

1.00 DOORS /Windows & louvers :**Preamble :**

The rate for various items shall include the following :

- (a) Providing and applying electrostatically polystyrene base powder coating of 50 micron or 20 micron color anodised of approved make and shade and oven baking the same at required temperature to give even shade and finish. The rate shall also include for required pre-treatment to sections such as cleaning, buffing, chromating etc. complete as per approval of Engineer-in-charge. The Tenderer has to submit their powder coating process/anodizing process by which they wish to perform the work. The thickness measuring instruments shall be brought on site as and when required to check the thickness

The Contractor shall have to give a guarantee bond, for powder Coating, on appropriate Stamp paper for a period of 5 years. In this period he shall attend to and rectify all complaints without causing any inconvenience to the Institute. The form of Guarantee Bond shall be as prescribed below :

"I/We (Contractor) hereby guarantee that work shall remain unaffected and shall not be in any way damaged by atmospheric conditions, for a period of 10 years after the completion of the work of Powder Coating the aluminium doors as per the terms and conditions of the Contract and guarantees to redo the affected work without claiming any extra cost."

- (b) In case of alteration items of M.S. windows standard "Z" sections M.S. rolled or fabricated sections as per requirement are to be used matching to the respective aluminium sections. The windows shall be painted with two coats of enamel paint (of approved make and shade) over two coats of zinc chromate yellow oxide and with steel putty etc. complete as per design, direction and approved sample.
- (c) The windows and doors are to be fixed with the external finished surface (either stone cladding/external plaster) and hence all the necessary rubber strips, IS 710 ply packing and approved make & color neutral grade silicon sealant with polyurathene back up rod (between the frame and concrete or other surface all around) shall be provided within the rate quoted so as to make the junctions fully water tight/air tight.
- (d) Approved make selected float glass (plain or frosted) of approved /required thickness/thickness as specified shall be used in doors. Wired glass louvers/plain glass louvers with ground edge shall be provided wherever shown on drawings.
- (e) Necessary locking arrangement of approved design (by Engineer-in-charge) shall be provided as per drawing & as directed by Engineer –in-charge
- (f) Wherever necessary EPDM rubber or wool piles as approve by Consultant & Engineer) etc. shall be provided for air/water tightness.
- (g) Necessary operating device (as per design) for operation of louvers of windows, ventilators, sky lights, including necessary rods shall be provided
- (h) The rates quoted shall be inclusive of manufacture, supply and installation at Site, and inclusive of all the necessary accessories rubber strips, locks, rods, excise duty, taxes, octroi, transport, labour charges, insurance, storage and safe custody, etc. complete.
- (i) The rates shall also be inclusive of providing and applying with gun neutral grade silicon sealant of

specified thickness ,width ,make & color and making the joints around aluminium doors, windows etc. watertight, on the external periphery of the building at the junction of two different materials as directed by the Engineer-in-charge.

The Contractor shall have to give a guarantee bond, for water tightness, on appropriate Stamp paper for a period of 5 years. In this period he shall attend to and rectify all complaints without causing any inconvenience to the Institute. The form of Guarantee Bond shall be as prescribed below :

"I/We (Contractor) hereby guarantee that work shall remain unaffected and shall not be in any way damaged by atmospheric conditions, for a period of **5 years** after the completion of the work of applying sealant and making the joints around aluminium doors watertight, on the external periphery of the building at the junction of two different materials as per the terms and conditions of the Contract and guarantees to redo the affected work without claiming any extra cost."

- (j) Necessary provision for rain water disposal shall be done in the bottom guides/frames as directed and approved by Engineer-in-charge.
- (k) Offer must be in accordance with detailed drawings with dimensions of aluminium sections in frames and shutters as shown in drawing. It shall be accompanied by the detailed drawing if any deviation is proposed.
- (l) The quantities are provisional and may vary to any extent. No claim will be entertained on this account for any reason.
- (m) Shutters with **double action hydraulic floor springs** of approved make shall be with minimum one year guarantee. The floor springs shall be of least possible thickness.

The Contractor shall have to give a guarantee bond, for the Hydraulic floor springs, on appropriate Stamp paper for a period **of 1 year**. In this period he shall attend to and rectify all complaints without causing any inconvenience to the Institute. The form of Guarantee Bond shall be as prescribed below:

"I/We (Contractor) hereby guarantee that the floor springs shall remain unaffected and shall not be in any way damaged by normal usage, pulls and pushes, for a period of 1 year after the completion of the work of supplying & fixing the Hydraulic Floor Springs to aluminium doors as per the terms and conditions of the Contract and guarantees to redo the affected work without claiming any extra cost."

- (n) Details/arrangements for after sales/maintenance services shall be furnished.
- (o) Work shall be carried out in co-operation and in coordination with all other agencies working at Site.
- (p) The civil work as required for fixing of floor springs & making it good on completion hold fast or other works required for the erection and completion of doors/windows etc. shall be done by the Contractor without any extra cost.
- (q) Any damage, if caused to the existing work done by other agencies, shall be reinstated by the Contractor to its original condition without any extra cost.
- (r) During the course of work, the Contractor shall pay due care to avoid any stains on the powder coating work and if required, the Contractors shall provide necessary protective arrangement as

directed by the Engineer-in-charge for which no extra payments shall be made. After the installation is completed, if required by the Engineer-in-charge, the aluminium work shall be washed with mild solution of non alkali soap and water.

- (s) The Contractor shall be responsible for the windows/doors/grills etc. being set straight, in plumb level and for their satisfactory operations after the fixing is completed.
- (t) Wherever required and as directed strengthening of members shall be done by providing steel/M.S. concealed members with extra cost & shall be paid in relevant tender item or prorate item
- (u) The door shutters may have hydraulic door closer of approved make with minimum one year guarantee as and where shown in the drawings and as directed.

The Contractor shall have to give a guarantee bond, for the Hydraulic door closer, on appropriate Stamp paper for a period of 1 year. In this period he shall attend to and rectify all complaints without causing any inconvenience to the Institute. The form of Guarantee Bond shall be as prescribed below:

"I/We (Contractor) hereby guarantee that the hydraulic door closers shall remain unaffected and shall not be in any way damaged by normal usage, pulls and pushes, for a period of 1 year after the completion of the work of supplying & fixing the Hydraulic Door Closers to aluminium doors as per the terms and conditions of the Contract and guarantees to redo the affected work without claiming any extra cost."

2 ALUMINIUM WORK

2.1.0 TERMINOLOGY

Bar

Any solid section, other than round, with at least one dimension of 10 mm or more.

Rod

Any round solid section with a diameter of 10 mm or greater.

Extruded Round Tube

A circular hollow extrusion of uniform wall thickness not subjected to cold drawing.

Hollow Section

An extruded shape other than round tube, the cross section of which completely encloses a void or voids and which is not subject to cold drawing.

Anodized Aluminium

Aluminium with an anodic coating, produced by an electrolytic oxidation process, in which the surface of the aluminium is covered with a coating, generally an oxide, to give protective and decorative properties.

Pre-laminated Particle Board

A particle board laminated on both surface by synthetic impregnated base papers under the influence of heat and pressure with finished foil under the pressure or pressure and heat depending on type of binder used.

Floor Spring (Hydraulically Regulated)

A device used to close the door so as to slow down its speed before it reaches its closed position.

Single Action Floor Spring (Hydraulically Regulated)

A device used to close the door in one direction only so as to slow down its speed before it reaches to its closed position.

Double Action Floor Spring (Hydraulically Regulated)

A device used to close the door in both directions so as to slow down its speed before it reaches its

closed position.

Shoe

The device fixed to the bottom of the door leaf in order to hoist it to the floor spring.

Top Centre Pivot

The device to secure the upper portion of the door leaf and the door frame above.

Right Hand Floor Spring

A floor spring suitable for use on an anticlockwise door; an anticlockwise door is one which when viewed from above, rotates in anticlockwise direction about its hinge while opening.

Left Hand Floor Spring

The floor spring suitable for use on clockwise door a clockwise door is one which, when viewed from above, rotates in clockwise direction about its hinge while opening.

Sash

It is a complete window unit whether fixed or open type.

Composite Window

Window unit having two or more sashes joined together with one or more coupling members.

Centre – Hung Ventilator

A ventilator horizontally pivoted at the centre on both sides. Top half opens inwards and bottom half opens outwards.

2.1.1 ALUMINIUM

2.1.1.1 Aluminium Sections

Aluminium sections used for fixed/openable windows, ventilators, partitions, frame work & doors etc. shall be suitable for use to meet architectural designs to relevant works and shall be subject to approval of the Engineer-in-Charge for technical, structural, functional and visual considerations. The aluminium extruded sections shall conform to IS 733 and IS 1285 for chemical composition and mechanical properties. The stainless steel screws shall be of grade AISI 304.

The permissible dimensional tolerances of the extruded sections shall be as per IS 6477 and shall be such as not to impair the proper and smooth functioning/operation and appearance of door and windows.

Aluminium glazed doors, windows etc. shall be of sizes, sections and details as shown in the drawings. The details shown in the drawings may be varied slightly to suit the standards adopted by the manufacturers of the aluminium work, with the approval of Engineer-in-Charge. Before proceeding with any fabrication work, the contractor shall prepare and submit, complete fabrication and installation drawings for each type of glazing doors, windows, ventilators and partition etc. for the approval of the Engineer-in-Charge. If the sections are varied, the contractor shall obtain prior approval of Engineer-in-Charge and nothing extra shall be paid on this account.

2.1.1.2 Anodising

Standard aluminium extrusion sections are manufactured in various sizes and shapes in wide range of solid and hollow profiles with different functional shapes for architectural, structural glazing, curtain walls, doors, window & ventilators and various other purposes. The anodizing of these products is required to be done before the fabrication work by anodizing/electro coating plants which ensures uniform coating in uniform colour and shades. The extrusions are anodized up to 25 micron in different colours. The anodized extrusions are tested regularly under strict quality control adhering to Indian Standard.

2.1.1.3 Powder Coating

2.1.1.3.1 Material: The powder used for powder coating shall be Epoxy/polyester powder of make approved by the Engineer-in-Charge. The contractor shall give detailed programme for powder coating in advance, to facilitate the inspection by Engineer-in-Charge or his authorized representative.

2.1.1.3.2 Pre-treatment: Each aluminium alloy extrusion or performed section shall be thoroughly cleaned by alkaline or acidic solutions under the conditions specified by chemical conversion coating supplier and then rinsed. A chemical conversion coating shall be applied by treatment with a solution containing essentially chromate ions or chromate and phosphate ions as the active components as

applicable. The amount of the conversion coating deposited depends on the type used by the conversion coating chemical supplier. The conversion coating shall be thoroughly rinsed either with the solution specified by the conversion coating chemical supplier or with de-mineralized water and then dried at the temperature for the time specified by the conversion coating chemical supplier. The contractor shall submit the detail specifications and application procedure for application of conversion coating for approval of Engineer-in-Charge. The metal surface after the conversion coating pretreatment and prior to the application of the coating shall be free from dust or powdery deposits.

2.1.1.3.3 Process: The polyester powder shall be applied by electrostatic powder spray method. Before start of powder coating the contractor shall submit detail specification for application of polyester powder from manufacturer of the polyester powder for approval of Engineer-in-Charge. The powder coating shall be applied as per the specification approved by Engineer-in-Charge.

2.1.1.3.4 Thickness: The thickness of the finished polyester powder coating measured by micron meter shall not be less than 50 micron nor more than 120 micron at any point.

2.1.1.3.5 Performance Requirements for the Finish

(i) Surface appearance: The finish on significant surfaces shall show no scratches when illuminated and is examined at an oblique angle, no blisters, craters; pinholes or scratches shall be visible from a distance of about 1 m. There shall not be any visible variation in the colour of finished surfaces of different sections and between the colours of different surfaces of same section.

(ii) Adhesion: When a coated test piece is tested using a spacing of 2 mm between each of the six parallel cuts (the cut is made through the full depth of powder coating so that metal surface is visible) and a piece of adhesive tape, approximately 25 mm x 150 mm approved by the Engineer-in-Charge is applied firmly to the cut area and then removed rapidly by pulling at right angles to the test area, no pieces of the finish other than debris from the cutting operation shall be removed from the surface of the finish.

2.1.1.3.6 Protection of Powder Coated / Anodizing Finish : It is mandatory that all aluminium members shall be wrapped with self adhesive non-staining PVC tape, approved by Engineer-in-Charge.

2.1.1.3.7 Measurement: All the aluminium sections including snap beading fixed in place shall be measured in running meter along the outer periphery of composite section correct to a millimeter. The weight calculated on the basis of actual average (average of five samples) weight of composite section in kilogram correct to the second place of decimal shall be taken for payment. (Weight shall be taken after anodizing). The weight of cleat shall be added for payment. Neither any deduction nor anything extra shall be paid for skew cuts.

2.1.1.3.8 Rate: The rate shall include the cost of all the materials, labours involved in all the operations as described in nomenclature of item and particular specification.

2.1.5 REFLECTIVE GLASS

2.1.5.1 Definitions

(i) Shading Coefficient: The shading coefficient is the ratio of total solar transmittance to the transmittance through 3.2 mm (1/8") clear glass. Windows with low shading coefficient values improve comfort for building, lower the total cooling load of the building and help smooth out of the difference in cooling loads between perimeter & core zones.

(ii) Luminous Efficacy Constant (Ke) indicates a windows relative performance in rejecting solar heat-while transmitting day light. It is the ratio of the visible transmittance to the shading coefficient; clear glass which lets in roughly equal amounts of visible light and solar near-infrared energy has a Ke close to 1.0. The solar radiation contains about 50% invisible near-infrared & ultra violet light. Therefore, a perfectly selective glazing, which would all allow visible light pass through while blocking all of the invisible near-infrared & ultraviolet light, would have Ke of about 2.0.

(iii) Resistance to Heat Conduction (R-value): It is a measure of resistance to heat flow that occurs because of temperature difference between the two sides of the windows. The inverse of R-value is termed as U-value.

2.1.5.2 Reflective Glass

This is an ordinary float glass with a metallic coat to reduce solar heat. Clear glass transmits most of the sunlight that shines upon it, and most of the solar heat as well; the metallic coated glass i.e. reflective glass has better shading coefficients because they reflect rather than absorb infrared energy. However, most of reflective glazing blocks day light more than solar heat.

2.1.5.2.1 Types of Coatings: There are two types of reflective glass, Pyrolytic (Hard) coated and vacuum (soft) coated.

(i) Pyrolytic: It is a coating applied during glass manufacture. The coating is fused into the glass at 1200°C.

(ii) Vacuum Coated Glass: It involves the deposition of metal particles on the glass surface by a chain reaction in a vacuum vessel. It is often called a soft coat; because the coating is more susceptible to damage than hard coat glass. Where toughening of product is required, the product must be toughened first & then vacuum coated. Vacuum coated products have better shading coefficient values than pyrolytic products.

2.1.5.2.2 Performance of Reflective Glass: The performance of reflective glass 6 mm of nominal thickness is given below:

Sr. No.	Parameter	Threshold Ratio In %age
1	Visible Light Transmittance %	15-46
	Reflectance %	12-24
2	Total Solar Energy Transmittance %	16-24
	Reflectance %	8-12
3	Ultra violet rays Transmittance %	2-10
4	U-value Summer	0.58
	Winter	0.45
5	Shading Co-efficient	0.25-0.35

2.1.5.2.3 Testing: The reflective glass shall be tested for the followings:

(i) Physical/Field Test: In a true reflective glass, when a pointed pencil is placed, then tip of pencil (physical) & image should coincide.

(ii) Lab. Test: In the lab, the reflective glass shall be tested for the parameter specified in 21.5.2.2 above.

2.1.5.2.4 Fixing of glass shall be done as specified.

K01 ALUMINIUM WORKS (DOORS & WINDOWS):

Providing and fixing in position frames/ shutter for any type of aluminum work like aluminium door, composite door-window, window (sliding, openable, side hung, top hung, fixed etc.), casement window, sliding window, aluminium partition, cabinet, aluminum fixed louvers as per approved shop drawings and aluminum sections of Jindal/ Indal/ Hindalco make having minimum 60 micron powder coating of approved shade & colour(including special colors) on sections for all floors/ all levels/ all heights/ all shapes/ all sizes as per the drawing, specifications. The quoted rate shall be inclusive of providing aluminium sections, powder coating, bending, cutting, fabrication, erection and fixing to the best workmanship manner with all type of wastage, including

1) Sheet metal screws, wool pile and aluminium angle corner cleat of required thickness and of full width, etc. for assembling the frame and shutter; 2) Best quality wool pile where ever shutter touches the frame; 4) Anchor fasteners of Hilty/ Mungo/ Fischer for fixing the frame assembly to

the RCC or masonry surfaces. Minimum 1 anchor fastener shall be used for every 750mm length of section for stability of frame. But excluding 1) Rough ground to fix a frame with wall or any surface. Work shall be carried out as per the shop drawings submitted by contractor and approved by Consultant. Actual weight of installed aluminium sections which shall only be measured (only standard weight shall be considered) considered for the payment. Infill panels and hardware shall be paid under the respective items of this tender.

Contractor to provide water jet test after complete installation of job for water tightness / leakages of external openings. The openings will be checked for water leakages / tightness from junction point of frame with structure work.

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K02 Providing and fixing rough ground (packing) as per approved shop drawing in the gap between wall and door-window frame, to fix Partition(if required). The rate shall be inclusive of :

1) providing and fixing average 6-8mm thick compact sheet of width as per aluminium section / frame / shutter member.

2) filling the gap between wall and frame on both sides (outside and inside) with polyethylene backer rod of average 10 mm thickness of make Supreme and color and then sealing the remaining gap with neutral grade G/M (Glazed & Metal) weather silicon sealant / structural sealant of make Wacker/ Dowcorning/ GE/ Soudal/ Bostik of approved color. Work shall be carried out as per approved shop drawings and approved sample at all floors/ all levels/ all heights/ all shapes. Contractor shall provide guarantee for water tightness for 12 months after defects liability period. Installed measurements shall be considered for payment.

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K03 Providing and fixing Clear Float Glass of 6 mm thickness of Modi guard / Saint Gobain / Asahi make of any size, any shape and specified thickness in frame and shutter work with necessary cutting of glass as per drawing & specifications including providing and fixing EPDM quality rubber/ silicon sealant/ structural sealant of make Wacker / Dowcorning / GE / Soudal / Bostik make of 3M tape and approved make of EPDM rubber on the periphery of the glass as per the required thickness etc. complete at all floors/ all levels/ all heights as per the directions of Architect. Actual visible glass installed at site shall be measured and paid. Rate shall be inclusive of all type of wastage.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K04 Providing and fixing Wired Glass including 1 mm thick ss wire @ every 1 cm horizontal & vertical of make Modi guard / Saint Gobain / Asahi / Gopal glass make of any size, any shape and specified thickness in frame and shutter work with necessary cutting of glass as per drawing & specifications including providing and fixing with EPDM quality rubber/ silicon sealant/ structural sealant /3M tape on the periphery of the glass as per the required thickness etc. complete at all floors/ all levels/ all heights as per specifications. Actual visible glass installed quantity shall be measured and paid. Rate shall be inclusive of all type of wastage.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K05 Providing and fixing Compact Sheet of 6 mm thick (plain) of any size, any shape, any color of make Sundek/ Vir/ Bloom/ Formica as per approved make and specified thickness in aluminium frame and shutter work with necessary cutting of sheet, single side, double side coloured as per drawing & specifications including providing and fixing EPDM quality rubber/ silicon sealant/ 3M tape/ screwing on the periphery of the sheet as per the required thickness etc. complete at all floors/ all levels/ all heights as per the drawing & directed by EIC. Cut edges of the compact sheet shall be provided with masking tape. Actual visible compact sheet installed at site shall be measured and paid. Rate shall be inclusive of all type of wastage.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K06 Providing and fixing "Sliding lock with auto locking " of make Alualpha/ Kitch, EPPW, Dunex, Dorma, Ebco, Palladium make for sliding door/ window with necessary s.s. screws and as per drawing, complete all as per specifications. The quoted rate shall be for all heights / all floors / all levels.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K07 Providing and fixing dead lock with 60/70mm Europrofile pin cylinder of Godrej/ Dorma/ Kitch/ Gadget/ Yale make with both side key/one side knob with one pair of rose for wooden/ aluminium doors with necessary ss phillips head screws etc. complete as per drawing and sample approved by EIC . The quoted rate shall be for all heights / all floors / all levels.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K08 Providing & fixing heavy quality SS "Butt Hinge with 4 Bearing" of 102 X 76 X 3mm of make of Godrej/ Dorma/ Kitch/ Gadget/ Yale make of grade SS 304 and brush/ satin finish with necessary s.s. screws and as per drawing, complete as approved by EIC. The quoted rate shall be for all heights / all floors / all levels.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K09 Providing & fixing Heavy duty (90 KG) Standard Model Door Closer with standard arm of make Godrej/ Dorma/ Kitch/ Gadget/ Yale make with necessary screws and as per drawing, complete as approved by EIC. Rate shall be inclusive of maintaining door closer in working condition till defect liability period with one year guarantee. The quoted rate shall be for all heights / all floors / all levels.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K10 Providing & fixing SS 304 grade of brush/ satin finish 18" x 10mm (square) size Tower Bolt of make Godrej/ Dorma/ Kitch/ Gadget/ Yale make in door/ window with necessary screws and as per drawing, complete as approved by EIC. The quoted rate shall be for all heights / all floors / all levels.

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K12 Providing & fixing SS of glossy/ satin finish 22mm (diameter) x 300mm size Push-Pull Handle in pairs of make Godrej/ Dorma/ Kitch/ Gadget/ Yale make in door/ window with necessary screws and as per drawing, complete as approved by EIC. The quoted rate shall be for all heights / all floors / all levels.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K13 Providing & fixing SS of glossy/ satin finish 19mm (diameter) x 150mm size Push-Pull Handle in pairs of make Godrej/ Dorma/ Kitch/ Gadget/ Yale make in door/ window with necessary screws and as per drawing, complete as approved by EIC. The quoted rate shall be for all heights / all floors / all levels.

Relevant specification shall be followed as above mentioned

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.

K15 Extraover bending charges of circular windows (measurement will be taken for entire window frame considered as 1 no. of each window made of any size of frame member or any no.) of any diameter as per drawing or as suggested and directed by EIC.

Mode of Measurement and Payment.

The work shall be measured under relevant item in the schedule of quantities and paid for.