TENDER FOR INTERIOR WORKS FOR "A" BLOCK, LIBRARY & CR 330 OF INDIAN INSTITUTE OF MANAGEMENT UDAIPUR

IIMU/Interior works "A" Block, Library & CR 330/2017-18/02/2

TECHNICAL SPECIFICATIONS

ARCHITECT AND PLANNERS

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TENDER FOR INTERIOR & FIXED FURNITURE WORKS FOR "A BLOCK, LIBRARY & "CR 330" IIM UDAIPUR

ITEM NO. 1. Supply & installation of wall paneling made of pinewood E1 grade fiberboard, melamine/veneer laminated finish, groove perforated L32-2 - (2mm grooves @ 32mm centers), back lined with Soundtexblack acoustical fleece, tongue-groove edge for a seamless look, 5-test fire retardant grade/ Non FR, Acoustics – NRC 0.77 (For E300* Mounting), size 128x2440x16mm, volume density of base board 800Kg/m3, 10.5Kgs/m2 (L32), installed by using Strut framework system. Slats to be backed with Synthetic PF 10x25 adhered to wall with stick .The Paneling shall be finished as per the drawings and to the satisfaction of the Engineer in Charge. All the support system shall be as per the Approved make list and the suspension system shall be got approved before starting installation at site.

1. General

The material shall be wood fiber cement composite tiles and shall be 15 mm thick of size 600X600 mm or 600 x 1200 mm as per drawing. The Tile shall have 0.9 NRC (Min) as per ISO: 354-1985 and ASTM 423-90 a, Density 500 Kg/ m3 (Min), and meets Fire Resistance Class 1(UK), weather resistance as per IS 3308, Thermal Insulation as per IS: 3346-1980 with relative humidity of 90% RH at 60^{o}Celsius (140^{o} Fahrenheit) for 15 days without any deterioration. The material shall conforms to En 131682001 and are RoHS Complaint

2. Fixing

The support system shall be made out of Gi Studs having thickness of 0.55 mm and cross section size of 50mm x 50 mm. The panel shall have linear grooves in the thickness and shall be fixed on to the GI Studs using suitable GI H profile fixed on the studs. The panels shall slide and fix into these H Profiles and shall be fixed firmly. The Wall Paneling shall have a backing of Polyfiber/ Polyester based Acoustical absorb Wool 50 mm thick having Minimum NRC of 0.60 (min) covered in Acoustical non-woven fabric and fixed to each panel with GI wires of 20 SWG. The Paneling shall be finished as per the drawings and to the satisfaction of the Engineer in Charge. All the support system shall be as per the Approved make list and the suspension system shall be got approved before starting installation at site.

3. Measurement

Measurement shall be per square meter of panel installed as per drawing.

4. Rate

Rate shall be for per square meter of panel including material,labor, tools and tackles required to complete the work as per the drawing and the satisfaction of Engineer in Charge.

ITEM NO. 2. Supply and Installation of, square edge, Mineral fiber core ceiling tiles of size 595x595x15mm having volume density 270 kg/m3, weight 4kg/m2 which is suspended by using 0.3mm thick metal grid system.

Tiles should have humidity resistance of 95% RH, NRC 0.57(For E600 Mounting), Fire Resistance Class 1(UK) as per drawing, complete with powder coated, hot dipped galvanized steel grid suspension system , as per manufacturers' specifications. The paneling shall be finished as per the drawings and to the satisfaction of the Engineer in Charge. All the support system shall be as per the Approved make list and the suspension system shall be got approved before starting installation at site.

Skelet TrelisT15 metal grid system of 600x600mm module includes Skelet WA15W30wall angle with unequal flanges of 15/19mm, length 3000mm, fixed along the perimeter of walls with thehelp of nylon sleeves and suitable fasteners at 300mm centers. Then suspend the SkeletMT15W36 MainT with flange width 15mm, height 32mm and length 3600mm, from the soffit slab with helpof soffit cleat and wire rod with leveling spring clip at 1200mm centres. Skelet CT15W12 CrossTwith flange width 15mm, height 26mm and length 1200mm is interlocked into the pre-cut slots in the MainT15 at 600mm centers in the perpendicular direction to the Main T15. Finally Skelet CT15W06CrossT with flange width 15mm, height 26mm and length 600mm are interlocked into the precut slots inthe CT15W12 CrossT in direction parallel to the Main T15 to result in 600x600mm module. SisoliSavana square edge of size 595x595x15mm shall be placed into the grid size of 600x600mm.

Technical Parameters
- Fire (Class)– 1/A
- Acoustics – NRC 0.57(For E600 Mounting)
- Thermal conductivity (W/mk)-na
- Climate (°C, RH) – 50,95
- Light (%) – 85
- Green (VoC, RC%) –Low, 63

ITEM NO. 3. Providing and fixing GI Clip in Metal Ceiling System of 600x600 mm module which includes providing and fixing 'C' wall angle of size 20x30x20mm made of 0.5mm thick pre painted steel along the perimeter of the room with help of nylon sleeves and wooden screws at 300mm center to centre, suspending the main C carrier of size 10x38x10mm made of G.I steel 0.7 mm thick from the soffit with help of soffit cleat 37x27x25x1.6 mm, rawl plugs of size 38x12 mm and C carrier suspension clip and main carrier bracket at 1000mm c/c Inverted triangle shaped Spring Tee having height of 24 mm and width of 34mm made of GI steel 0.45 mm thick is then fixed to the main 'C' carrier and in direction perpendicular to it at 600mm centers with help of suspension brackets. Wherever the main C carrier and spring T have to join, C carrier and spring T connectors have to be used. All sections to be galvanized @ 120 gms/sqm (both side inclusive) Fixing with clip intiles into spring 'T' with : GI Metal Ceiling Clip in plain Beveled edge global white color tiles of size 600x600 and 0.5mm thick with 25mm height, made of G I sheet having galvanizing of 100 gms/sqm (both sides inclusive) and 20% perforation area with 1.8mm dia holes and having NRC of 0.5, electro statically polyester powder coated of thickness 60 microns (minimum), including factory painted after bending and perforation.

Specification as per DSR

ITEM NO. 4. Providing & fixing false ceiling at all height including providing & fixing of framework made of special section, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/ Sqm (both side inclusive) as per IS : 277 and consisting of angle cleat of size 25mm wide x 1.6mm thick with flanges of 27mm and 37mm, at 1200mm c/c, one flange fixed to the ceiling with dash fastener 12.5mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25 x10 x0.50mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I channels 45 x15 x 0.90mm running at the spacing of 1200 mm c/c, to which the ceiling section 0.5mm thick bottom wedge of 80mm with tapered flanges of 26 mm each having lips of 10.5mm, at 450mm c/c, shall be fixed in a direction perpendicular to G.I intermediate channel with connecting clip made out of 2.64mm dia x 230mm long G.I wire at every junction, including fixing perimeter channels 0.50mm thick 27mm high having flanges of 20mm and 30mm long, the perimeter of ceiling fixed to wall/ partitions with the help of roll plugs at 450mm center, with 25mm long dry wall screws @ 230mm interval, including fixing of Calcium Silicate Board to ceiling section and perimeter channels with the help of dry wall screws of size 3.5 x25mm at 230mm c/c, including jointing & finishing to a flush finish of tapered and square edges of the board with recommended jointing compounds, jointing tapes, finishing with jointing compounds in three layers covering up to 150mm on both sides of joints and two coats of primer suitable for boards, all as per manufacture's specification and also including the cost of making opening for light fittings, grills, diffusers, cut outs made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in charge but excluding the cost of painting with:
(a) 12.5 mm thick tapered edge gypsum fire resistant board conforming to IS: 2095- Part I

General:

The Material shall be 12.5 mm gypsum plain board conforming to IS: 2095-Part I. The board shall be as per approved make lost.

Workmanship

The frame work is made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/Sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm center to center, one flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the spacing of 1200 mm center to center, to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm center to center, shall be fixed in a direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawlplugs at 450 mm center, with 25mm long dry wall screws @ 230 mm interval, including fixing of gypsum board to ceiling section and perimeter channel with the help of dry wall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound , jointing tapes , finishing with jointing

compound in 3 layers covering up to 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in Charge but excluding the cost of painting

Measurement & Rate:

The measurement shall be done for square meter of false ceiling installed. Rate shall be inclusive of all materials, labors, tools and tackles required to complete the work to the satisfaction of the Engineer in Charge and as per drawings.

ITEM NO. 5. Providing and supplying Steel Writing Board for writing purpose using marker pen. Medium Density Fiber (MDF) Board to be covered with electrogalvanized steel sheet conforming to IS: 277-2003(Reaffirmed 2007),Amdts.1&2, of 0.3 to 0.4 mm thickness on the front and with sheet of 0.25 mm to 0.03 mm thickness on the back side of MDF Board. Writing top surface of White Boards to receive e3 vitreous Enameled coating of 0.11 mm min thickness on top. Galvanizingon All other surfaces of Sheet steel to be of 0.03 mm min. thickness. The top surface of Writing board shall be free from waviness and shall show no scratches when HB to 3H pencils are used for writing. The surface shall show excellent eras ability when the specified writing medium is used. It should be possible to fully erase the marking of permanent marker pens using methanol, without adversely affecting the e3 vitreous coating in any manner.
The core material shall be 9 mm thick MDF board having Bulk Density of 750 kg per cubic meter and Grade-1 as per IS: 12406-2003 Edition 2.2. Both the top and the backing sheet shall be properly fixed with the MDF board using suitable adhesive with mechanical press to avoid any moisture absorption.
The Writing board will be fixed to walls with the help of suitable size Stainless steel screws and wooden/PVC rawl plugs with teak wood framingof 65 mm x 50 mm size on the periphery and 30 mm x 50 mm wide stiffeners on the backside.

1. General
The core material shall be 9 mm thick MDF board having Bulk Density of 750 kg per cubic meter and Grade-1 as per IS: 12406-2003 Edition 2.2. Both the top and the backing sheet shall be properly fixed with the MDF board using suitable adhesive with mechanical press to avoid any moisture absorption.

The Writing board will be fixed to walls with the help of suitable size Stainless steel screws and wooden/PVC rawl plugs with teak wood framing of 65 mm x 50 mm size on the periphery and 30 mm x 50 mm wide stiffeners on the backside.

2. Measurement
Surface area of white board should be measured in square meters correct to two places of decimal. Nothing extra shall be paid.

3. Rate
The rate shall include the cost of all materials and labor involved in all the operations described above. Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 6. Supply and Installation of Tack board acoustical panels, hardened square edge, FR grade NRC fabric (color choice), wrapped on encapsulated grassfire core panels made from size 600x1200x25mm, volume density 100-120Kgs/m3, weight 3.0kg/m2 installed by using Strut Impale Clip. Panels should have Acoustics – NRC 0.9 (For D50 Mounting), Fire Resistance Class 1(UK) as per manufacturer specifications. The paneling shall be finished as per the drawings and to the satisfaction of the Engineer in Charge. All the support system shall be as per the Approved make list shall be got approved before starting installation at site.

Subtex NRC acoustical panels, hardened square edge, FR grade NRCfabric (colour choice) wrapped on encapsulated glassfibre core panels of size 600x1200x25mm, volumedensity 100-120Kgs/m3, weight 3.0kg/m2 installed by using Strut Impale Clip.Strut Impale Clips are attached directly to the wall/frame work with the points extending outwardand such that the spikes are truly horizontal. The spikes are tipped with Stick S7 adhesive. Thenthe panels are positioned and pressed into place.

Technical Parameters
- Fire (Class) – 1 & P
- Acoustics – NRC 0.9 (For D50 Mounting)
- Thermal conductivity (W/mk) – 0.07
- Climate (°C, RH) – 40,90
- Light (%) – Colour dependent
- Green (VoC, RC%) – Low, 25

ITEM NO. 7. Tack Board Panel –
Supplying and fixing Tack board in line and level as per architecural drawing and as directed by engineer in charge. Tack board made of Fabric: Fine Jute Fabric of Color as approved during sampling on the front side. Thickness: of Jute Fabric 1±0.1 mm. The top surface should be smooth, finish, without any wrinkles, fungus proof, terminate proof & eye catching. The color should not fade even if the Tack board is fixed in Direct sunlight position. Soft Board: Thickness: 12.00 mm. thick Density of Soft board should be 2.5 kg/m2. Linear expansion/ contraction in range 33% to 90% RH @ 200 C: % max. 0.5. The core material is soft board. The board should be soft, resilient, light colored sheet material of approved make.Soft board with 12 mm thick beading on each side should be fixed to backside plywood with adhesive. Back Side plywood: The Backside of the Tack board to be supported with 12.00 mm thick marine plywood confirming to IS 710 of approved make. The plywood will be fixed to walls with the help of suitable size Stainless steel screws and wodden/PVC rowl plugs with teak wood support for levelling.
Tack board with plywood to be fixed to wall/partition with suitable size SS Screws or equivalent Two way adhesive tape or with adhesive in such a way that screws are not visible from the front side of Tack board as per drawing and as directed by engineer in charge.

1.0 General
Tack board made of Fabric: Fine Jute Fabric of Color as approved during sampling on the front side. Thickness: of Jute Fabric 1±0.1 mm. The top surface should be smooth, finish, without any wrinkles, fungus proof, terminate proof & eye catching. The color should not fade even if the Tack board is fixed in direct sunlight position. Soft Board: Thickness: 12.00 mm. thick Density of Soft board should be 2.5 kg/m2. Linear expansion/ contraction in range 33% to 90% RH @ 200 C: % max. 0.5. The core material

is soft board. The board should be soft, resilient, light colored sheet material of approved make. Soft board with 12 mm thick beading on each side should be fixed to backside plywood with adhesive. Back Side plywood: The Backside of the Tack board to be supported with 12.00 mm thick marine plywood confirming to IS 710 of approved make

2. Fixing

Tack board to be fixed to wall, /partition with suitable size SS Screws or 3M or equivalent two way adhesive tape in such a way that screws are not visible from the front side of Tack board

3. Measurement

Surface/usable area of boards should be measured in square meters correct to two places of decimal. Nothing extra shall be paid.

4. Rate

The rate shall include the cost of all materials and labor involved in all the operations described above. Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 8. Providing & Fixing premium quality Motor operated Roller blinds with Prestressed Micro-Aerated Solar protection fabric of high tenacity Polyester Yarn with PVC Coating &Fungistatic Treatment and should block the light flux & offer elimination of glare and sunlight.

Fabric for the Blinds: Composition: 40% Polyester / 60% PVC, Weight: 400 g/m2 (+/-5%), Thickness: 0.45 mm (+/-5%), Fabric Openess Factor: 4%, Tensile Strength (Warp/Weft): 220/220 daN / 5cm, Tearing Strength (Warp/Weft): 30/25 daN, Fire Retardancy: M2 (NFP92-507)-

The roller mechanism operate with Control unit is made of high strength reinforced plastic. The clutch is of wrap spring design. High carbon steel springs are provided to transmit motion from driving to driven members of clutch mechanism. Clutch is operated directionally by the use of Remote Transmission Service type Motor with Remote control. Clutch never needs any adjustment. The Idler is of high strength reinforced plastic, consisting of a center shaft. The idler is mounted on the heavy quality bracket (to take the load of Blinds, Idler and the Motor Mechanism) by using a plastic lock. The metal sleeve inside the plastic lock provides bearing surface for the center shaft, which rotates freely, providing smooth, quiet and long wearing operation in a roller tube of 32mm (OD) (depending upon the size) aluminum extruded grooved tube made of alloy T6063 weighing 0.27kg/m. Control unit and Idler are fixed to the either ends of the tube comprising Roller Headrail which is made of aluminum extruded rail Power coated in white. Control unit and Idler are mounted on the Head rail with powder coated M.S. brackets the fabric of the blind is fitted to the tube with heavy duty adhesive tape. Bottom rail is an aluminum extruded rail with a groove for fixing the fabric and powder coated in white. It is fixed to the bottom of the fabric and the purpose of it is, to keep the fabric in tension and straight. The fabric is fitted to the tube using plastic insert. The end caps of the tube are ABS. The size of rail shall be 21mm (OD) made of Alloy HE 9 WP weighing 0.17kg/m. The fabric shall be attached to the roller tube with high quality self-adhesive tape. Operational action shall be smooth and up to the satisfaction of the Architects.

Motor for the motorized Operation of the blinds to confirm the following requirements: Rated Torque 6NM, RPM 28, Protection IP 44 and above, Rated Voltage 230 mm with suitable Remote to operate up to 4 nos. Motorized blind in a single room

Scope:
The item shall be executed as per the item description. All the materials used shall be as per the approved make list. Each Curtain shall be provided with individual motor.

Measurement
Surface area of blinds should be measured in square meters correct to two places of decimal. Nothing extra shall be paid. Cost shall include all the accessories required to operate the blinds. All the motors shall have individual control remote.

Rate
The rate shall include the cost of all materials and labor involved in all the operations described above.
Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 9. Providing & Fixing premium quality Manually operated Roller blinds with Prestressed Micro-Aerated Solar protection fabric of high tenacity Polyester Yarn with PVC Coating &Fungistatic Treatment and should block the light flux & offer elimination of glare and sunlight.
Fabric for Blinds: Composition: 40% Polyester / 60% PVC, Weight:400 g/m2 (+/-5%), Thickness:0.45 mm (+/-5%), Fabric Openess Factor: 4% , Tensile Strength (Warp/Weft): 220/220 daN / 5cm, Tearing Strength (Warp/Weft): 30/25 daN, Fire Retardancy:M2 (NFP92-507)- Roller Tube shall be of extruded Aluminum alloy 38mm O.D (or as per system dimension) with a minimum wall thickness of 1.0mm duly anodized for long life. Clutch shall be wrap spring design with high strength fiberglass reinforced polyester assembly and high carbon steel springs to transmit motion from driving to driven members of clutch mechanism. Clutch shall operate directionally with the use of an endless beaded chain. Clutch mechanism shall be crash proof, prevent slippage and shall raise and lower smoothly to any desired height. Clutch shall never need adjustment. Idler shall be of high strength fiberglass reinforced polyester,consisting of an outside sleeve and center shaft. Sleeve shall provide bearing surface for roller tube and rotate freely on center shaft, providing smooth, quiet and long wearing operation. Brackets shall be of tomised steel powdercoated to give superior finish. Bracket shall accommodateoverhead, side or face mounting with clutch assembly on either end of the roller.Bottom of the blind shall be provided with aluminium tube powder coated in a colour matching to the fabric. The fabric shall be enclosed in the suitably created pocket along with the tube. The tube shall be closed from sides with end caps to give a neat look.

Scope:
The item shall be executed as per the item description. All the materials used shall be as per the approved make list. Each Curtain shall be provided with individual control rope.

Measurement
Surface area of blinds should be measured in square meters correct to two places of decimal. Nothing extra shall be paid. Cost shall include all the accessories required to operate the blinds.

Rate
The rate shall include the cost of all materials and labour involved in all the operations described above.
Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 10. Supply and Installation of wooden Acoustical doors with necessary hardwares of the following specification and as per the final drawings. The door frame shall be of hard wood of size 150 mm x 75 mm, including making necessary grooves for fixing of hollow bulb type EPDM Gasket on the rebates. The frame of shutter shall be made of hardwood stiles and top & bottom rails of size 60 mm and core made of lock rail of 100 mm wide and 30 mm thick. The core of the door shytter shall be filled with resin bonded rockwool of a minimum density of 64 kg/cum and a 3 mm thick sound damping layer. Face panels shall be 12 mm thick BWP ply confirming to IS 770 on both sides of the core of the shutter. Both the faces shall be finished with 4 mm thick birch ply bonded to the surface of the ply using high strength cross linked PVAC based adhesive. The door assemby shall be fixed to the door frame with heavy duty stainless steel hardwares like SS hinge with 4 ball bearing, SS door handle 300mm C shaped, SS Tower Bolt 300 mm and Mortice lock with lock body, door clauser, C shaped round bar handle and Pin cylinder lock with 6 pin mechanism and one side key and one side knob. The rate shall be inclusive of all tools and tackles and completing the work to the satisfaction of the Engineer-In-Charge.

1.0 General

The Acoustical door shall be factory fabricated as per the item description. All the materials and accessories used in the door shall be as per the Approved make List.

2.0 Material

The door frame shall be of hard wood of size 150 mm x 75 mm, including making necessary grooves for fixing of hollow bulb type EPDM Gasket on the rebates. The frame of shutter shall be made of hardwood stiles and top & bottom rails of size 60 mm and core made of lock rail of 100 mm wide and 30 mm thick. The core of the door shutter shall be filled with resin bonded rockwool of a minimum density of 64 kg/cum and a 3 mm thick sound damping layer. Face panels shall be 12 mm thick BWP ply confirming to IS 770 on both sides of the core of the shutter. Both the faces shall be finished with 4 mm thick brich ply bonded to the surface of the ply using high strength cross linked PVAC based adhesive.

3.0 Workmanship

The door shall be manufactured as per standards and approved drawings are factory. The exact dimension of the door shall be measured at site as per the civil construction and the size of the door should be decided accordingly. The Frame shall be fixed first in line and level and then The door assembly shall be fixed to the door frame with heavy duty stainless steel hardwares like SS hinge with 4 ball bearing, Each door leaf to be fixed with 4 nos SS hinges. The door shall also be provided with SS door handle 300mm C shaped, SS Tower Bolt 300 mm and Mortice lock with lock body, C shaped round bar handle and Pin cylinder lock with 6 pin mechanism and one side key and one side knob, and door closer also be provide . All these items shall be included in the cost of the door.

4.0 Measurement and Rates

Measurement shall be done in Per Square Meter. The rate shall include all the materials of the door including SS hinges, C shaped handles, SS tower bolt, Mortice lock body, c shaped round bar handle and pin cylinder lock.

ITEM NO. 11. Providing and fixing partition wall, comprising 12.5 mm + 12.5 mm thick (Total 25mm thick) Gypsum Board fixed on both side, fixed on GI framework. GI framework to comprise of 72mm floor and ceiling channels (0.55mm thick having equal flanges of 32mm made of GI steel), 70mm vertical studs (0.55mm) thick having one flange of 34mm and another flange 36mm made of GI steel), placed at 610 c/c (Sections 72C55 and 70S55 of Saint Gobain) to be fixed to floor and roof slab or under window frame by 6mm dia screws and expansion fasteners at 300mm c/c. The joints of Gypsum Board to be over the GI frames only and to be screwed at maximum 300mm c/c to the frame . All joints between the boards to be taped and paper tape and filled with jointing compound so as to provide a smooth surface which can receive Painting coats directly without application of putty.
Providing & fixing 50 mm thk resin bonded glass wool (48 kg/m3 density) packed in to Polythene bags in cavity held on 28Gx12, GI wire netting. Entire work to be done as per drawings, and as per direction of engineer-in-charge.

General
Partition wall, comprising 12.5 mm + 12.5 mm thick (Total 25mm thick) Gypsum Board fixed on both side, fixed on GI framework. GI framework to comprise of 72mm floor and ceiling channels (0.55mm thick having equal flanges of 32mm made of GI steel), 70mm vertical studs (0.55mm) thick having one flange of 34mm and another flange 36mm made of GI steel), placed at 610 c/c (Sections 72C55 and 70S55 of Saint Gobain) to be fixed to floor and roof slab or under window frame by 6mm dia screws and expansion fasteners at 300mm c/c. The joints of Gypsum Board to be over the GI frames only and to be screwed at maximum 300mm c/c to the frame . All joints between the boards to be taped and paper tape and filled with jointing compound so as to provide a smooth surface which can receive Painting coats directly without application of putty.Providing & fixing 50 mm thk resin bonded glass wool (48 kg/m3 density) packed in to Polythene bags in cavity held on 28Gx12, GI wire netting.

Material
The material shall conform to IS: 2849.
Laying
(i) Panels are stored in a dry place and water should not come in contact with panels during or after construction. If the panels get wet, they should be dried before use.
(ii) The floor should be perfectly level before laying the first course. All panels must be properly aligned to the plumb. Successive layer of panels must be alternatively staggered so that vertical joints are not in the same line.
(iii) The recommended quantity of Gypsum Bonding Plaster must be used for joints and filling the grooves made for conduits, pipelines, etc. Excess Bonding Plaster must be scooped and removed, so that the joints and the places where the grooves are filled in are flush and even.
(iv) The walls should be dry and sanding done properly especially at joints before the primer is applied so that the surface is even and joints will not be visible after painting. Avoid chasing with chisel and hammer. Use electrical saw or grooving tools for conduting etc.

(v) The recommended span of walls is maximum 6 meters and maximum height is 4.5 meters.
(vi) Gypsum panel can easily be cut with coarse tooth hand saw, electric jigsaw, etc. The panels can be cut, sawn, drilled, milled or dowelled on the job. For concealed piping and conduit, the depth of groove should not exceed 50 mm. Hammer and chisel techniques to form chases must be avoided.
(vii) Sanding: This application is to make the surface level without undulations. To make the gypsum wall surface level (in particular at joints, where there is excess bonding plaster), do sanding with sand paper at joints and other places, wherever you find uneven surface, otherwise joints will be visible after painting. It is important to sand all joints uniformly.

Measurements
The length and height shall be measured correct to a cm. Area shall be calculated in square meters correct to two place of decimal. No deduction shall be made for ducts, opening made from the standard size of panel.

Rate
The rate shall include the cost of materials and labour involved in all the operations described above.

Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 12. Providing and fixing partition wall, comprising 12.5 mm + 12.5 mm thick (Total 25mm thick) Gypsum Board fixed on one side, fixed on GI framework. GI framework to comprise of 72mm floor and ceiling channels (0.55mm thick having equal flanges of 32mm made of GI steel), 70mm vertical studs (0.55mm) thick having one flange of 34mm and another flange 36mm made of GI steel), placed at 610 c/c (Sections 72C55 and 70S55 of Saint Gobain) to be fixed to floor and roof slab or under window frame by 6mm dia screws and expansion fasteners at 300mm c/c. The joints of Gypsum Board to be over the GI frames only and to be screwed at maximum 300mm c/c to the frame . All joints between the boards to be taped and paper tape and filled with jointing compound so as to provide a smooth surface which can receive Painting coats directly without application of putty.
Providing & fixing 50 mm thk resin bonded glass wool (48 kg/m3 density) packed in to Polythene bags in cavity held on 28Gx12, GI wire netting. Entire work to be done as per drawings, and as per direction of engineer-in-charge.

General
Partition wall, comprising 12.5 mm + 12.5 mm thick (Total 25mm thick) Gypsum Board fixed on one side, fixed on GI framework. GI framework to comprise of 72mm floor and ceiling channels (0.55mm thick having equal flanges of 32mm made of GI steel), 70mm vertical studs (0.55mm) thick having one flange of 34mm and another flange 36mm made of GI steel), placed at 610 c/c (Sections 72C55 and 70S55 of Saint Gobain) to be fixed to floor and roof slab or under window frame by 6mm dia screws and expansion fasteners at 300mm c/c. The joints of Gypsum Board to be over the GI frames only and to be screwed at maximum 300mm c/c to the frame . All joints between the boards to be taped and

paper tape and filled with jointing compound so as to provide a smooth surface which can receive Painting coats directly without application of putty. Providing & fixing 50 mm thk resin bonded glass wool (48 kg/m3 density) packed in to Polythene bags in cavity held on 28Gx12, GI wire netting.

Material

The material shall conform to IS: 2849.

Laying

(i) Panels are stored in a dry place and water should not come in contact with panels during or after construction. If the panels get wet, they should be dried before use.

(ii) The floor should be perfectly level before laying the first course. All panels must be properly aligned to the plumb. Successive layer of panels must be alternatively staggered so that vertical joints are not in the same line.

(iii) The recommended quantity of Gypsum Bonding Plaster must be used for joints and filling the grooves made for conduits, pipelines, etc. Excess Bonding Plaster must be scooped and removed, so that the joints and the places where the grooves are filled in are flush and even.

(iv) The walls should be dry and sanding done properly especially at joints before the primer is applied so that the surface is even and joints will not be visible after painting. Avoid chasing with chisel and hammer. Use electrical saw or grooving tools for conduting etc.

(v) The recommended span of walls is maximum 6 meters and maximum height is 4.5 meters.

(vi) Gypsum panel can easily be cut with coarse tooth hand saw, electric jigsaw, etc. The panels can be cut, sawn, drilled, milled or dowelled on the job. For concealed piping and conduit, the depth of groove should not exceed 50 mm. Hammer and chisel techniques to form chases must be avoided.

(vii) Sanding: This application is to make the surface level without undulations. To make the gypsum wall surface level (in particular at joints, where there is excess bonding plaster), do sanding with sand paper at joints and other places, wherever you find uneven surface, otherwise joints will be visible after painting. It is important to sand all joints uniformly.

Measurements

The length and height shall be measured correct to a cm. Area shall be calculated in square meters correct to two place of decimal. No deduction shall be made for ducts, opening made from the standard size of panel.

Rate

The rate shall include the cost of materials and labour involved in all the operations described above.

Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 13. Providing and fixing partition wall, comprising 12 mm + 12 mm thick (Total 24mm thick) plywood confirming to IS 710 including 25 mm thk resin bonded glass wool (48 kg/m3 density) packed in to Polythene bags in cavity held on 28Gx12, GI wire netting fixed on both side, fixed with wooden frame of 50x50 mm second class teak wood, placed along the walls, ceiling and floor in a grid pattern with spacing maximum @ 60 cm centre to centre both ways (vertically & horizontally) or at required spacing near opening, with necessary welding at junctions and fixing the frame to wall/

ceiling/ floors with dash fasteners of 8 mm dia, 75 mm long bol,including all as per drawings, and as per direction of engineer-in-charge.

General

Partition wall, comprising 12 mm + 12 mm thick (Total 24mm thick) plywood confirming to IS 710 including 25 mm thk resin bonded glass wool (48 kg/m3 density) packed in to Polythene bags in cavity held on 28Gx12, GI wire netting fixed on both side, fixed with wooden frame of 50x50 mm second class teak wood, placed along the walls, ceiling and floor in a grid pattern with spacing maximum @ 60 cm centre to centre both ways (vertically & horizontally) or at required spacing near opening, with necessary welding at junctions and fixing the frame to wall/ ceiling/ floors with dash fasteners of 8 mm dia, 75 mm long bolt.

Material

The material shall conform to IS: 2849.

Laying

(i) Panels are stored in a dry place and water should not come in contact with panels during or after construction. If the panels get wet, they should be dried before use.

(ii) The floor should be perfectly level before laying the first course. All panels must be properly aligned to the plumb. Successive layer of panels must be alternatively staggered so that vertical joints are not in the same line.

(iii) The recommended quantity of Gypsum Bonding Plaster must be used for joints and filling the grooves made for conduits, pipelines, etc. Excess Bonding Plaster must be scooped and removed, so that the joints and the places where the grooves are filled in are flush and even.

(iv) The walls should be dry and sanding done properly especially at joints before the primer is applied so that the surface is even and joints will not be visible after painting. Avoid chasing with chisel and hammer. Use electrical saw or grooving tools for conduting etc.

(v) The recommended span of walls is maximum 6 meters and maximum height is 4.5 meters.

(vi) Gypsum panel can easily be cut with coarse tooth hand saw, electric jigsaw, etc. The panels can be cut, sawn, drilled, milled or dowelled on the job. For concealed piping and conduit, the depth of groove should not exceed 50 mm. Hammer and chisel techniques to form chases must be avoided.

(vii) Sanding: This application is to make the surface level without undulations. To make the gypsum wall surface level (in particular at joints, where there is excess bonding plaster), do sanding with sand paper at joints and other places, wherever you find uneven surface, otherwise joints will be visible after painting. It is important to sand all joints uniformly.

Measurements

The length and height shall be measured correct to a cm. Area shall be calculated in square meters correct to two place of decimal. No deduction shall be made for ducts, opening made from the standard size of panel.

Rate

The rate shall include the cost of materials and labour involved in all the operations described above.

Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 14. Provoding and fixing wooden frame work for partitions/ wall lining etc. made of 50x50 mm second class teak wood, placed along the walls, ceiling and floor in a grid pattern with spacing maximum @ 60 cm centre to centre both ways (vertically & horizontally) or at required spacing near opening, with necessary welding at junctions and fixing the frame to wall/ ceiling/ floors with dash fasteners of 8 mm dia, 75 mm long bolt, including making provision for openings etc.,For fixing marine plywood {paid separately in respective item) including all as per direction of engineer in charge and as directed.

(a) : Second class teak wood
Measurement to be done in Sqm.
Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 15. Providing and fixing 5 mm thick mirror of superior glass (of approved quality) and of required shape and size fixed with teakwood beading or with adhesive or with two way tape (3M or equvivalent Quality) on to backing Ply wood (paid seperately)and fixed to wall/partition with wooden cleats with C.P. brass screws and washers complete.

Length and breadth of superficial area of the finished work shall be measured correct to a cm. Area shall be calculated in square meter correct to two places of decimal.

Rate
The rate shall include the cost of all materials and labour involved in all the operations described above.

ITEM NO. 16. Providing and fixing cut to size 5.5 mm thick toughned glass fixed with second class teak wooden bedding 12x12 mm including the cost of wooden beadings , glass and necessary cutting finishing as per drawing and as directed by Engineer-in-charge.

1 The relevant specification shall be followed as per general item of glass. Theglass to be used shall be 5.5 mm thick toughened plain float glass.
2 Measurement
The height and width of glass for partition/door/window units as fixed in placeshall be measured correct to one centimeter and area calculated in sqm. Correctto second place of decimal shall be taken for payment.
3 Rate

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

ITEM NO. 17. Providing and fixing 25 mm thick calibrated BWP plywood confirming to IS 710 as per approved drawings and as per direction of engineer in charge, for wardrobes, cabinets, wooden panelling, partitions, glass fixing patta, fixed benches, modesty panels etc.

Relevant specifications shall be followed as per item number 18 blow. Rate shall be for per Square meter.

ITEM NO. 18. Providing and fixing 18 mm thick calibrated BWP plywood confirming to IS 710 as per approved drawings and as per direction of engineer in charge, for wardrobes, cabinets, wooden panelling, partitions, glass fixing patta, fixed benches, modesty panels etc.

1 Installation
The wooden frame, Wardrobe, Cabinets in kitchen and bath rooms, Paneling, Benches, Modesty Panels, and wooden partitions shall be fixed as per nomenclature of the item, as per the detailed drawings and directions of Engineer-in-Charge.

2 Jointing & Finishing
Joints of the boards are finished with specially formulated Jointing compound and fiber tape to provide seamless finish. Board surface can be decorated with any type of paint, wall paper, wood veneer & hard laminates. Services should be incorporated before commencement of board fixing.

3 Fitting and Fixtures
It is easy and simple to attach different fittings to wall paneling boards. Inclined nails can be fixed to the boards itself for light materials. For heavier materials the fastening should be centered on internal stud work or steel or wood frame behind the boards, fixed before
boarding. Services should be incorporated before commencement of board fixing.

4 Tolerance
Tolerance in dimensions shall be + 5 mm.

5 Measurements
Length and breadth of superficial area of the finished work shall be measured correct to a cm. Area shall be calculated in square meter correct to two places of decimal. No deduction will be made of openings of areas up to 0.40 sqm nor shall extra payment be made either for any extra material or labour involved in forming such openings. For openings exceeding 0.40 sqm. In area, deduction in measurements shall be made but extra will be payable for any extra material or labour involved in making such openings.

6 Rate
The rate shall include the cost of all materials and labour involved in all the operations described above.

ITEM NO. 19. Providing Providing and fixing 12 mm thick calibrated BWP plywood confirming to IS 710 as per approved drawings and as per direction of engineer in charge, for wardrobes, cabinets, wooden panelling, partitions, glass fixing patta, fixed benches, modesty panels etc.

Relevant specifications shall be followed as per item number 18 above. Rate shall be for per Square meter.

ITEM NO. 20. Providing and fixing 8 mm thick calibrated BWP plywood confirming to IS 710 as per approved drawings and as per direction of engineer in charge, for wardrobes, cabinets, wooden panelling, partitions, glass fixing patta, fixed benches, modesty panels etc.

Relevant specifications shall be followed as per item number 18 above. Rate shall be for per Square meter.

ITEM NO. 21. Providing and fixing 6 mm thick calibrated BWP plywood confirming to IS 710 as per approved drawings and as per direction of engineer in charge, for wardrobes, cabinets, wooden panelling, partitions, glass fixing patta, fixed benches, modesty panels etc.

Relevant specifications shall be followed as per item number 18 above. Rate shall be for per Square meter.

ITEM NO. 22. Providing and fixing PVC/ABS edge beading 2 mm thick as per approved drawings and as per direction of engineer in charge for various thickness of plywood for wardrobes, cabinets, partitions etc.

The PVC/ABS edge beading shall be 2 mm thick and the width shall as per the plywood thickness. The material shall be of approved make and shall be fixed on to the edges using adhesive of approved make.
Rate shall be of per running meter of edge beading installed as per drawing.

ITEM NO. 23. Providing &fixing wooden band made from 12 mm thick marine plywood conforming to IS: 710 finishing with 4 mm thick birch ply (paid separately) and back side supporting second class teakwood patti 47 X 47 mm top and bottom as per architectural drawing and as directed by engineer- in- charge

1. General
All the items to be used shall be as per the approved make list. The wooden patta shall be done at site as per the item description and the good for construction drawings. The work shall include all the items mentioned in the item description.

2. Measurement and Rates

Measurement shall be per square meter of the patta. The rate shall be inclusive of all materials, labour, tools and tackles required to complete the work as per the drawings and to the satisfaction of the Engineer in Charge.

ITEM NO. 24. Providing &fixing wooden band made from exterior Grade-I MDF Board 18 mm thick confirming to IS:14587 and back side supporting second class teakwood patti 35x35 mm top and bottom as per architectural drawing and as directed by engineer- in- charge

1. General

All the items to be used shall be as per the approved make list. The wooden band shall be done at site as per the item description and the good for construction drawings. The work shall include all the items mentioned in the item description.

2. Measurement and Rates

Measurement shall be per square meter of the band. The rate shall be inclusive of all materials, labour, tools and tackles required to complete the work as per the drawings and to the satisfaction of the Engineer in Charge.

ITEM NO. 25. Providing & fixing C shaped pelmet made from 18 mm thick marine plywood conforming to IS: 710 finishing frontside and top with 4 mm thick birch ply (paid separately) and back side supporting to wall including all complete as per architectural drawing and as directed by engineer- in- charge.

1. General

All the items to be used shall be as per the approved make list. The C shape pelmet shall be done at site as per the item description and the good for construction drawings. The work shall include all the items mentioned in the item description.

2. Measurement and Rates

Measurement shall be per square meter of the pelmet. The rate shall be inclusive of all materials, labour, tools and tackles required to complete the work as per the drawings and to the satisfaction of the Engineer in Charge.

ITEM NO. 26. Providing & Fixing decorative high pressure laminated sheet of plain / wood grain in gloss / matt / suede finish with high density protective surface layer and reverse side of adhesive bonding quality conforming to IS : 2046 Type S, including cost of adhesive of approved quality.

(a) 1.0 mm thick on one side only

1 Scope:
Decorative thermosetting synthetic resin bonded laminated sheets shall generally conform to IS 2046. This material is intended for interior use and is not intended for load bearing applications.

2 Terminology:
For the purpose of this standard, the definition given under para 2 of IS 1998 shall apply.

3 Types:
Having only one side bearing decorative surface the other side being roughened or given an appropriate treatment to promote adhesion to the base. This type shall generally be used, unless specified otherwise.

4 Requirements
(i) Appearance: The types of surface finish of decorative and reverse side, edge finish, colour and pattern shall be as agreed to between the purchaser and the supplier. The sheets shall be reasonably free from local deformation.
Note : Since sheets may vary slightly in colour and appearance, it is recommended that sheets for any one scheme may be matched.
(ii) Flatness : For nominal thickness upto 1.5 mm – when a sheet is tested for flatness in accordance with the method given in Appendix –C of IS 2046, the height above the flat surface at the edge of full manufactured and trimmed width shall nowhere exceed 150 mm.
(iii) Tolerance to nominal thickness: The departure from nominal thickness of sheet at any point, shall not exceed the value given below:
Nominal Thickness Tolerance Upton 1.5 mm + 0.25 mm
(iv) Straightness of edges of rectangular finished panels, resistance to dry heat, resistance to boiling water, resistance to staining, gross breaking strength, packing and marking, sampling and criteria for conformity etc. shall be as per IS 2046. Relevant specifications of paneling shall be followed as specified and fixed to flush door as per drawing and as directed by engineer in charge.

5 Measurement:
The decorative high pressure laminated sheet of plain / wood grain in gloss / matt / suede finish as describe in item shall be measured in square meter.

6 Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above.

ITEM NO. 27. Providing & Fixing decorative high pressure laminated sheet of plain / wood grain in gloss / matt / suede finish with high density protective surface layer and reverse side of adhesive bonding quality conforming to IS : 2046 Type S, including cost of adhesive of approved quality.

a) 0.8 mm thick on one side only

Relevant specifications shall be followed as per item number 17 except that laminate shall be 0.8 mm thick. Rate shall be for per Square meter installed as per specifications.

ITEM NO. 28. Providing and fixing 6 mm thick calibrated birch plywood with each core of birch, birch face veneer of BB grade , density(700-750)kg/m3; water resistant WBP grade; E1 class of formaldehyde emission ; humidity of 5-10%; ultimate sheering strength1.5Mpa; in both long and cross grain direction of approved colour, texture sample as approved and as per direction of engineer in charge.

The brich ply shall be 6 mm thick and shall be of approved make, color and texture. The brich ply shall be fixed on to the ply as per the drawing with suitable adhesive as per approved make list.
The measurement shall be for per Square meter of brich ply installed as per the drawings and to the satisfaction of Engineer in Charge.
Rate shall be inclusive of all the material, labour, tools and tackles required to complete the work as per the item.

ITEM NO. 29. Providing and fixing 4 mm thick calibrated birch plywood with each core of birch, birch face veneer of BB grade , density(700-750)kg/m3; water resistant WBP grade; E1 class of formaldehyde emission ; humidity of 5-10%; ultimate sheering strength1.5Mpa; in both long and cross grain direction of approved colour, texture sample as approved and as per direction of engineer in charge.

The brich ply shall be 4 mm thick and shall be of approved make, color and texture. The brich ply shall be fixed on to the ply as per the drawing with suitable adhesive as per approved make list.
The measurement shall be for per Square meter of brich ply installed as per the drawings and to the satisfaction of Engineer in Charge.
Rate shall be inclusive of all the material, labour, tools and tackles required to complete the work as per the item.

ITEM NO. 30. Provoding and fixing Wooden Grill made from second class teak wooden louwerspatti 40 x12 mm at centre to centre distance of 40 mm fixed to 50x20 mm wooden frame as per approved drawing and as directed by engineer in charge.

ITEM NO. 31. Providing and fixing of wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length
(a) : Second class teak wood.

Specification as per DSR

ITEM NO. 32. Providing and fixing panelled or panelled and glazed shutters for doors, windows and clerestory windows, including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws, excluding panelling which will be paid for separately, all complete as per direction of Engineer-in-charge.

(a) : Second class teak wood 35 mm thick shutters

Specification as per DSR

ITEM NO. 33. Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured). Panelling for panelled or panelled and glazed shutters 25 mm to 40 mm thick :

Specification as per DSR

ITEM NO. 34. Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters, lipping with 2nd class teak wood battens 25 mm minimum depth on all edges of flush door shutters :
(a) : 35 mm thick excluding ISI marked Stainless Steel butt hinges with necessary screws

Specification as per DSR

ITEM NO. 35. Providing and fixing aluminium extruded section body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight unto 36 kg to 80 kg and door width from 701 mm to 1000 mm), with double speed adjustment with necessary accessories and screws etc. complete.

Specification as per DSR

ITEM NO. 36. Providing & Fixing S.S. 316 Grade Fire resistance BSEN 1634:1:2000 Certified & Mechanically tested BSEN 1935:2002 Satin Finish S.S. 316 Grade 4 ball bearings Hinges approximate size 102mm X 76mm X 3 mm minimum Weight 260 grm of approved make with AISI 316 Grade ball Bearing S.S. Pin, Cap, and with necessary S.S. Self Tapping Phillips Cross Head Screws etc. complete as specified as per drawing and as directed by engineer-in -charge.

Butt Hinges
These shall be of the following types according to the material used.

(a) Stainless steel 316 grade butt hinges.
Stainless steel 316 grade butt hinges: These shall be manufactured from S.S. 316 sheet as per specified thickness.

These shall be well made and shall be free from flaws and defects of all kinds. All hinges shall be cut

clean and square and all sharp edges and corners shall be removed. These shall generally conform to IS 12817.

Hinge Pin: Hinge pin shall be made of mild steel wire. It shall fit inside the knuckles firmly and riveted head shall be well formed so as not to allow any play or shake, and shall allow easy movement of the hinge, but shall not cause looseness.

Knuckles: The number of knuckles in the hinges of different sizes shall be as per IS 12817. The size of knuckles shall be straight and at right angle to the flap. The movement of the hinges shall be free and easy and working shall not have any play or shake.

Screw Holes: The screw holes shall be clean and counter sunk. These shall be suitable for countersunk head wood screws and of the specified size for different types, and sizes of hinges. The size of the holes shall be such that when it is counter sunk it shall be able to accommodate the full depth of counter sunk head of the wood screws. The nos. of screw holes shall as specified in IS 12817.

Sampling and Criteria for Conformity: The number of butt hinges to be selected from a lot shall be depend on size of lot and shall be in accordance with Table
9.11 below. Butt hinges for testing shall be selected at random from at least 10 per cent of the randomly selected packages subjected to minimum of three equal number of hinges being selected from each package. All butt hinges selected shall be checked for dimensions and tolerance requirements. Defects in manufacture and finish shall also be checked and lot shall be considered conforming to the requirement of this specifications, if the number of defective hinges among those tested does not exceed the corresponding number given in Table 9.11.

TABLE 9.11Scale of Sampling and Criteria for Conformity

SR. No.	Lot size	Sample Size	Permissible No. of Defective hinges
1	2	3	4
1.	Upton 150	5	0
2.	151 to 300	20	1
3.	301 to 500	32	2
4.	501 to 1000	50	3
5.	1001 and above	80	5

Sampling and Criteria for Conformity: The number of butt hinges to be selected from a lot shall depend on the size of lot and shall be in accordance with Table 9.12. Butt hinges for testing shall be taken at

random from at least 10 per cent of the package subject to a minimum of three, equal number of hinges being selected from each package. All butt hinges selected from the lot shall be checked for dimensional and tolerance requirements. Defects in manufacture and finish shall also be checked. A lot shall be considered conforming to the requirements of this specification if the number of defective hinges among those tested does not exceed the corresponding number given in Table 9.12.

TABLE 9.12 Scale of Sampling and Criteria for Conformity

Sl. No.	Lot size	Sample	Permissible No. of
		size	defective hinges
1	Upton 200	15	0
2	201 to 300	20	1
3	301 to 500	30	2
4	501 to 800	40	2
5	801 and above	55	3

Note: Any hinge which fails to satisfy the requirements of any one or more of the characteristics shall be considered as defective hinge.

Rate

Rate includes the cost of materials and labour involved in all the operations described above. The framework and paneling of each type or glazed panels shall be paid separately. The rate for framework includes the cost of hinges and necessary screws as specified description. However, extra shall be paid for providing moulded beading where specified. Nothing extra shall be paid for plain beading.

ITEM NO. 37. Providing & Fixing S.S. 304 Grade Stainless Steel Satin Finish Round Tower bolt of overall length (excluding Bracket) 300 mm and inner bolt of dia meter 12mm and outer barrel dia meter 16 mm, minimum weight 430 grm. of approved make with necessary Nickel Plated Screws complete as per specified as per drawing and directed by Engineer in charge.

Fitting shall be of stainless steel SS 316 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of chromium plated brass screws or stainless steel screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in-Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sunking of hinges.

Towerboltsshallbewell
madeandshallbefreefromdefects.Theboltsshallbefinishedtothecorrectshapeandshallhavea smoothaction.Alltowerboltsmadewithsheetof1.2mmthicknessandaboveshallhavecountersunk screwholestosuitcountersunkheadofwoodscrews.Allsharpedgesandcornersshallberemoved andfinishedsmooth.

Theheightofknoboftowerboltwhenthedoor,windowetc.isinclosedpositionfromthefloorlevel shallbenotmorethan1.9metre.

Theknobsofstainless steel towerboltsshallbecastandtheboltfixedwithknob,steelspringandball shallbeprovidedbetweentheboltandthebarrel.

SamplingandCriteriaforConformity:Itshallbesameasspecifiedinabove.

The Stainless steel towerboltsas per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The Stainless steel towerboltsas describe in item shallbemeasuredinnumbers.

Rate:
Therateshallincludethecostofallmaterialsandlabourinvolvedinalltheoperationsdescribed above

ITEM NO. 38. Providing & Fixing Satin Finish Brass Parliamentary Hinges with the Size of 100 X 75 X 4 mm of approved make with necessary fixing screws as specified as per drawing & as directed by engineer-in-charge.

ITEM NO. 39. Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified & mechanically tested BSEN 1906:2010 Pair of AISI S.S. 316 Grade Satin Finish hollow Pipe or solid design Mortise Handle with the minimum weight 930 grm with S.S. 316 Grade euro profile escutcheons key hole for Mortise

Pin Cylinder, high grade brass bushing for extra fixing strength for intensive use of door with back to back fixing screws system. of approved make with both side active mortise handle and spindle, High Quality Stainless Steel Wood Screws (8 PCS.) for minimum door thickness 30 mm as per drawing and as directed by engineer in charge. The Inner and Outer Rose of Mortise handle and Escutcheons must be of AISI 316 grade only.

The relevant specification shall be followed as per above mentioned item of mortise handle except that the weight of the handle shall be 930 gm. The Stainless steel Mortise Handle as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The Mortise handle as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labor involved in all the operations described above.

ITEM NO. 40. Providing & Fixing Satin Finish Double Door Lock body , 26 mm brass latch. 52 mm lock with Back Set centre of approximate size 85 X 45 mm, of approved make, minimum Weight 0.880 grmsuitable for minimum 30 mm thick Double Door Shutter with necessary fixing screw as specified as per drawing and as per directed by engineer in charge.

The Stainless steel Latch and lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The latch and lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

ITEM NO. 41. Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified Satin Finish Mortise Lock body approximate size of back set 45 mm X 85 mm, with 52 mm Lock and 26 mm brass latch , Stainless steel main & Strike plate & including back to back fixing feature suitable for minimum door thickness 30 mm Single door shutter with necessary fixing screw as per specified as per directed by engineer in charge.

The Stainless Latch and lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The latch and lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

ITEM NO. 42. Providing & Fixing Satin Finish 6 pin Mechanism, high Quality brass body Mortise Pin Cylinder with 5 high accuracy Computerized Dotted keys of approved make one side key & one side knob suitable for minimum door thickness 30 mm with necessary Fixing Screw as specified and as per drawing and as per directed by engineer in charge.

The Cylinder lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

This is a Cylinder lock having a single spring bolt withdrawn from the outside by using the key and from

inside by Knob with an arrangement.

Measurement:
The Cylinder lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

ITEM NO. 43. Providing & Fixing Satin Finish S.S. Door Magnet length of 75 mm of approved make, minimum Weight 150 grm with necessary nickel plated screw complete, as specified, as per drawing and as directed by engineer in charge.

Fitting shall be of stainless steel SS 316 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.
Screws used for fittings shall be of chromium plated brass screws or stainless steel screws.
Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in-Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sinking of hinges.

This shall be made of cast brass of overall size as specified and shall have rubber cushion. The shape and pattern of stopper shall be approved by the Engineer-in-Charge. It shall be of brass finished bright, chromium plated or oxidized or as specified. The size of magnetic door stopper shall be determined by the length of its plate. It shall be well made and shall have four counter sunk holes for fixing the door stoppers to the wall by means of wood screws. The body for housing of the door stopper shall be cast in one piece and it shall be fixed to the cover plate by means of brass or mild steel screws and cover plate shall be SS finish. The spring shall be fixed firmly to the pin. Tongue
which would be pressed while closing or opening of the door shall be connected to the lower part by means of copper pin. On the extreme end a rubber piece shall be attached to absorb shock. All parts of

the door stopper shall be of good workmanship and finish, burrs and sharp edges removed. It shall be free from surface and casting defects.

Measurement:
The Stainless steel magnetic door stopper as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above.

ITEM NO. 44. Providing & Fixing high Quality Zinc Material Door Stopper length of 150 mm including Rubber of approved make minimum Weight 260 grm with necessary Screws etc. complete as specified, as per drawing as directed by engineer-in-charge.

Fitting shall be of stainless steel SS 316 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.
Screws used for fittings shall be of chromium plated brass screws or stainless steel screws.
Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in-Charge. These shall be truly vertical or horizontal as the
case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sunking of hinges.

This shall be made of cast brass of overall size as specified and shall have rubber cushion. The shape and pattern of stopper shall be approved by the Engineer-in-Charge. It shall be of brass finished bright, chromium plated or oxidized or as specified. The size of magnetic door stopper shall be determined by the length of its plate. It shall be well made and shall have four counter sunk holes for fixing the door stoppers to the wall by means of wood screws. The body for housing of the door stopper shall be cast in one piece and it shall be fixed to the cover plate by means of brass or mild steel screws and cover plate shall be SS finish. The spring shall be fixed firmly to the pin. Tongue which would be pressed while closing or opening of the door shall be connected to the lower part by means of copper pin. On the extreme end a rubber piece shall be attached to absorb shock. All parts of the door stopper shall be of

good workmanship and finish, burrs and sharp edges removed. It shall be free from surface and casting defects

Measurement:
The Stainless steel door mounted door stopper as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above.

ITEM NO. 45. Providing & Fixing Stainless Steel C Shaped Handles in Satin Finish, 10 mm dia and centre to centre minimum 100 mm size, minimum weight 94 grm with necessary screws etc. complete of approved make as per drawing and as directed by engineer-in-charge.

General:
Fitting shall be of stainless steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.
The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge. Screws used for fittings shall be of chromium plated brass screws or stainless steel
screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in-Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sinking of hinges.

Measurement:
Measurement shall be of per Pair of Handles installed.

Rate:
Rate shall include all material, labour, tools and tackles required to complete the work as per item description.

ITEM NO. 46. Providing & Fixing S.S. 304 Grade Stainless Steel Satin Finish Round Tower bolt of overall length (excluding Bracket) 100 mm and inner bolt of dia meter 12mm and outer barrel dia meter 16 mm, minimum weight 150 grm of approved make with necessary nickel Plated Screws complete as per specified as per drawing and directed by Engineer in charge.

1. General

Fitting shall be of stainless steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.
The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge. Screws used for fittings shall be of chromium plated brass screws or stainless steel screws.
Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in-Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sinking of hinges. Tower bolts shall be well made and shall be free from defects. The bolts shall be finished to the correct shape and shall have a smooth action. All tower bolts made with sheet of 1.2mm thickness and above shall have countersunk screw holes to suit countersunk head of wood screws. All sharp edges and corners shall be removed and finished smooth.
Theheightofknoboftowerboltwhenthedoor,windowetc.isinclosedpositionfromthefloorlevel shallbe notmorethan1.9meter.
Theknobsofstainless steeltowerboltsshallbecastandtheboltfixedwithknob,steelspringandballshallbeprovidedbetweenthebolt andthebarrel.

2. SamplingandCriteriaforConformity:
Itshallbesameasspecifiedinabove.
The Stainless steel towerboltsas per manufacture's standard and fixed to door as perdrawing and as directed by engineer in charge.

3. Measurement:
The Stainless steel towerboltsas describe in item shallbemeasuredinnumbers.

4 Rate:
Therateshallincludethecostofallmaterialsandlabourinvolvedinalltheoperationsdescribed above

ITEM NO. 47. Providing and fixing Satin Finish soft closing Clip on hinges of Stain less steel materials of Approved makes for cupboard shutters, kichen cabinets etc. with necessary concealed SS Screws complete, as spcified in drawing and as approved by Engineer in charge.

General:
The Clip on hinges shall be soft closing type and shall be made with MS material and coated with High Quality Nickle coating as per manufactures specifications. The Hinges shall be of the approved makes as specified in Approved make list. The hinges shall be installed on to the cabinet using CP brass wood screws.

Measurement:
Measurement shall be of per Number of hinge installed.

Rate:
Rate shall include all material, labour, tools and tackles required to complete the work as per item description.

ITEM NO. 48. Providing and Fixing Stainless Steel Cupboard/ Wardrobe Lock for minimum 25 mm Door thickness with approved make with necessary screws etc. complete as approved drawing and as per direction of Engineer in charge.

General
The lock shall be of makes from approved make list. The lock shall be suitable to fix in the Wardrobe shutter. The lock Plate shall be fixed on to the second shutter. The lock should be supplied with minimum 3 sets of keys

Measurement:
Measurement shall be of per Lock installed.

Rate:
Rate shall include all material, labour, tools and tackles required to complete the work as per item description.

ITEM NO. 49. Providing and fixing accoustical seal 6 mm thick neosprene rubber gasket as per drawing and as directed by engineer in charge.

ITEM NO. 50. Providing and fixing acoustic seal for meeting point of doube leaf do as per drawing and as directed by engineer in charge.

ITEM NO. 51. Providing and fixing accoustical seal sweeper gasket as per drawing and as directed by engineer in charge.

ITEM NO. 52. Providing and fixing accoustical Automatic door bottom seal RP8si seal, as per drawing and as directed by engineer in charge.

ITEM NO. 53. Providing & fixing 50 mm thk resin bonded glass wool (48 kg/m3 density) packed in to Polythene bags in cavity held on 28Gx12, GI wire netting as per drawings, and as per direction of engineer-in-charge.

ITEM NO. 54. Filling the gap in between frame& adjacent RCC/ Brick/ Stone work by providing weather silicon sealant over backer rod of approved quality as per architectural drawings and direction of Engineer-in-charge complete. Up to 5mm depth and 5 mm width

ITEM NO. 55. Providing and applying 12 mm thick (average) premixed formulated one coat gypsum lightweight plaster having additives and light weight aggregates as vermiculite/ perlite respectively conforming to IS: 2547 (Part - 1 & II) 1976, applied on hacked / uneven background such as bare brick/ block/ RCC work on walls & ceiling at all floors and locations, finished in smooth line and level etc. Complete.

GYPSUM LIGHT WEIGHT PLASTER

Materials

Premixed light weight plasters essentially consist of retarded hemihydrate gypsum plaster andlight weight aggregate which are characterized by low density, high thermal insulation and soundabsorption properties. Other additions may be incorporated to impart desired properties. The physicaland chemical requirements shall conform to IS 2547 (Pt. II).

The minimum recommended water-premixed plaster ratio is 1:2 as per standard practice oras recommended by the manufacturers.

Application of Plaster

Thickness

Where the thickness required, as per description of the item is 12 mm, the average thickness of theplaster shall not be less than 12 mm whether wall treated is of brick/block/RCC work.

Measurement

Length and breadth shall be measured correct to a cm and its area shall be calculated in square metres correct to two places of decimal.

Rate

Rate shall include the cost of all labour& material involved in all the operations described above.

ITEM NO. 56. Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered/Gypsum or any other wall/ ceiling surface as required to prepare the surface even and smooth complete.

Materials

Putty of approved brand and manufacture shall be used. Only ready mixed putty as received from the manufacturer without any admixture shall be used.

Commencing of Work

Cement based putty shall not be started until the Engineer-in-Charge has inspected the items of work to be painted, satisfied himself about their proper quality and given his approval to commence the painting work. Cement based putty shall generally be taken in hand after practically finishing all other building work. The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the Putty work being started.

Preparation of Surface

The surface shall be thoroughly cleaned and dusted off. All rust, dirt, scales, smoke splashes, mortar droppings and grease shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Engineer-in- Charge after inspection, before painting is commenced.

Application

Before starting painting work order to achieve a superior finished surface, putty/ paste fillers shall be used on, all surfaces to be painted to fill pores, dents etc. The putty/paste fillers shall be approved quality and manufacture and shall be applied to the surface with a knife or other sharp edged tool after the priming coat as well after each under coat. The surface, after filling with putty/paste filler, shall be rubbed down with fine paper and dusted off before the application of the subsequent coat. Paste wood filler when set shall be wiped across the grain of the wood and then with the grain to secure a clean surface. Surface to be stained shall be covered with a uniform coat of stain wiped off if required. Each coat shall be allowed to dry completely and lightly rubbed with fine grade pumice stone sand paper before next coat is applied. Each coat shall vary in shade and well approved to Engineer in charge.

Measurement and Rate

Measurement shall of per Sqm of putty applied and rate shall be for per Sqm including all the materials, tools and tackles required to complete the work as per the item.

ITEM NO. 57. Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content. With water thinnable cement primer on wall, ceiling and partitions surface having VOC content less than 50 grams/litre.

Primer

The primer for wood work, iron work or plastered surface shall be as specified in the description of item. Primer for plaster/wood work/Iron & Steel/Aluminium surfaces shall be as specified below:

TABLE 13.2

S. No.	Surface	Primer to be used
1	Wood work (hard and soft wood)	Pink conforming to IS 3536
2	Resinour wood and	Aluminium primer

	plywood	conforming to IS 3585
3	(A) Aluminium and light alloys	Zinc chromate primer conforming to IS 104
	(B) Iron, Steel and Galvanized steel	Red Oxide Zinc chromate Primer
4	Cement/Conc/RCC/brick work, Plastered Cement primer conforming to IS 109 surfaces, non-asbestos surfaces to receive Oil bound distemper or Paint finish.	(conforming IS 2074

The primer shall be ready mixed primer of approved brand and manufacture. Where primer for wood work is specified to be mixed at site, it shall be prepared from a mixture of red lead, white lead and double boiled linseed oil in the ratio of 0.7 kg :
0.7 kg : 1 litre.
Where primer for steel work is specified to be mixed at site, it shall be prepared from a mixture of red lead, raw linseed oil and turpentine in the ratio of 2.8 kg : 1 liter : 1 liter. The specifications for the base vehicle and thinner for mixed on site primer shall be as follows:
(a) White Lead : The White lead shall be pure and free from adulterants like barium sulphate and whiting. It shall conform to IS 103.
(b) Red Lead : This shall be in powder form and shall be pure and free from adulterants like brick dust etc. It shall conform to IS 102.
(c) Raw Linseed Oil : Raw linseed oil shall be lightly viscous but clear and of yellowish colour with light brown tinge. Its specific gravity at a temperature of 30 degree C shall be between 0.923 and 0.928.
Note : The oil shall be mellow and sweet to the taste with very little smell. The oil shall be of sufficiently matured quality. Oil turbid or thick, with acid and bitter taste and rancid odour and which remains sticky for a considerable time shall be rejected. The oil shall conform in all respects to IS 75. The oil shall be of approved brand and manufacture.
(d) Double Boiled Linseed Oil : This shall be more viscous than the raw oil, have a deeper colour and specific gravity between 0.931 and 0.945 at a temperature of 30 degree C. It shall dry with a glossy surface. It shall conform in all respects to IS 77. The oil shall be of approved brand and manufacture.

Preparation of Surface
Plastered Surface : The surface shall ordinarily not be painted until it has dried completely.
Trial patches of primer shall be laid at intervals and where drying is satisfactory, painting shall then be taken in hand. Before primer is applied, holes and undulations, shall be filled up with plaster of paris and rubbed smooth.

Application
The primer shall be applied with brushes, worked well into the surface and spread even and smooth.
The painting shall be done by crossing and laying off with horizontal and vertical strokes alternatively. The entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks.

Rate shall be per square meter of primer.

ITEM NO. 58. Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content With water thinnable cement primer on wall, ceiling and partitions surface having VOC content less than 50 grams/litre

Specification as per above primer items

ITEM NO. 59. Painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile Organic Compound) content less than 50 grams/ litre of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour. Two coats

1. General:
Paints, oils, varnishes etc. of approved brand and manufacture shall be used. Only ready mixed Paint (Interior grade) as received from the manufacturer without any admixture shall be used.
If for any reason, thinning is necessary in case of ready mixed Paint, the brand of thinner recommended by the manufacturer or as instructed by the Engineer-in-Charge shall be used. Approved Paints, oil or varnishes shall be brought to the site of work by the contractor in their original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The materials shall be kept in the joint custody of the contractor and the Engineer-in-Charge. The empties shall not be removed from the site of work, till the relevant item of work has been completed and permission obtained from the Engineer-in-Charge.

2. Commencing Work
Painting shall not be started until the Engineer-in-Charge has inspected the items of work to be painted, satisfied himself about their proper quality and given his approval to commence the painting work. Painting of external surface should not be done in adverse weather condition like hail storm and dust storm. Painting, except the priming coat, shall generally be taken in hand after practically finishing all other building work. The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the Paint work being started.

3. Preparation of Surface
The surface shall be thoroughly cleaned and dusted off. All rust, dirt, scales, smoke splashes, mortar droppings and grease shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Engineer-in- Charge after inspection, before painting is commenced.

4. Application
Before pouring into smaller containers for use, the Paint shall be stirred thoroughly in its containers, when applying also, the Paint shall be continuously stirred in the smaller containers so that its consistency is kept uniform.
The painting shall be laid on evenly and smoothly by means of crossing and laying off, the latter in the direction of the grains of wood. The crossing and laying off consists of covering the area over with Paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction, two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

Where so stipulated, the painting shall be done by spraying. Spray machine used may be (a) high pressure (small air aperture) type, or (b) a low pressure (large air gap) type, depending on the nature and location of work to be carried out. Skilled and experienced workmen shall be employed for this class of work. Paints used shall be brought to the requisite consistency by adding a suitable thinner.
Spraying should be done only when dry condition prevails. Each coat shall be allowed to dry out thoroughly and rubbed smooth before the next coat is applied. This should be facilitated by thorough ventilation. Each coat except the last coat, shall be lightly rubbed down with sand paper or fine pumice stone and cleaned off dust before the next coat is laid.
No left over Paint shall be put back into the stock tins. When not in use, the containers shall be kept properly closed.
No hair marks from the brush or clogging of Paint puddles in the corners of panels, angles of moldings etc. shall be left on the work.
In painting doors and windows, the putty round the glass panes must also be painted but care must be taken to see that no Paint stains etc. are left on the glass. Tops of shutters and surfaces in similar hidden locations shall not be left out in painting. However, bottom edge of the shutters where the painting is not practically possible, need not be done nor any deduction on this account will be done but two coats of primer of approved make shall be done on the bottom edge before fixing the shutters.

5. Brushes and Containers
After work, the brushes shall be completely cleaned of Paint and linseed oil by rinsing with turpentine. A brush in which Paint has dried up is ruined and shall on no account be used for painting work. The containers when not in use, shall be kept closed and free from air so that Paint does not thicken and also shall be kept safe from dust. When the Paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth, so that they are clean, and can be used again.

6 Measurements

6.1 The length and breadth shall be measured correct to a cm. The area shall be calculated in sqm (correct to two places of decimal), except otherwise stated.

6.2 Small articles not exceeding 10 sq. Decimeter (0.1 sqm) of painted surfaces where not in conjunction with similar painted work shall be enumerated.

6.3 Painting up to 10 cm in width or in girth and not in conjunction with similar painted work shall be given in running meters and shall include cutting to line where so required.

Note: Components of trusses, compound girders, stanchions, lattices and similar work shall, however, be given in sq. meters irrespective of the size or girth of members. Priming coat of painting shall be included in the work of fabrication.

6.4 In measuring painting, varnishing, oiling etc. of joinery and steel work etc. The coefficients as indicated in following tables shall be used to obtain the area payable. The coefficients shall be applied to the areas measured flat and not girthed.

6.5 Width of molded work of all other kinds, as in hand rails, cornices, architraves shall be measured by girth.

6.6 For trusses, compound girders, stanchions, lattice girders, and similar work, actual areas will be measured in sq. meter and no extra shall be paid for painting on bolt heads, nuts, washers etc. even when they are picked out in a different tint to the adjacent work.

6.7 Painting of rain water, soil, waste, vent and water pipes etc. shall be measured in running meters of the particular diameter of the pipe concerned. Painting of specials such as bends, heads, branches, junctions, shoes, etc. shall be included in the length and no separate measurements shall be taken for these or for painting brackets, clamps etc.

6.8 Measurements of wall surfaces and wood and other work not referred to already shall be recorded as per actual.

6.9 Flag staffs, steel chimneys, aerial masts, spires and other such objects requiring special scaffolding shall be measured separately.

7. Precautions
All furniture, fixtures, glazing, floors etc. shall be protected by covering and stains, smears, splashing, if any shall be removed and any damages done shall be made good by the contractor at his cost.

8. Rate
Rates shall include cost of all labour and materials involved in all the operations described above with tools and scaffolding.

ITEM NO. 60. Painting with synthetic enamel paint, having VOC (Volatile Organic Compound) content less than 150 grams/ litre, of approved brandand manufacture, including applying additional coats wherever required to achieve even shade and colour.
Two coats

Specification as per DSR

ITEM NO. 61. Providing and applying two coats of fire retardant paint on cleaned wood / ply / steel surface @ 3.5 sqm per litre per coat including preparation of base surface as per recommendations of manufacturer to make the surface fire retardant.

Specification as per DSR

ITEM NO. 62. Removing dry or oil bound distemper, melamine polish, water proofing cement paint and any other color like by scrapping, sand papering and preparing the surface smooth including necessary repairs to scratches etc. complete.

Specification as per DSR

ITEM NO. 63. Providing and applying Melamine polishing with "Asian paints Melamine Gold" or "Timber tone Melamine" of ICI Dulux or "Wudfin of Pidilite Industries Limited", on wood & veneer works (two or more coats) including preparation of surface and staining to the approved colour and shade as per the manufacturers specifications including scaffolding, curing, cleaning the surfaces and

other incidental work to be done etc. complete at all floors for any height as directed by engineer in charge.

Material:
The melamine polish is two component acid catalyzed wood finish shall be of best quality and make such as Asian Paints, Nerolac, Burger or equivalent, as approved. It shall give silken, smooth finish. It offers excellent non yellowing and stain resistant property. The Melamine polish shall have shade and shine, either Mat or glossy. It shall be two component polish consisting of a base and hardener. It shall be capable of protecting wood from moisture, heat, cold, scratches, stains, cigarette burns etc. It shall be applied using brush or spray gun. It shall require lesser time to dry and there shall be no cracks or pealing of the polish. There shall not be any undulation on the finished surface nor cracks at joints. It shall be durable and flexible to absorb cracks. It shall have resistant to scrubs, light rays, heat etc.

Preparation of Surface: The surface shall be cleaned. All unevenness shall be rubbed down smooth with sand and well dusted. Knots if visible shall be covered with a preparation of red lead and glue size laid on while hot. Holes and indentations on the surface shall be stopped with glazier's putty. The surface shall then be given a coat of wood filler made by mixing whiting (ground chalk) in methylated spirit at the rate of 1.5 Kg of whiting per liter of spirit. The surface shall again be rubbed down perfectly smooth with glass paper and wiped clean.

Application: The number of coats of polish to be applied shall be as described in the item. A pad of woolen cloth covered by a fine cloth shall be used to apply the polish. The pad shall be moistened with the polish and rubbed hard on the wood, in a series of overlapping circles applying the mixture sparingly but uniformly over the entire area to give an even level surface. A trace of linseed oil on the face of the pad facilitates this operation. Sand the surface with the emery paper no 180, apply wood filler and allow it to dry for 2-3 hours. Again sand the surface with the emery paper no 180, apply melamine sealer and allow it to dry for 2-3 hours. Sand the surface with the emery paper no 320, wipe off the dust and dirt. Apply melamine polish mat or gloss as required two or three coat and finishing with spray coat.

Measurement shall be per Sqm and rate shall be inclusive of all material, labour, tools and tackles required to complete the work as per the item description and to the satisfaction of Engineer-In-Charge.

ITEM NO. 64. Varnishing with varnish of approved brand and manufacture : Two or more coats of glue sizing with copal varnish overan under coat of flatting varnish

Specification as per DSR

ITEM NO. 65. Cement concrete flooring 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) finished with a floating coat of neat cement, including cement slurry, but excluding the cost of nosing of steps etc. complete.

Specification as per DSR

ITEM NO. 66. Providing and laying GVT vitrified floor tiles in different sizes (thickness to bespecified by the manufacturer) with water absorption less than 0.08% and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement : 4

coarse sand), jointing with grey cement slurry @ 3.3kg/sqm including grouting the joints with white cement and matching pigments etc., complete.

Specification as per DSR

ITEM NO. 67. Providing and application for 2mm Self-Leveling Epoxy flooring system, including surface preparation by diamond grinding for providing physical key with the base floor, filling the constructionjoints with epoxy mortar,laying of 200 microns epoxy primer of approved make, followed by 1000 microns self-smoothening Epoxy screed and top layer of 1000 micron self – smoothening epoxy flooring of Floortop 1000 , laid as per standard shade from the colour and as per manufacturers' specification and as direction of engineer in charge.

ITEM NO. 68. Providing & laying 2.0/2.5 mm thick approved Linoleum Flooring as per EN 548, made up of 97% natural raw materials and out of which 70% should be rapidly re-newable. The product must have natural & permanent bacteriostatic property even against MRSA bacteria as per manufacturer's specifications and the independent test reports for the same must be submitted by the manufacturer. The product must be approved by TERI- GRIHA (Green Rating for Integrated Habitat Assessment). It is compusory to use multi-coloured welding rods similar to the shade and texture of the floor to complement the floor colour of the flooring material. The joints between 2 rolls should be welded using a hot air welding gun. The product will have UV curved Top shield-2 comprising of 2 layers, top coating of primer and acrylic to provide better performance. This coating should be resistant to Betadine stains. Acoustical impact noise reduction as per EN1SO717- 2- 4 dB ,Indentation Residual as per EN-ISO 24343-1 : 0.15mm. The product should be SMART Platinum Certified ((Sustainable Materials Rating Technology)by USA.
The product should carry third-party, independent, Life Cycle Analysis (multi-attribute) to show its environmental footprint from Cradle to Grave.Flooring should be done as per manufacturers specifications and as directed by engineer in charge.

ITEM NO. 69. Providing and Fixing of Flocked Carpet rolls flooring having a density of 70 mnfibres of nylons 6.6 per sqm firmly anchored into a waterproof backing and having an average recycled content of 20%. The carpet must inhibit the growth of Bacteria and Fungi. The Carpet must be Zero Emission carpet (Emission below detection limit after 28 days in accordance to ISO 16000-9 requirements). Fire Test EN-13501, Appearance Retention Hexapod ISO 140-8, Friction Slip resistance Test EN 14041 Class DS, Sanitized anti- microbial treatment with resilient water proof backing. The carpet should be anti stactic and thickness shall be 4.3 mm with approximate weight of 1.8 kg/ sqm. The rate shall be inclusive of fixing at site as per the drawings and direction of Engineer in charge complete in all respect.

1. General

The Flocked Carpet rolls flooring having a density of 70 mnfibres of nylons 6.6 per sqm firmly anchored into a waterproof backing and having an average recycled content of 20%. The carpet must inhibit the growth of Bacteria and Fungi. The Carpet must be Zero Emission carpet (Emission below detection limit after 28 days in accordance to ISO 16000-9 requirements). Fire Test EN-13501, Appearance Retention Hexapod ISO 140-8, Friction Slip resistance Test EN 14041 Class DS, Sanitized anti- microbial treatment with resilient water proof backing. The carpet should be anti stactic and thickness shall be 4.3 mm with approximate weight of 1.8 kg/ sqm

2. Fixing:
The carpet shall be laid and fixed on pre-leveled IPS flooring or any other flooring. The carpet shall be stuck on to the floor using suitable adhesive of approved brand.

3. Measurement
Surface area of the laid carpet surface should be measured in square meters correct to two places of decimal. Nothing extra shall be paid.

4. Rate
Rates shall include cost of all labour and materials involved in all the operations described above with tools and scaffolding.

ITEM NO. 70. Providing and fixing 25 mm wooden planking, tongued and grooved in flooring, including fixing with iron screws complete with, Second class teak wood supporting structure as required on stage including Providing and fixing 6 mm to 12 mm thick High Density polyurethane foam having density of approx. 90 kg/cum. fixed to Ply wood sheet or Concrete floor with suitable adhesive to act as cushioning foam below the wooden flooring.

Planking to be fixed over Shock Absorbent foam over Water MR grade Plywood confirming to IS 710 of necessary thickness and Teak wood wooden framing. Cost of Foam, Plywood and Teak wood framing will be paid under relevant items.

(a) Second class teak wood
Seasoning and Preservation
All timber used for timber floors shall be thoroughly seasoned in accordance with IS 1141. After seasoning the timber shall be treated with preservative in accordance with IS 401. Seasoning and preservative treatment shall be paid for separately unless otherwise specifically included in the description of the item of flooring.

Supporting Joists
Main beams and joists of the class of wood sections specified in the description of the item for beams and joists, or as instructed by the Engineer-in-Charge shall be fixed in position to dead levels. The width of the joints shall not be less than 50 mm. The arrangement and spacing of beams joists etc. shall be as per design furnished.

Boards
It shall be of the class of timber and thickness specified in the description of the item. The timber shall be as specified. Only selected boards of uniform width shall be used. Unless otherwise specified or shown in the drawings, the width of boards selected shall not be less than 100 mm nor more than 150 mm. The same width of boards shall not be maintained throughout except where the width of the room is not an exact multiple of the boards. In the latter case, the difference shall be equally adjusted between the two end boards (adjacent to walls). The length of the boards shall not exceed 3 meter anywhere. Ordinarily, the minimum length of boards shall be such that the boards shall rest at least on three supports, except where otherwise required by the pattern specified in the drawings or as directed by the Engineer-in- Charge. The boards shall be planed true on the top face only unless otherwise specified in the description of the item. Where the bottom face is exposed and it is also required to

be planed, then such planning shall be paid for extra. Unless otherwise described in the item, the longitudinal joints of planks shall be tongued and grooved to a minimum depth of 12 mm while the heading joints shall be of the square butt type and shall occur over the center line of the supporting joists. Heading joists in adjacent boards shall be placed over the same joists.

Iron Screws

Iron screws shall be of the slotted counter sunk head type, of length not less than the thickness of planks plus 25 mm, subject to a minimum of 40 mm, and of designation No. 9 conforming to IS 451.

Fixing

The Planks will be fixed over shock absorbent foam of required thickness over a plywood sheet fixed to wooden framing. The joists of the wooden framing on which the planks shall be fixed shall be checked and corrected to levels. The end boards shall be accurately fixed with the sides parallel and close to the walls. Each adjoining board shall be carefully jointed and shall be tightened in position and screwed. For

fixing the boards to the joists, two screws shall be used at each end of the boards and one screw at each of the intermediate joists in a zig zag manner. The screws shall be countersunk and screw holes filled with approved stopping. The junction between timber flooring and adjacent flooring shall be formed by

inserting a metal strip (brass or aluminum) at the junction. The metal strip shall be fixed to the end of the planks by screws. The flooring shall be truly level and plane. The joints shall be truly parallel and or perpendicular to the walls, unless otherwise specified. The floor shall be planned in both directions and made perfectly even, true and smooth.

Finishing

The surface of the floor shall be bees waxed or finished otherwise as directed by the Engineer-in-Charge. The lower face shall be painted or treated with wood preservative as directed. The finishing shall be paid for separately unless specifically included in description of the flooring item.

Measurements

Length and breadth of superficial area of the finished work shall be measured correct to a cm. The area shall be calculated in square meter correct to two places of decimal. No deduction shall be made nor extra paid for voids not exceeding 0.20 square meter. Deductions for ends of dissimilar materials or other articles embedded shall not be made for areas not exceeding 0.10 square meter. The rate includes the cost of all materials, equipment, labour, carting, loading & unloading, removal of debris to local specified within the site, involved in all the operations described above. Shop drawings to be submitted and approval from Design Consultant to be taken by Contractor before execution.

ITEM NO. 71. Supply and Fixing of Slim Glass partition of 10mm Toughened Glass using profile System- Frames clip profile to a height as per architectural drawing and as per manufacturers specifications .The Fixed glass to be fixed using Profiles at Top & Bottom & fixed frame cleat . The profile size to be 45x25MM to be fixed on to the floor/ ceiling as per the design. H Junction profile to be used at Glass to Glass vertical joints, 90 Deg L Junction Profiles and T Junction profiles necessary as per design.In case of Glass overall panel Overpanel Profile to be used. The Profile shall be matt natural anodized, the Profile Manufacturer to supply all the necessary clips, seals and fixing accessories for the system. All Profiles to be with 2 mm Gauge thickness Excluding 20 Micron of Anodizing.

All joints of the glass to glass and glass to wall/floor/ceiling shall be filled with RTV silicon sealant of structural grade and weathering grade of approved make , to make the partition leak proof, complete . The sound reduction between two spaces with this glass partition shoud meet criteria of NBC 2016, volume II, part 8 building services, section 4 acoustic, table no 6.2.4.2.
The contractor shall submit the detailed shop drawing showing all junction details and get the same approved from Engineer - in - Charge before executing this item.

The item shall comprising of 10mm thick toughened plain float glass with fittingswith Connecting Profile SS Finish base rail Dorma or equivalent with fixingholes incl. clamping parts with screws and gasket for 12mm glass with coverprofile on both sides, as per drawing and directed by engineer-in-charge

Measurement
The height and width of partition unit as fixed in place shall be measured correctto one centimeter and area calculated in sqm. Correct to second place of decimalshall be taken for payment.

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

ITEM NO. 72. Supply & Fixing of Glass Door (Single Leaf) of 10mm toughened glass with profile System- frames all around the door with complete assembly to a height as per architectural drawing and as per manufacturers specifications .Door Profile frame of size 45X50mm with seals with Hinges (3nos) & Studio Gala Locks (1no) & Studio Gala lever handles in aluminium silver (EV1) finish , Euro profile cylinder and Door closer with slide channel and Hold Open Unit (as per EN 1154) and saddle plate for fixing on the Glass door and necessary seals to be provided all around the door frames.The Profile shall be matt natural anodized, the Profile Manufacturer to supply all the necessary clips, seals and fixing accessories for the system. All Profiles to be with 2 mm Gauge thickness including 20 Micron of Anodizing.
The sound reduction between two spaces with this glass partition shoud meet criteria of NBC 2016, volume II, part 8 building services, section 4 acoustic, table no 6.2.4.2. The contractor shall submit the detailed shop drawing showing all detailsas directed by Engineer - in - Charge.

ITEM NO. 73. Providing and fixing Automatic Sliding door operator, compliant with future European standards and produced according to the guidelines for power-operated windows, doors and gates, BGR 232, the UVV and the VDE regulations. TÜV design tested, according to the low voltage guidelines, fulfils DIN 18650 standards, for framed glass door application with ST-Flex Profiles Systems or equivalent , modular design including internal cover and with 12 mm toughned glass for sliding door panels and fixed panels, both sliding & fixed panels with framed profile system with Interlocking Seals.Operator& Frame Finish should be Silver Anodised E6/C0, with operator dimensions (H x D) : 100 x 180 mm and of length as required to suit the opening size. The track profile should be separate from the main profile for enabling reduction in vibration insulation. Microprocessor-controlled control unit, Self-learning, with adjustable parameters for opening and closing speed, hold-open time and opening and closing force, reversing when obstruction is encountered, Class of protection IP 20. Activators- ProsecureOptiCombi 1 Sensor System (02 Nos),

Light barriers, comprising receiver and transmitter - 02 Pair with Electro-mechanical locking, Bistable, Program Switch with Key. Max Panel Weight Carrying Capacity of 2 X 120 Kgs. The system shall have constant power supply 230V+ 5%, 50Hz, AC .The requirement in total is as mentioned ,wall conneting profiles be used on top of overpanel and on all sides to fixed panels only .The above work should complete in all respect as per approved drawings and as directed by Engineer-in-Charge.

ITEM NO. 74. Extra for providing and fixing frosted glass panes instead of plain clear glass as per drawing and as directed by engineer in charge.

ITEM NO. 75. Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.
In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works

ITEM NO. 76. Demolishing brick work/RCC Work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.
In cement mortar

ITEM NO. 77. Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS : 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required : Kitchen sink with drain board 510x1040 mm bowl depth 250 mm. Conforming to Manufacturers Standards and to the specified by engineering in-charge.

ITEM NO. 78. Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture, laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding, holes and polishing to edges to give high gloss finish etc. complete at all levels.

ITEM NO. 79. Supplying and Fixing of Factory Fabricated Teachers table having main desk of size 1200 x 600 x 740 mm (All dimensions shall have tolerance of ± 20 mm based on manufacturer standard Sizes) with top and modesty panel of 18 mm thick Calibrated BWP Plywood and based support structure of MS ERW Tubes of size 25mm x 25mm with Epoxy polyested paint finish of 50-60 micron thickness including pedestal unit of size 355(W)x670(H)x560(D) in CRCA material painted with Epoxy powder coating of 50-60 micron with stiffners. The other side of the table shall have a CPU hanger of CRCA steel sheet to place the CPU. The Plywood shall be provided with 1 mm thick Decorative laminate on the top surface and the edges shall be covered with 18 mm thick teakwood Beading. The color shall be as per the as per the archtiects selection. All the Accessories and Fixtures shall be of approved make or as per manufacturers Specifications. The Rate shall be inclusive of all material and labour required to finish the work as per the drawings. The table Laminate selection shall be as per the archtiects selection. Selections shall be as per approved make basket and approved make list.

ITEM NO. 80. Supplying and Placing Mid Back Revolving Chair of size 760mm W x 760mm D x 850-970 mm H. The seat & back made from 12mm thick hot pressed plywood and upholstered with frabic and moulded polyurethane foam. The back foam is deigned with contoured lumber support for extra comfort. The Seat Size: 470mm W X 480mm D and Back Size 475mm W x 695mm H. The HR polyurethane foam is moulded with density of 45 +/- 2 kg per meter cube and hardness load of 16 +/- 2 kgf as per IS 7888 for 25% Compression. The Armerest should be of one-piece armrest are fitted to the seat are injection moulded black polypropelene. There should be a synchrnous tilt mechanism designed with 360 degree revolving type and upright locking. There should be gas lift having Height adjustment of stroke of 120mm. Below should have 3 piece telescopic type and injection moulded in black Polypropylene. The pedestal should be injection moulder black polypropelene in black 30% glass-filled nylon. The pedestal of 660mm +/- 5mm pitch-center dia. The color of the chair fabric shall be as per architects selections. All the moving parts shall be tested as per relevant ANSI/BIFMA Standards. Selections shall be as per approved make basket and approved make list.

ITEM NO. 81. Providing and fixing Electric Tray of approved make as per drawing and as directed by engineer in charge.

ITEM NO. 82. Providing and fixing Wall Clock of approved make as per drawing and as directed by engineer in charge.

ITEM NO. 83. Providing and fixing Name Tag for Student desk made out of 2 mm thick clear acrylic sheet of dimension 125 mm x 30 mm of approved make as per drawing to be fixed on to the front face of the table surface such that there is a gap suitable to place a name card in the space created between the table face and the acrylic sheet. Contractor has to prepare a mock up at site for approval from the archtiect before commencement of the work. The rate shall be inclusive of Acrylic sheet, screws, adhesives etc required to complete the work as directed by and to the satisfaction of the engineer in charge.

SECTION - 1
INTERNAL WIRING

E – 14 INTERNAL WIRING

1.1 Scope :

The scope covers supply, laying,testing and commisssoining of wiring in rigid PVC pipes , Switches, Sockets and accessories.

1.2 Standards :

AS PER SCHEDULE OF INDIAN STANDARDS, ATTACHED IN THE DOCUMENT

1.3 Rigid and Flexible conduits :

A) All conduits shall be rigid PVC having minimum wall thickness of medium gauge 1.6 to 1.8 approved by F.I.A. & I.S.I. All rigid pipe and its accessories shall be of suitable material complying with IS:3419-1989 and IS :9537 (Part 5) 2000 for flexible conduits.
The conduits shall be circular in cross-section and designated by their nominal outside diarmeter.Minimum thickness of walls shall be as follows:

a) Upto 38 mm. diameter - minimum 1.8 mm. wall thickness.
b) Above 40 mm. diameter - minimum 2.2 mm. wall thickness.

The maximum number of PVC insulated copper conductor cables of 650/1100V grade confirming to IS:694-1990 that can be drawn in one conduit of various sizes shall be as specified.

B) Flexible conduits shall be formed from a continuous length of spirally wound interlocked steel strip with a fused zinc coating on both sides. The conduit shall be terminated in brass adapters.

1.4 Accessories :

A) PVC conduit fittings such as bends, elbows, reducers, chase nipples, split couplings, plugs etc. shall be specifically designed and manufactured for their particular application. All conduit fittings shall conform to IS:2667-1964 and IS:3857-1966. All fitting associated with galvanized conduit shall also be galvanized.

1.5 Wires :

A) All wires shall be single core multi-strand/ flexible copper or single strand Copper FRLS type PVC insulated as per IS:694 and shall be 660 V\1100 V grade.

B) All wires shall be colour coded as follows :

Phase	**Colour of wire**
R	Red
Y	Yellow
B	Blue
N	Black
Earth	Green (insulated)
Control (If any)	Grey
All off wires	Same as Phase wire

C) Both end of wires should be terminated with adequate size copper crimping type lugs and ferrules as per instructions of engineer in charge.

1.6 Outlets switches &Sockets :

A) Switches shall be moulded plate type flush piano type with silver-coated contacts. Sockets shall be multipin pin with switch and plate type cover. Combination of multiple switch units and sockets should be used to minimize the switch boxes. All screws shall be brass – chromium plated and shall be counter sunk type with half round head or flat headed.

B) For heavy duty, metal clad sockets with M.C.B/ Isolator mounted in a galvanized steel box shall be provided.

C) The switch boxex shall be made of either rigid PVC moulidng or mild steel or cast iron on all sides except at the front. PVC boxes shall comply with the requirements laid down in IS :14772-2000. These boxes shall be free from internal roughness.Wall thickness of PVC boxes shall not be less than 2 mm.Clear depth of the box shall not be less than 60 mm and this shall be increased suitably as per requirements. An earth terminal with stud and washer shall be provided in each MS boxes for termination of protective conductors.

D) All the fan boxes shall be of cast iron type only with minimum wall thickness of 3 mm.

1.7 Additional requirements

1.7.1 Making Chase

The chase in the wall shall be neatly made and of ample dimensions to permit the conuidt to be fixed in the manner desired. Chase shall be done with machine cutter only. In the case of building under construction, the conduits shall be buried in the wall before plastering and shall be finished neatly after erection of conduit. In case of exposed brick/ RCC work, special care shall be taken to fix the conduit and accessories in position along with the building work.

1.7.2 Fixing conduits in chase

The conduit pipe shall be fixed by means of staples, J-hooks, or by means of saddler, not more than 60 cm apart or by any other approved means of fixing. All thereaded joints of conduit pipes shall be treated with some approved preservative compound to secure protection against rust.

1.7.3 Fixing conduits in RCC work (slab / wall / floor etc)

The conduit pipes shall be laid in position and fixed to the steel reinforcement bars by steel binding wires before the concreting is done. The conduit pipes shall be fixed firmly to the steel reinforecement bars to avoid their dislocation during pouring of cement concrete and subsequent tamping of the same. Fixing of standard bends or elbows shall be avoided as far as practicable, and all curves shall be maintained by bending the conduit pipe itself with a long radius, which will permit easy drawing in of conductors.Location of inspection/ junction

boxes in RCC work should be identified by suitable means to avoid unnecessary chipping of the RCC slab subsequently to locate these boxes.
At either side of the bends, saddles/staples shall be fixed at a distance of 15 cm from the center of the bends.

1.7.4 Fixing of inspection boxes

As far as possible inspection boxes shall be avoided or to be minized as much as possible. If necessary suitable inspection boxes to the minimum sizes shall be provided to permit inspection and to facilitate replacement of wires with prior approval of engineer in charge. These shall be mounted flush with the wall or ceiling concrete with minimum depth of 65 mm for slab and as per IS : 2667 – 1988 for other places.

1.7.5 Fish Wire

To facilitate subsequent drawing of wires in the conduit, GI fish wire of 1.6mm /1.2mm (16/18 SWG) shall be provided along with the laying of the recessed conduits.

1.7.6 Earthing

A protective earth conductor shall be drawn inside the conduit in all distribution circuits to provde for earthing of non current carrying metallic parts of the entire installtion. These shall be terminated on the earth terminal in the switch boxes, and/or earth terminal blocks at the distribution boards. Gas or water pipes shall not be used as protective conductors (earth medium). Every sub main will hae earth continuity conductor to run along with sub main wiring. Every circuit will have its earth continuity conductor to run along with circuit wiring. In case of 3 phase sub mian wiring two earth continuity conductor shall be provided.

SECTION – 2

LIGHT FIXTURES AND FANS

E – 15 LIGHT FIXTURES AND FANS

1.1 Scope :

The scope covers supply, installation, testing and commissioning of different types of light fixtures, fans and exhaust fans.

1.2 Standards :

AS PER SCHEDULE OF INDIAN STANDARDS.

1.3 Type of fixtures :

1.3.1 General Requirement:

1.3.1.1 All fixtures shall be complete with accessories necessary for installation whether so detailed under fixture description or not.

1.3.1.2 Fixture housing, frame or canopy shall provide a suitable cover for the fixture outlet box or fixture opening.

1.3.1.3 Fixtures shall be installed at mounting heights as detailed on the drawings or instructed on site by the Architects/Consultants.

1.3.1.4 Fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the fixture. Design of hangers and method of fastening other than shown on the drawings or herein specified shall be submitted to the Architect/Consultant for approval.

1.3.1.5 Pendant fixtures within the same room or area shall be installed plumb and at a uniform height from the finished floor. Adjustment of height shall be made during installation as per Architect's/Consultant's instructions.

1.3.1.6 Flush mounted and recessed fixtures shall be installed so as to completely eliminate light leakage within the fixture and between the fixture and adjacent finished surface.

1.3.1.7 Fixture mounted on outlet boxes shall be tightly secured to a fixture stud in the outlet box. Extension pieces shall be installed where required to facilitate proper installation.

1.3.1.8 Fixture shall be completely wired and constructed to comply with the regulations and standards for Electric Lighting Fixtures, unless otherwise specified. Fixtures shall bear manufacturer's name and the factory inspection label unless otherwise approved.

1.3.1.9 Wiring within the fixture and for connection to the branch circuit wiring shall be not less than 1.0/1.5 sq.mm. copper for 250 volt application. Wire insulation shall suit the temperature conditions inside the fixture and wires bypassing the choke shall be heat protected with a heat resistant sleeve.

1.3.1.10 Metal used in lighting fixtures shall be not less than 22 SWG or heavier if so required to comply with the specification or standards. Sheet steel reflectors shall have a thickness of not less than 20 SWG. The metal parts of the fixtures shall be completely free from burrs and tool marks. Solder shall not be used as mechanical fastening device on any part of the fixture.

1.3.1.11 Ferrous metal shall be bonderized and given a corrosion resistant phosphate treatment or other approved rust inhibiting prime coat to provide a rust-proof base before application of finish.

1.3.1.12 Non-reflecting surfaces such as fixture frames and trim shall be finished in baked enamel paint.

1.3.1.13 Light reflecting surface shall be finished in baked white enamel having a reflection factor of not less than 80%. All parts of reflector shall be completely covered by finish and free from irregularities. After finish has been applied and cured, it shall be capable of withstanding a 6 mm radius bend without showing sign of cracking, peeling or loosening from the base metal. Finish shall be capable of withstanding 72 hours exposure to an ultraviolet sun lamp placed 10

cm from the surface without discoloration, hardening or warping and retain the same reflection factor after exposure. Test results shall be furnished for each lot of fixtures.

1.3.1.14 Fixture with visible frames shall have concealed hinged and catches. Pendant fixtures and lamp holders shall be provided with ball type Algiers or similar approved means. Recessed fixtures shall be constructed so as to fit into an acoustic tile ceiling or plaster ceiling without distorting either the fixture or the ceiling plaster rings/flanges shall be provided for plaster ceiling. Fixtures with hinged diffuser doors shall be provided with spring clips or other retaining device prevent the diffuser from moving.

1.3.1.15 Detailed catalogue cuts for all fixtures, or, if so required by the Architect/Consultant sample fixtures shall be submitted for approval to the Architect/Consultant before orders for the fixtures are placed. Shop drawings for non-standard fixture types shall be submitted for approval to the Architect/Consultant.

1.3.1.16 Recessed fixtures shall be constructed so that all components are replaceable without removing housing from the ceiling.

1) Lamps shall be supplied and installed in all lighting fixtures furnished under this contract. All lamps shall be rated for 250 volts.

2) Lamps used for temporary lighting service shall not be used in the final lighting of fixtures units.

3) Lamps shall be of wattage and type as shown on the drawings and schedule. Where not shown, the details shall be ascertained from the Architect/Consultant before procurement.

4) Lamps for permanent installation shall not be placed in the fixtures until so directed by the Architect/Consultant, and this shall be accomplished directly before the building portions are ready for occupation.

1.3.2 Fluorescent fittings :

1.3.2.1 Only single and/or two lamp ballast shall be used in any one fixture. Ballast shall be completely enclosed inside sheet steel casing and shall have a corrosion - resistant finish. Ballast shall contain a thermosetting type compound not subject to softening or liquefying under any operating conditions or upon ballast failure. Compound shall not support combustion. All ballast shall be of high power factor compensated to above 0.9PF. Ballast temperature and sound rating shall be specified by the manufacturer and guaranteed. Ballast shall be for operation at the voltages and frequencies indicated and under temperature conditions prevailing in the various locations of the premises. Tapped ballast are preferred.

1.3.2.2 All fluorescent fixtures shall be provided with separate wiring channel with cover plate and an earth terminal. All screws shall be chromium brass screws. Lamp and starter holders shall be out of tough moulded plastic with spring loaded rotor type contactors rendered shock and vibration proof. Condensers shall be low loss paper impregnated hermetically sealed complying with IS 1969-196 . Internal wiring shall be neatly clipped and where by passing the ballast, a suitable heat resistant barrier or sleeve shall be provided.

1.3.2.3 Surface mounted fixtures longer than two feet shall have one additional point of support besides the outlet box fixture stud when installed individually. Pendant individually mounted fixtures four feet long and smaller shall be provided with twin stem/conduit hangers. Stems shall have ball aligners or similar devices and provided for a minimum of 25 mm vertical adjustment. Stems shall be of appropriate length to suspend fixtures at required mounting height.

1.3.2.4 Lamps shall have bi-pin bases and a minimum approximate rated and guaranteed life of 6000 hrs. Colour spectrum of light shall be equivalent to `Philips White'. Lamp starter and ballast shall match the lamp.

1.3.3 Incandescent fittings :

1.3.3.1 Incandescent fittings shall be of the type generally specified on the drawings. Contractor should have sample approved by Architects/Consultant before procurement.

1.3.3.2 Incandescent fixtures shall be equipped with porcelain, medium base, screw type sockets for lamps upto and including 200 watt and mogul screw type pin type base for lamps 300 watt and over.

1.3.3.3 Re-lamping the fixture shall be possible without having to remove the fixture from its place.

1.3.3.4 Incandescent lamps shall be inside frosted/or clear type as required by the Architect/Consultant.

1.4 LED Light Fixtures Specifications :

1.4.1 General Purpose Led Luminaires should be suitable for indoor/outdoor installation for Office applications. The Fixtures should be Operational for 220-240 V Single Phase 50 HZ AC , and operational from 170-280 V without significant variation in output .The LED modules should be from approved make list Only with efficiency of a min 110 lm/watt and efficacy of fixtures should be greater than 80 lm/w for both indoor and outdoor fixtures.

1.4.2 Luminaries should be with built in Integral driver only. The Min degree of Protection for Indoor Fixtures should be IP20 and IP 44 for Semi Indoor an IP65 for Outdoor Fixtures. The THD of fixtures should be strictly <10 % and drivers should be compulsorily provided with overload, short circuit and over voltage protections. Power factor should be >0.90.

1.4.3 For Indoor applications the housing should be made of die cast/ Metal Housing and diffusers should be polycarbonate only, outdoor fixtures should be with die cast aluminium / extruded aluminium housing only .The Fixtures should be prewired upto the terminal block and easy to mount and Install and maintain.

1.4.4 The fixture should comply LM79-08 certification criteria and also module should be backed with LM80-08 Certificate from the OEM. The fixtures should be warranted for minimum period of 3 years from the date of Installation. The fixtures should have some kind of embossing/ engraving to identify the brand name. The manufactures should provide all kind of test report, technical details as and when called for. If required contractor have to provide test certificate from Government approved Lab for Claimed parameters by the manufacturer without any extra cost.

Technical specification of Lighting Fixtures :

S.No.	Description	Value
1	**Site Parameters**	
1.1	Ambient Temperature	0˚C to 50˚C
2	**Electricity Efficiency Management/Electronic Driver**	
2.1	Input Operating Voltage	110 to 270Volts, AC 50Hz±2
2.2	AC Power Factor	Not Less than 0.95
2.3	Efficiency of driver	More than 85%
2.4	THD (AC current 110V to 250V)	Not more than 10%
2.5	LED Drive Current	Not more than 500mA
2.6	Led Efficacy	≥110lm/watt
3	**Optical Management**	
3.1	Colour Temperature	2700˚K to 6500˚K
3.2	LED life with L70 criteria	Above 50,000 operating hours
3.3	CRI	More than 70
4	**Thermal Management**	
4.1	Jn. Temperature of LED at 25˚C	≤65˚C

4.2	Heat Sink temperature rise above ambient	≤30˚C
5	**General parameters**	
5.1	Mounting Arrangement	Mounting Angle Adjustment facility should be provided
5.2	IP Clause & Environment Protection	Minimum IP 20 for indoor, IP 44 for semi covered area and IP 65 for outdoor
5.3	Overall system efficiency	Not less than 75%

Successful Contractor has to submit test report of similar LED light fixture for following parameters from any Government Approved Test Laboratories for approval. However, test certificates of the lot to be supplied are required to be produced before supply of material at site.

For LED

- LM 80 report of the LED chip being used

For Fixtures

- Endurance Test
- Thermal Test
- IP rating test
- Power factor, efficiency
- Harmonic test
- Surge test
- Mechanical strength test
- Dielectric test
- IR test
- Goniophotometer Reading for the LED Light

Contractor have to give three year unconditional guarantee for replacement for each light fixture.

The electronic components used shall be as follows:-

a) IC (Integrated circuit) shall be of industrial grade or above.

b) Metallic film / Paper/Polyester Capacitor shall be rated for a sustained operating temperature of 105ºC.

c) The resistors should be preferably made of metal film where suitable, of adequate rating. The actual rating versus loading shall be by a factor of >2.

d) The junction temperature of the Switching devices such as transistors and MOSFETs etc. shall not exceed 125ºC (allowing thermal margin of 25 ºC).

e) The protective cum adhesive coating used on PCBs should be clear and transparent and should not affect color code of electronic components or the product code of the company.

f) The construction of PCBs and the assembly for components for PCBs should be as per relevant Indian / international standards.

g) The electronics covered for this equipment shall pass all the tests covered under relevant Indian / International standards specification.

h) The infrastructure for Quality Assurance facilities must be available at the manufacturing facility. In house testing facility for Quality Assurance should be present.

i) The connecting wires used inside the luminaries, shall be low smoke halogen free, fire retardant e-beam cable and fuse protection shall be provided in input side.

j) For outdoor fixtures, Care shall be taken in the design that there is no water stagnation anywhere. The entire housing shall be dust and water proof having IP66 or above protection and the light shall pass driving rain test/jet water test.

k) The LED Module(s), Driver gear, etc. shall be designed in such a way so that temperature of heat sink shall not exceed 30ºC above the ambient temperature.

l) All the material used in the luminaries shall be halogen free and fire retardant confirming to UL94.

m) The LED Luminaries shall have an input connector which shall be made of fire retardant material & its construction shall be water proof

n) The Contractor shall submit all the necessary support documents alongwith the compliance statement of all technical requirements w.r.t. Electrical, Optical, Thermal & environmental performance, including the Technical specification mentioned herewith.

o) Each LED should have necessary lens /reflector for better distribution of light at surface.

p) All the applicable test reports for complete fixtures and spare parts have to be submitted.

q) The manufacturer should have in house testing facilities within the India for the fixtures intending to supply.

1.3.4 Ceiling Fans :

1.3.4.1 Ceiling fans shall be complete with fan suspension stem canopies and regulators. 30 cm suspension stem shall be standard accessory and stems shall be heavy duty galvanized steel tubes to IS 1239- 1958.

1.3.4.2 Fans shall be mounted on a pre-embedded hook with hard rubber isolator. Regulators shall be no-step type mounted in the switch box. The box in all such cases shall be large enough to accommodate the regulator and switches. One sample box with top cover shall be got approved before procurement.

Note :- All the items specification for electrical to be consider general specification above