**Section V: Specifications**

**GENERAL SPECIFICATIONS FOR CIVIL ENGINEERING CONSTRUTIONS**

The following specifications published by the Institute for Construction Industry Development Authority (CIDA) shall be used in respect of this contract.

a). Specifications for Building Works (volume I & II)

b) Specifications included in the Contract Document superseded the CIDA specification.

Specifications in addition to the above specifications are included in the contract document. Any specifications which are not covered by the above specifications will be issued by the employer on the request.

**Specification for Aluminium Doors and Partitions**

* 1. **Aluminum Doors and Frames**

 This section on aluminum alloy doors and partitions covers the construction, finishes and iron-mongery. These aluminum alloy doors are single glazed.

* + 1. **List of References**

BSEN 755 /1- 9 Aluminium & Aluminium alloys. Extruded rod/bar,

 tube& profiles.

BSEN 573 / 1-4 Aluminium & Aluminium alloys .Chemical composition &form of wrought products.

BSEN 515 Aluminium & Aluminium alloys wrought products

##  BSEN 485/1-4 Aluminum & Aluminum alloys, Sheets, Strips

##  & plate.

##  BS EN 12020/1-2 Aluminium & Aluminium alloys, Extruded Precision

##  profiles in alloys

 **BSEN ISO 7599:2010**  Anodizing of Aluminium & its alloys. General

specifications for anodic oxidation coating on

 Aluminium

**BS 3987** Anodic oxidation coating on wrought Aluminium for external architectural applications.

BSEN ISO 11600:2003 + A1:2011 Building Construction Jointing Products,

 Classifications,& requirements for sealants.

BS 5251 One part sun guard Polysulphide based sealants

BS 6100 Glossary of building and civil engineering terms

BS EN ISO 3506/1-2 Mechanical properties of Corrosion resistant stainless steel fasteners., Bolts, screws & Studs

BS 6262 Code of practice for glazing for buildings

BS CP3 Chapter V code of basic data for the design of building loading.

 Part 2 wind loads.

* + 1. **Definitions**

 **Glass adapter** : A supplementary frame or section inserted into the normal glazing rebate to provide a deeper and./or wide rebate for double glazing units or infill panels.

 **Glazing Gasket** : Plastics or synthetic rubber members used between the glass and the frame and/or the glass and the beading.

 **Hardware** : Fittings attached to the door window which are used to operate and/or secure it.

 **Partition Type**

 Aluminium framed partitions of Bronze-Anodized Aluminium with thick shop front sections according to the attached drawings with 5mm thick glass fitted and paneled with 3mm thick luxury type PVC laminated plywood board from both sides as per details.

* + 1. **Shop Drawing and Installation Details**

 Drawings showing elevations, large scale sections and proposed method of fixing shall be submitted for approval prior to fabrication.

* 1. **Materials and product Requirements**
		1. **Aluminium**

 Extruded Aluminium members : They shall comply with BS EN 755, BSEN 12020.Former BS 1470, BS 1474)

 Aluminium Sheet Materials: They shall comply with BSEN 485 (Former BS 1470) and BS EN ISO 11600:2003 + A1:2011.

 Finish of Aluminium Extrusions: The anodizing shall comply with BS 3987.

* + 1. **Thickness of Aluminium Members**

 Nominal wall thickness shall be 1.575 +/- 0.15 mm from a solid extruded shape and 1.515.

 Nominal wall thickness shall be 1.575 +/- 0.15 mm for solid extruded shapes and 1.515 +/- 0.25 mm for hollow extruded shapes.

 Surface Finish: Exposed surface of Aluminium shall be anodized to BS 3987.

* + 1. **Anodic Coating Thickness**

 The anodic coating thickness shall comply with the following minimum thickness grade of BSEN ISO 7599:2010 (Former BS 1615).

AA 25 or above Conditions where sea influence industrial pollution etc. are expected.

AA 15 or above For internal use such as partitions and doors.

* + 1. **Colour Matching and Texture**

 The completed work shall be uniform appearance in regard to colour and texture and shall be satisfactorily match with identical samples or colour matches held by the Engineer and the Contractor/Supplier.

 Any material finish or workmanship which would not comply with this specification will be rejected by the Engineer. Any such rejected items will be removed immediately and replaced to the entire satisfaction of the Engineer entirely at the Contractor’s expense.

* + 1. **Fasteners**

 The straps clips brackets, hinges, screws bolts, rivets and other miscellaneous fixing devices shall be manufactured from one of the following.

 Stainless steel complying with BSEN ISO 3506 (BS 6105).

 Aluminium alloy having mechanical strength properties least equal to that of the frame and anodized to grade AA 15 of BSEN ISO 7599:2010 (BS 1615 ).

 **Anchors** : All anchoring devices used in the erecting of the windows shall be of aluminium non magnetic stainless steel or other non corrosive materials compatible with aluminium steel anchors may be used provided that they be properly insulated from the aluminium.

* + 1. **Bearing Devices and Hardware**

 **Bearing Devices and Hardware :** Hardware including its fixings shall be of suitable materials resistant to and suitably protected against atmospheric corrosion. Plated or coated materials not compatible with aluminium are not permitted unless properly insulated from aluminium. Hardware shall be able to retain the casement rigidly in both open and closed positions.

 **Weather Stripping :** Weather stripping shall be of materials compatible with aluminium which will not promote corrosion and shall be resistant to deterioration by all forms of weathering. Wool pile weather strip where used shall be treated with silicone and free of residential wetting agents.

 **Sealants and Caulkings** : Sealants and caulking shall be of durable material that can stand all forms of weathering and shall be compatible with BS EN ISO 11600:2003 + A1:2011 (BS 4254 , BS 5889)

 **Delivery and Packing** : The contractor shall ensure that all components suitably packed to ensure protection against handling and other damages during delivery to the other site. All aluminium components shall be covered by special protective coatings comprising of “Fablon” “Cellotape” 2 14” or other equal table material fixed with non-damaging and non-reactive adhesive. The contractor shall state in his tender, the type of protection proposed complete with samples and references to previous uses.

* 1. **Construction**

 **Assembling** : The assembling of fittings shall be done by his duly authorized representative.

 **Joints** : Joint in frames shall be either by mechanical means (examples are cleating & screwing). Where necessary joints shall be sealed.

 Keys shall be permanently inscribed with a number that identifies the Cylinder or provided as follows :

 All locks – 03 keys for lock.

 Keys of any one set shall not operate locks of any other set.

 **Locks**

 Locks shall be Mortice Lock sets manufactured by Newmon Tonk or any other manufacturer whose locks are considered equivalent to the above and approved by the Engineer.

 Control Sample : Sample window and door units as required shall be lodged with the Engineer as control standards within six weeks of the acceptance of a tender.

 Samples showing the surface finish which is to be applied to the Aluminium component offered, shall in all circumstances, be submitted to the Engineer for examination with the tender. This surface finish will be used as a reference standard. A sample from a typical mullion section and pivoted sash section which the tenderer proposes to use in the windows shall be submitted with the tender. Similar samples shall also be submitted in the case of doors.

* + 1. **Work Sizes and Manufacturing Tolerances**

**Work Sizes** : The manufacturer shall state the work sizes for the overall length and height.

**Manufacturing Tolerances** : The permissible deviation of the size of an assembled frame shall be within the limits of +1.5 mm from the work sizes and the maximum difference between the diagonals of the assembled frame shall be 4 mm.

**Tolerances in Structural Opening** : The structural shall allow a 5 mm clearance all round to facilitate easy installation have flush or stepped or lapped surfaces. Flush joints formed by mechanical means may deviate from the same plane only within the limits set by the use of extrusion tolerances given in BS 1474.

**Welded Joints** : They shall be clean and smooth on the surface which are exposed when the window or door is in the closed position where they come into contact with the glazing.

**Sliding Action** : In horizontally and vertically sliding windows or horizontally sliding doors, adjacent Aluminium members shall not slide upon each other but shall be separated by a material that does not react with Aluminium and does not interfere unduly with the sliding.

 **Bearing Devices** : In horizontally sliding windows or doors the sashes shall be supported on bearing devices that facilitate the movement and prevent direct contact between the sashes and the aluminium track.

**Hardware**  : Hardware shall be possible to renew the weather stripping without removing the outer frame from the structure.

 **Weather Stripping**  : It shall be possible to renew the weather stripping without removing the outer frame from the structure.

 **Caulking and Sealing** : All the mechanical joints shall be sealed with silicon or Polysulphide sealants (according to the standard or equivalent & acceptable to the Engineer) in matching colour . The gap between the windows or doors and the opening right round shall be sealed with silicon sealer applied with pressure to achieve a water-tight joint.

* + 1. **Keys Locks – Hardware**

 Before locks are delivered to work site complete keying system shall be submitted for approval by the Engineer.

* + 1. **Precautions**
		2. **Priming/Sealing**

 Aluminium surfaces in contact with lime or mortar or concrete or other masonry materials shall be painted with alkali resistant coatings.

* + 1. **Corrosion Protection**

 Where Aluminium is in contact with wood or steel (even galvanized) shall be treated with a chemical that will not promote corrosion of Aluminium.

* + 1. **Expansion Joints**

 Where aluminium windows are to be constructed over a considerable length due consideration must be given to the possibility of thermal expansion through the provision of expansion joints or other suitable means.

* + 1. **Fixing**

 Components shall be positioned accurately plumb, level and aligned as necessary. Fixing shall be done to manufacturer’s recommendations to prevent pulling away and other movements during use. The installation shall be according to the specifications of the manufacturers proprietary assembly details and components.

* + 1. **Distortion**

 Adequate care shall be taken not to distort components when driving sedges or other packing or when tightening/fixing.

* + 1. **Dissimilar Materials**

 Where aluminium surfaces may come in contact with other metals, water absorbent or porous materials or incompatible materials, such surfaces shall be kept away from direct contact with these materials.

* + 1. **Testing**

 The following tests may be required at the discretion of the Engineer.

* + 1. **Coating Thickness**

 The coating thickness shall be measured using an eddy current instruments as specified in BS 3978 1966 or ASTM B244 of the Aluminium Association of America’s method for measuring thickness of Anodic Coating of Aluminium.

* + 1. **Coating Weight**

 The coating weight shall be measured as specified in ASTM B15.

* + 1. **Staining**

 The Aluminium Association of America’s Stain Test for Anodic Coatings of Aluminium” shall be carried out to assess resistance to staining.

* + 1. **Hardness**

 Hardness tests shall comply to testing with an “Eagle Turqoise” pencil grade 2H, pushing forward about 6mm at one angle of 45 degrees using pressure without breaking lead : if the hardness of the film is satisfactory the film will not rupture.

* + 1. **Resistance to Sulphur Dioxide**

 The film shall comply to BS EN ISO 7599:2010 ( BS 1615 : 1961) the finish shall show no blistering, softening or lack of adhesion and there shall be no corrosion/creep under the coating.

* + 1. **Air Infiltration**

 Air infiltration shall be measured as specified in BS 4315.

 The window including all glazing shall be capable of withstanding conditions of test pressure 300 N/m2.

 Under these conditions when the outside surface of the window is completely covered with a film of water, there shall be no leakage of water through the window and the whole shall be waterproof.

 Details on how to provide such tests as to prove that the fixed and pivoted windows are water tight shall be as specified by the Engineer.

* + 1. **Structural Gasket**

 Ensure that fixing in faces are smooth undistorted and free from burrs/wood protections. Any specified painting to be carried out before glazing.

 Lay gaskets in a flat warm area for 24 hours before glazing.

 Ensure that edges of panels are ***arised*** or covered with self adhesive tape.

 Fit the gasket to the frame butt jointing any end in the center of the lap of the opening of tape.

 Lubricate gasket and zipper strips with water or liquid paraffin.

 Inset panel carefully using hardwood or plaster spatulas.

 Equalize edge clearance with setting blocks.

 Insert zipper strips and allow to retract for at least 4 hours before corners and passing into position leaving no gaps.