

EXTERNAL FAÇADE AND ASSOCIATED WORKS

PARTICULAR SPECIFICATIONS MENTIONED IN THE BOQ- FINANCIAL BID
VOLUME - IIPARTICULAR SPECIFICATION

S.No	Ref.		Description of Items
	BOQ item No	Description	
General Note: This Particular specification shall be read along with Schedule of quantities while quoting the rate for the respective items. The quoted rate under this schedule shall be deemed to have considered Technical specification.			
22.01	17.7	Supply of Glass for windows / glazing. (IGU/DGU/ Monolithic)	<p>Glass for windows / Glazing system:</p> <p>a. General: Supply of glass either Insulated glass, Double or Monolithic glass as per the options given in Schedule of quantities to the respective place to fix the glass on the system. Fixing the glass shall form part of the system cost quoted under respective items. Refer Annexure - I for the glass performance, processing, thickness and coating of glass and other parameters. Refer the separate item in Schedule of Quantities for the supply of Insulated / Monolithic glass. However all the glass panes are shall be heat strengthened and the protection of glass as specified shall be responsible of the Bidder/Processor.</p> <p>b. Processing of Glass: Details of the processor and their facilities should be submitted to the Employer/PMC/Architect for approval. Insulated glazing unit shall be processed only by the approved Processor. All glass panes used in the glazing shall be heat strengthened conforming to ASTM C 1048. No tong marks shall be allowed in the processed glass. Necessary test certificate shall be produced by the processor to confirm the adherence of the parameters set out in the codes and standards. New substrate glass shall only be used for coating and to ensure the same, a certificate shall be produced by the contractor. Making necessary arrangement to inspect the Glass processor by the representative of Employer, PMC and Architect (one representative from each as minimum) during the progress of glass processing.</p> <p>Glass Manufacturer shall ensure that only new substrate glass is used for coating and necessary inspection procedure shall be adopted to eliminate the incidence of Nickel sulphate (NIS) inclusion on the float glass used for coating and to ensure the same, a certificate from glass Manufacturer shall be obtained by the contractor and submit the same to Engineer-in-charge. Contractor shall arrange for obtaining necessary clearance from the processor for the inspections of the glass processing plant during the progress of glass processing and to carry out the random test (Minimum 3 nos) at the glass processor lab by Engineer-in-Charge. It shall be the responsibility of the contractor to make sure that the glass shall be processed as per specification and it shall be conforming to the criteria of the respective codes and standards. The contractor shall have to submit certificate from the glass processor that the glass processing has been done as per specification and codal provisions has been observed and such copy of codes shall be made available for verification of Employer / PMC / Architect.</p> <p>Processor shall provide removable Safety clips on each corner of glass</p>

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			<p>and provide self adhesive plastic sheet to the required thickness on the external surface of the glass as a safety measure prior to packing to avoid breakage of glass in the corners during transit, free from scratches and this safety clip shall be retained till the glass is taken for Glazing in to the frame at factory and plastic sheet shall be retained till handing over the project. Glazed panel with broken or Chipped off glass at the edges and with any scratch on the surface of the glass shall not be allowed to use in the Facade and found any such damages in the glazed panel even after glazing / erected in place shall be rejected and shall be replaced with new one after the approval of installation methodology by Employer / PMC / Architect</p> <p>c. Mode of Measurement: Length and breadth of the superficial area of the finished work shall be measured centre to centre of the grooves on the external surface viewed externally correct to a centimeter under the respective items. Areas shall be calculated in a square meter correct to two places of decimal.</p> <p>d. Attic stock Glass: Actual size of the glass shall be measured correct to a centimeter. Areas shall be calculated in a square meter correct to two places of decimal.</p>
22.02	18.1	ACP Cladding	<p>Laminated sandwiched composite panel cladding system and Associated works</p> <p>Scope: Designing the cladding system with Laminated sandwiched composite panel (Aluminium composite panel) as per design intent, preparation of shop drawings for approval, supply, fabricate, erect as per approved shop drawings at all floor levels and at all floor heights and the projection as shown in the approved drawings (Minimum 150mm projection) wherever required. Design the framing system with the gap as per drawing between wall/column/steel structures/any supporting system & cladding. Frame to support Laminated sandwiched composite panel and Decorative capping to any shape & profile and shall be supported between the aluminium angle brackets anodized finish. Brackets shall be fixed on to the Masonry wall with Solid block (Compressive strength not less than 5.5 N/mm²) / RCC / steel structures/any other supporting structures like brackets, Angles and the brackets shall be fixed with Polyamide expansion SS anchors of suitable dia and length with the strength as per design criteria. In order to decide the actual strength of expansion bolts to be achieved as per design, a pull out test on bolts shall be conduct at site on the block wall/RCC member at minimum 3 locations on each. Pull out test results will decide the type of anchors (PMC/Architect. All fasteners and expansion bolts shall be Hilti make or approved equivalent. Groove width in the system both in horizontal and vertical shall not be more than 18 mm and the groove width shall be maintained uniform for both structural glazing and cladding system. Groove shall be sealed with non structural and non-staining sealant.</p> <p>A.DESIGN Design : Design the cladding system with Laminated sandwiched composite panel for the external surface like column, wall, jambs, sills, projected area, ceiling, decorative cladding on any surface to any profile and shape at horizontally / vertically / sloped / curved / circular etc with approved make of Laminated sandwiched composite panel (ACP) - 4 mm thick (0.5 mm thick aluminium sheet on top & bottom sandwiched with 3 mm thick core material confirming to BS 1467 in combination with approved Solid and Metallic colour panels Laminated sandwiched composite panel. The complete system to be designed to satisfy the structural design criteria specified in the technical specification. Necessary pull out test of anchor fastener shall be carried out on the</p>

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			<p>masonry wall /RCC structure to check the load carrying capacity of the bolt designed under suction pressure for designing the supporting and anchoring system.</p> <p>Movement: System shall be designed to accommodate movement due to any force including the movement resulting from the exterior skin temperature ranging from 15 to 85 deg.celsius and also to accommodate the horizontal building movement of 10 mm per panel & vertical movement of 20 mm between floors on the aluminium framing system with support brackets, glass, gaskets and fastening devices. System shall be designed to accommodate the size and shape of the Laminated sandwiched composite panel as per the approved drawings including approved modifications as may be required during execution as well as all other incidental forces and stresses likely to be experienced under service conditions, i.e. Lateral force, Dead weight and Thermal expansion due to building movement both vertical and horizontal etc. Grooves shall be designed in such a way to accommodate weather sealant - Non staining sealant of approved make.</p> <p>B.MATERIALS</p> <p>a. Frames: Providing and fixing Aluminium extruded members (Box Tube) designed to with stand design wind pressure and movement as specified as continuous member for cladding the aluminium Composite panel. Aluminium member shall be fixed into masonry wall / RCC member /steel structures with Brackets / Clamps and it shall be of chromotised finish aluminium. All fastening straps, nuts & bolts, rivets, washers/other fastening materials shall be of non magnetic Stainless steel and aluminium brackets shall be considered for ACP cladding with standard dimension and after the site survey if any undulation is observed in tern that doesn't allow to fix the aluminium bracket only in these areas the additional support with locally fabricated Hot dip galvanized bracket can be considered. The bidder shall include the provision for these brackets also within the quoted rate for ACP cladding works. Aluminium shim shall be used for level adjustment of bracket but more than 20 mm is not acceptable. If more than 20 mm bracket shall be designed according to site condition. The weight of aluminium content shall not be less than 3.0 Kg/Sqm and thickness of frame shall be not less than 2.0 mm, the weight and thickness of aluminium specified is subject to satisfying the structural design criteria.</p> <p>Aluminium brackets / clamps shall be fixed with chemical injection technique threaded anchor rods of Hilti make or approved equivalent to the base structure in the case of masonry wall / RCC members and SS anchor bolts in the case of steel structure. Extruded member shall be designed to accommodate Laminated sandwiched composite panel as per the approved shop drawings and extruded aluminium member shall be 6063 T6 or 63400 (H9) grade conforming to BS 1467 or IS 8147, finished with transparent electrolytic colour anodic coating AC15 grade conforming to IS 1868.</p> <p>b. Composite Panel: Laminated sandwiched composite panel of approved make as specified in BOQ in combination with solid and Metallic colors and it shall consist of 3 mm thermoplastic of Low Density polyethylene (LDPE) sandwiched between 2 skins of 0.5mm thick Aluminium sheet (alloy designation 3000 series conforming to BS 1475) making a consolidated panel thickness of 4 mm and to be fixed on the framing system described above. Laminated sandwiched composite panel finished with PVDF (Polyvinylidenfluorid) coating containing</p>

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			<p>minimum 70% kynar 500 and 30% resin or Lumiflon based coating on the topside / top surface and the dry film thickness shall not be less than 23 microns for solid colour and 33 microns for Metallic colour with natural pearl pigment. The reverse side coated with polyester based wash coat and top surface shall be protected with a self-adhesive peel-off foil. Lamination process of Aluminium panel shall only be Glue Technology and the source of complete composite panel shall only be accepted. Providing and fixing Laminated sandwiched composite panel suitably stiffened internally on the back side for preventing deformation due to design wind pressure beyond permissible limits by using aluminium member with thickness not less than 2.00mm and glued with 3 M make Double adhesive tape in order to maintain panel flatness and to avoid permanent deformation over a period. Stiffener shall be provided at behind ACP panel irrespective of structural check of the panel against stability and deflection. Aluminium angle cleat of size 20 x 20 mm and 2 mm thick shall be provided to a length 100 mm bent to shape, wherever the Inner skin is cut to bend the ACP at the corners and as per approved shop drawing. Methodology of fixing the stiffener/Flat in the corner panel shall be established in the drawing or to be glued to ACP on the backside of the panel in such a way the fixing mechanism of stiffener / Flat shall not be visible on the elevation of the panel / outside.</p> <p>d. Sealing: Providing and applying the sealant for Jointing / Sealing and it shall be done with Non structural (weather) sealant / Non staining sealant of DC 991 HP of Dow corning make or approved equivalent with Polyurethane baker rods of Supreme make or approved equivalent. Acetoxo sealant shall not be used for Glazing application. Sealing shall be carried out with Non structural (weather) sealant / Non staining sealant with Polyurethane baker rods, wherever the system is interfacing with glazing, cladding groove and any other groove. In addition to the sealant provided in the Cladding joints, all horizontal Cladding joints shall be covered with 3M (Code No: 4412N Translucent white) Tape of approved type and pattern with minimum 50 mm wide in addition to the Sealant. 3M Tape and Sealant shall be provided as per manufacturer requirement and methodology.</p> <p>e. Flashing: providing and fixing flashing at terrace level as part of the system made to profile as shown in the approved shop drawings and the profile shall be made out of hot dip galvanized sheet 1.2 mm thick and galvanizing coating thickness shall be in accordance with IS 2629 & 4759. In general, the flashing shall be provided to the entire length of cladding horizontally at terrace level with necessary anchoring system with SS fastening devices of Hilti make or approved equivalent. Also, the flashing shall be provided at parapet top below the coping to drain the water during any seepage through the sealant joints with overlap of 100 to 125 mm in plan with sealant at joints to make sure that no water leakage through coping / flashing joints.</p> <p>f. Field Test: Conduct Field test at site on the installed system as per the criteria set out in the particular specification in the presence of Engineer in charge. Methodology for carrying out the test shall be submitted to Employer/PMC/Architect for approval prior to testing. Record the results and submit the report to the Employer/ PMC/ Architect for approval. If Field test fails, correct the defects revealed to the satisfaction of the performance data as set out in the Technical Specification with the prior approval of Employer/PMC/Architect on defects rectification Methodology.</p>

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			<p>g. General Guideline: System design in total, including Aluminium extruded member, type & thickness of Aluminium composite panel, Aluminium sleeves at connections, inserts, Sealant, Supporting system/bracket including fastening and anchoring system & Materials specified in the schedule and the system details as shown in the tender drawing are only tentative and is meant to set out a general outline of the Proprietary system. Since the cladding system in terms of Design, materials, all fixing details, methodology of execution are proprietary in nature, the onus of the design and Performance requirements, shop drawing, execution etc satisfying the design intent, particular specification and site conditions lies solely with the Contractor.</p> <p>h. Mode of Measurement: Length and width of the superficial area of the finished work shall be measured centre to centre of the grooves on the external surface viewed externally correct to a centimeter under the respective items. Areas shall be calculated in a square meter correct to two places of decimal.</p> <p>i. Rate. Quoted rate shall include the cost of all materials and labour involved in the item for all operation described above and any other stipulations in the particular specification and agreement. Also, include the cost of scaffolding, infrastructure facility and all other consumables to execute the work as specified above.</p>
22.03	18.3	Bituminous coating	Providing and applying Cold Bituminous coating on the External wall behind Composite panel cladding area by using Multi-purpose anti-corrosive black cold bituminous of `Shalikote / Tankmastic' of STP Ltd or Lloyds - L4 of Lloyds Insulation make at the rate of application as specified by the manufacturers. Rate shall include for all Materials, Labour and consumables such as brush, gloves, labour charges for handling, surface preparation, scaffolding etc, to execute the work described above all complete as directed by Employer/PMC/Architect.
22.04	18.4	Structural steel	Providing and fixing in position Hot rolled structural steel Members / Sections at all levels and to any shape & profile, if specifically ordered as & when required by the Employer/PMC/Architect and to be executed on prior approval (In general the structural Supports called for as part of the Schedule of quantities item elsewhere in the Schedule of quantities will not be considered in this item) and the structural support may be called for in a special case for cladding on the ceiling / soffit etc. In general, Structural steel consists of MS joists, channels, angles, purlins, runners, pipes (hollow / solid – square / rectangular / circular) insert plates, flats and sag rods with necessary sleeves, bolts and nuts, gratings including cutting, straightening, welding as per standards for connections including consumables, anchoring the structural members in to the RCC/Masonry wall with suitable anchor fastener of Hilti or approved equivalent make etc complete. Rate shall include preparation of surface, applying Zinc Phosphate primer before and after erection with minimum 75 microns (DFT) with top coat with Low VOC Epoxy or Polyurethane paint with minimum 225 microns (DFT) of Akzo Noble make of approved colour for all structural steel members with in the quoted rate. Note: In general the structural steel members called for as part of the Schedule of quantities item elsewhere in the Schedule of quantities will not be considered in this item.

Note: The Contractor shall submit shop drawings for all of the above items in accordance with the relevant standard specifications and architectural drawings. The supply, fabrication and installation will be permitted only after obtaining approval for the shop drawings from IIT Madras. Necessary testing of materials and installation shall be done by the contractor at free of cost.

LIST OF APPROVED MAKES:

The make of materials specified below shall be followed by the successful bidders strictly. If the successful bidder wishes to propose the alternate make and the same shall be got it approved by the Employer. Decision on approval alternate make shall be the discretion of the Employer.

S.No	Description	Vendor Name
1	Aluminium Extrusions – Windows, Louvers and its frames.	Century Extrusions. Sapa Aluminium Global Aluminium. Bhoruka Jindal Hindal
2	Aluminium Anodizing	Bhoruka Aluminium Ltd. Abinova Anodizing / Ajit Metal
3	Glass	Saint Gobain Asahi
4	Glass processor – Insulated, laminated and Monolithic Glass with Reflective coated Glass	Fuso, Mumbai. Glass Tech, Mumbai. AIS, Mumbai TPRS, Pondichery
5	EPDM / Silicon Gasket	Sai Rubber Industries Anand Reddiflex Osaka Rubber
6	Silicone Sealant	Dow Corning, Sika, Momentive
7	Double Adhesive Tape	Saint Gobain – Nortan , Pentogon
8	Friction Hinges & Restrictor Assembly Cremany / Handle with Key	Securistyle / Alualpha Alualpha or equivalent
9	Anchor fasteners – 316 Grade.	Hilti Fischer Mungo
10	SS Nut Bolt / screws – 316 Grade.	Nut Bolt Centre Kunthan
11	Backup rod	Supreme Enterprises or equivalent
12	Masking tape	Royal Traders or equivalent
13	Glass Wool Rock wool	U.P.Twiga Fiberglass Ltd Rocklyod Insulations
14	Spiders & Articulated Bolts Patch Fittings and Hardwares	Dorma / Geze / Kinlong
15	E board	Associated Agencies or equivalent
16	Bitumen	STP ltd or equivalent
17	Structural Steel	TATA / SAIL