreign materials.
13. Clean metal surfaces exercising care to avoid damage.

END OF SECTION