**Bank of Baroda,**
**Facilities Management Dept., 5th floor, Baroda Bhavan, Alkapuri, Vadodara.**

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**SUB: NOTICE INVITING TENDER FOR CIVIL, INTERIOR FURNISHING, ELECTRICAL, HVAC, FIREFIGHTING, CCTV & ALLIED WORKS ON 10TH FLOOR, BANK OF BARODA, BIFC TOWER, SEZ, GIFT CITY, GANDHINAGAR,GUJARAT**

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**Common Set of Conditions / Corrigendum No. 01 dt. 07.10.2022**

1.0 All common set of conditions/ Corrigendum No. 1, Integrity Pact, technical bid and revised price bid shall form part of tender i.e. contract agreement. The same shall be sealed and signed as acceptance of those conditions without any modifications and submit the same along with the tender bid. Non acceptance of the common set of conditions/ Corrigendum by the bidder or adding any other condition shall be treated as conditional tender and price bid of such tenderers shall not be opened.

2.0 The bidders have to submit "Unconditional Tenders" since all the queries have been clarified. Conditional bids / Tender is liable to be rejected. Other terms and conditions of the tender remain unchanged.

2.1 Reply on the queries /suggestion of the contractors:

| Sr. No | Clarification / Query / Deviation requested by Bidders | Reply/Clarifications |
|---|---|---|
| 1 | Please provide specifications of PA system | Please find attachment |
| 2 | Electrical HT connection required or LT | As per service provider |
| 3 | Confirm size of workstations | Please refer BOQ item No 13a,13b &13c of Furniture & Civil work |
| 4 | Location of CCTV camera and configuration | Please refer BOQ item No G1,G2 &G3 of Electrical work |
| 5 | Confirm size of lighting fixtures as per renovation area | Please refer BOQ item no K Lighting Fixture |
| 6 | Access control specifications | Please find attachment |
| 7 | UPS specifications | Please find attachment |
| 8 | Make of HDMI cable | MX, Kramer, Crestron |
| 9 | Make of light fixtures | Wipro / Philips / Havells / Halonix |
| 10 | Patch Cord make | D - Link / Digi Link / Molex / Legrand |
| 11 | Jelly cable required to be laid from ground floor | Please refer BOQ item No 23 (LAN system) For Electrical work |
| 12 | Specifications of Fire protection system | Please find attachment |
| 13 | Wood/Veneer panel details | Please refer BOQ item No 6-g of Furniture & Civil work |
| 14 | Kitchen platform specifications | Please refer BOQ item No 22 of Furniture & Civil work |
| 15 | Conference table/Reception table | Please refer item no 12-a & 12-e, layout plan. |
| 16 | Integrity Pact | Please find attachment |
| 17 | Cabins drawing specifications | Please refer layout plan |

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|---|---|---|
| 18 | Wooden flooring specifications | Please refer BOQ item No 16-f of Furniture & Civil work |
| 19 | Request to consider completion time of project a 3 month as in SEZ working is not permitted during night hours and delivery of modular furniture/ AHU/ AC system/curved glass is more than 45 days | Completion period of project : 2 months |
| 20 | Basic Rate of material -SSC-15 | Basic Rate of Material means Landed Cost (Discounted Rate) including all Govt. Duties, Taxes excluding GST, Transportation, Loading, Unloading, local carting , Handling etc. |

3.0 Last Date of submission of Tender shall be **14.10.2022 @ 1500 hrs.**

4.0 **Contractor have to submit:**
a) All common set of conditions/ Corrigendum No. 1, Integrity Pact, technical bid in **Envelop-1**
b) Revised Price bid (copy attached) in **Envelop-2**.

In case of non-submission of Corrigendum No. 1, Integrity Pact, technical bid and revised Price Bid, tender submitted by bidder shall be treated as conditional tender and shall not be considered for further evaluation.

5.0 The technical bid shall be opened on **14.10.2022 @ 1530 hrs**.in the presence of authorized representatives of the tenderers.

6.0 The Price bid will be opened at later date, of those firms/ contractors/ agencies, who fulfill the requirements / criteria put in the tender document.

7.0 All bidders are advised to consider the above points while submitting the financial bids.

8.0 The above shall be complementary in contents with the existing terms and conditions of the tender except otherwise explicitly superseded. Other terms and conditions of the tender shall remain unchanged.

**Sd/-**
**Asstt. General Manager**
**(FM & Security)**

**Place: Vadodara**
**Date: 07.10.2022**

Price Bid : NIT for Civil, Interior Furnishing, Electrical, HVAC, Firefighting, CCTV & Allied Works at 10th Floor, Bank of Baroda, BIFC Building, Gift SEZ, Gift City, Gandhinagar

| SUMMARY | | |
|---|---|---|
| **S.NO** | **DESCRIPTION** | **AMOUNT in Rs** |
| **1** | **FURNITURE / CIVIL WORK** | |
| | | |
| **2** | **TOTAL AMOUNT FOR FIRE FIGHTING WORKS** | |
| | | |
| **3** | **TOTAL AMOUNT FOR ELECTRICAL WORK** | |
| | | |
| **4** | **TOTAL AMOUNT FOR HVAC AND ALLIED WORK** | |
| | | |
| **5** | **GRAND TOTAL (S.No 1+2+3+4)** | |
| | **GRAND TOTAL in WORDS** | |
| | **Tax shall be as per GIFT SEZ norms and applicable Government regulations in this regard.** | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| A | **FURNITURE / CIVIL WORK** | | | | | |
| | **PARTITION /PANELLING** | | | | | |
| | Measurement of height shall be taken from finished floor level up to the level of ceiling, in case of varying heights on either side of partition, average height shall considered. The rate include Provision of extra frame work as necessary for skirting and making cut-outs for electrical switch plates, switch boxes, light fittings light etc. making provision for laying conduit as per drawings & directions. All plywood to be applied 1 coat of wood preservative with anti termite compound. | | | | | |
| 1 | **FULL HEIGHT SOILD PARTITION** | | | | | |
| a | Providing and Fixing of full height wooden partition made of 2 MM thick Aluminium tube frame The sections are placed @ 600 x 600 MM C/C both ways and additionally at openings or ends as required. Sections are joined by Aluminium angle cleats and the frame is fixed to wall, floor & ceiling with suitable aluminium angles and fastened with steel screws.Frame size 50 x 50 MM with 12 MM thick BWR Ply with glass wool for sound insulation need to close properly and 1mm thk. High Gloss Laminate/ Laminate in approved colour,design, shape and size, inculding all exposed surface with teak lipping 6mm thk as required and instructed by Architect inculding Anti Termite Treatment.Complete in all respect and satisfacation of Architect/Bank's Engineer.Rate shall include cost of making of all cut-outs for light fixtures, switchboards gadgets, gizmo, pelmets, grooves, beads cut out as per EIC instruction at site. | 304.00 | Sq. m. | | | |
| b | Extra over the above items-Providing and fixing High glossy Laminate Basic (Rate 1300/- per sqmt) on above partition. | 30.00 | Sq. m. | | | |
| c | Extra over the above items- providing and fixing 4mm thick veneer with PU finish instead of laminate for complete work. | 60.00 | Sq. m. | | | |
| d | **12mm thick coloured Interior grade MDF plain / texture with polishing** :<br>" ------DO ---------- as per above item No : 1 a - using 12mm thick coloured Interior grade MDF plain / texture with polishing for panelling work , as per the detailed drawing CNC cutting work / Engraving , with ICA water based PU spray polish as per approved by Architect/Client. The rate shall be for all floors, at all heights, all shapes including all costs. | 30.00 | Sq. m. | | | |
| e | **Coloured lacqured glass panelling** :<br>" ------DO ---------- as per above item No : 1 a - using 6 mm thick coloured lacqured glass panelling on frame work for panelling work , as per the detailed drawing CNC cutting work / Engraving , with ICA water based PU spray polish as per approved by Architect/Client. The rate shall be for all floors, at all heights, all shapes including all costs. | 6.00 | Sq. m. | | | |
| 2 | **LOW HEIGHT PARTITION** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| a | Providing and Fixing of low height wooden partition (up to 4'-0" to 5'-0" height or as per site required condition as architetct drawing) made of 2 MM thick Aluminium tube frame The sections are placed @ 600 x 600 MM C/C both ways and additionally at openings or ends as required. Sections are joined by Aluminium angle cleats and the frame is fixed to wall, floor with suitable aluminium angles and fastened with steel screws.Frame size 50 x 50 MM with 12 MM thick BWR Ply with 1mm thk.High Gloss Laminate/ Laminate as per approved colour,design, shape and size,inculding 100mm/80MMX12 mm Acrylic Soild Surface thermoformed on top , vertical face and Teak wood lipping 6mm thk as required to be provided at every exposed section of ply inculding Anti Termite Treatment.Complete in all respect and satisfacation,instructed by Architect/Engg. Rate shall include cost of making of all cut-outs for light fixtures, switchboards gadgets, gizmo, grooves, as per EIC instruction at site. | 140.00 | Sq. m. | | | |
| b | Half height partition with glass :<br>" ------DO ---------- as per above item No : 2 a - using 6mm thick coloured lacqured toughened glass for complete work. | 10.00 | Sq. m. | | | |
| c | Soft Board : Providing and fixing on wall approved quality soft board with cotton cloth/fabric of approved make and shade on 8mm thick BWR Ply with 19mm x 25 mm thick Ghana teak wood beading all around including ICA waterbased PU spray polish, as approved sample and as directed by Architect/Client. The work shall be measured & paid in Sqm. for all floors, all level and at all heights including all costs . The rate shall be inclusive of lacquer polish to all the exposed wooden members. Only the clear elevation area of the cloth/fabric shall be measured and paid. | 11.00 | Sq. m. | | | |
| 3 | **LOW HEIGHT PARTITION FOR OVEL SHAPE SEATING** | | | | | |
| | Providing and Fixing of low height wooden partition (up to 4'-0" to 6'0" height) made of 2 MM thick Aluminium tube frame The sections are placed @ 600 x 600 MM C/C both ways and additionally at openings or ends as required. Sections are joined by Aluminium angle cleats and the frame is fixed to wall, floor with suitable aluminium angles and fastened with steel screws.Frame size 50 x 50 MM with 9 MM thick flexible Ply with 1mm thk.High Gloss Laminate/ Laminate as per approved colour,design, shape and size,inculding 100mm/80MMX12 mm Acrylic Soild Surface thermoformed on top ,vertical face and Teak wood lipping 6mm thk as required to be provided at every exposed section of ply inculding Anti Termite Treatment.Complete in all respect and satisfacation,instructed by Architect/Engg.Rate shall include cost of making of all cut-outs for light fixtures, switchboards gadgets, gizmo, pelmets, grooves, beads cut out as per EIC instruction at site. | 75.00 | Sq. m. | | | |
| 4 | **FULL HEIGHT WOODEN GLAZED PARTITION** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| a | Providing and Fixing of full height wooden glazed partition made of 2 MM thick Aluminium tube frame The sections are placed @ 600 x 600 MM C/C both ways and additionally at openings or ends as required. Sections are joined by Aluminium angle cleats and the frame is fixed to wall, floor & ceiling with suitable aluminium angles and fastened with steel screws.Frame size 50 x 50 MM with 12 MM thick BWR Ply with 1mm thk. Laminate/High Gloss Laminate in approved colour,design, shape and size, & 12mm thick toughned glass panel fixed upto 8'-0"ht. as per disign given by architect with S.S clit/brackets,joints to be filled with matching silicon complete, as required and instructed by Architect and teak wood door frame in between the partition. inculding Anti Termite Treatment.Complete in all respect and satisfacation of Architect/Engg.Rate shall include cost of making of all cut-outs for light fixtures, switchboards gadgets, gizmo, groovesas per EIC instruction at site. | 95.00 | Sq. m. | | | |
| b | **FRAMING WORK FOR PARTION ABOVE CEILING** | | | | | |
| | -same as item no 4 a for above ceiling- Providing & fixing partition with acoustic treatment (With glass wool for sound insulation need to close properly) ,aluminum support for all partitions between false ceiling to RCC ceiling etc. complete as per direction. | 225.00 | Sq. m. | | | |
| 5 | **TOUGHENED GLASS FIX PARTITION - CABIN FRONT** | | | | | |
| a | Providing & fixing 12mm toughened fixed glass partition upto the false ceiling height. The glass fixed with S.S channel inserted in floor and fixed to wooden member in the false ceiling/partition with s.s clits/bracket. The size of glass to be bigger in width. The edges of glass to be polished and if joints are needed the joints to be filed with matching silicon complete. | 207.00 | Sq. m. | | | |
| b | **FULL HT.CURVED TOUGHENED GLASS PARTITION FOR DEALING ROOM** | | | | | |
| | Curved Glass for dealing room-Providing & fixing 12mm toughened curved glass partition . The glass fixed in solid 3" thk. 6" to 9" flexible plywood patta and fixed in solid 3" thk. 18" to 24" flexible plywood patta/partition with s.s clits/bracket. all the fiiting shall be S.S 304 grade. The size of glass to be bigger in width. The edges of glass to be polished and if joints are needed the joints to be filed with matching silicon complete. | 130.00 | Sq. mt. | | | |
| c | **CURVED TOUGHENED GLASS FIX PARTITION** | | | | | |
| | Providing & fixing 12mm toughened glass fixed on above the table top 6" flexible plywood patta . The glass fixed in curve plywood patta with groove and fixed with SS brackets. The size of glass to be bigger in width. The edges of glass to be polished and if joints are needed the joints to be filed with matching silicon complete. | 35.00 | Sq. m. | | | |
| 6 | **WALL & COLUMN PANELING** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| a | Providing and Fixing of **wooden Panelling** of wall and column made of 2 MM thick Aluminium tube frame The sections are placed @ 600 x 600 MM C/C both ways and additionally at openings or ends as required. Sections are joined by Aluminium angle cleats and the frame is fixed to wall, floor & ceiling with suitable aluminium angles and fastened with steel screws.Frame size 25 x 50 MM with 9 MM thick BWR Ply with 1mm thk.High gloss Laminate/ Laminate in approved colour,design, shape and size, inculding Anti Termite Treatment.Complete in all respect and satisfacation of Architect/Bank's Engineer.Rate shall include cost of making of all cut-outs for light fixtures, switchboards gadgets, gizmo, groovesas per EIC instruction at site. | 345.00 | Sq. m. | | | |
| b | **EXTRA 6MM LACQUERED GLASS** | | | | | |
| | Providing & fixing 6mm thick colour lacquered glass to be fixed on existing ply, lacquered glass is pasted or fixed with SS studs/adessive with grooves and edge polish as per details complete. Extra over above item no 6 a and for paneling, partition etc | 40.00 | Sq. m. | | | |
| c | **EXTRA ACRYLIC SOILD SURFACE** | | | | | |
| | Providing & fixing 6mm thick 100% Acrylic Soild Surface thermoformed to be fixed on existing ply,paneling, partition,side unit and table top etc. Acrylic Soild Surface is pasted or fixed with SS studs with grooves and edge polish as per details complete with buffing. Acrylic Soild Surface thermoformed surfaces to be buffered.Architect/EIC shall finalize the same in one or two colours. | 40.00 | Sq. m. | | | |
| d | Providing & fixing **12mm thick** 100% Acrylic Soild Surface thermoformed to be fixed on existing ply,side unit,partition top and faces and table top etc. Acrylic Soild Surface is pasted or fixed with SS studs with grooves and edge polish as per details complete with buffing. Acrylic Soild Surface thermoformed surfaces to be buffered.Architect/EIC shall finalize the same in one or two colours. | 60.00 | Sq. m. | | | |
| e | **FABRIC PANELLING** | | | | | |
| | Providing & fixing Fabric Panel on Acoustical Paneling for conference room on perforated panels made of a high density particle board , The back of the perforated panel shall have sound absorbing non-woven acoustical fleece. Providing and fixing Synth of 10mm thick on the acoustical panel high density particle board by using adhesive as per specifications of manufacturer.Supplying and laying FR grade fabric then cut into required size and shape.and stretched, inserted inside the gripper by using tools recommended by manufacturer. Rate shall include cost of making of all cut-outs for light fixtures, switchboards gadgets, gizmo, pelmets, grooves, beads cut out as per EIC instruction at site. Panelling item including openable shutter wherever required area and finish with the same material. | 40.00 | Sq. m. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| f | Providing and fixing powder coated Aluminum Skirting of 100mm high on partition/panellin and wall made of 1.0 to 1.5mm thick aluminum sheet.The skirting projection from installed surface of 5.1 mm approx and powder coating thickness 50-70 microns.skirting capping strip flexible PVC and end caps of skirting in hard pvc.skirting installation by screw fixing | 50.00 | RMT | | | |
| | | | | | | |
| g | **VENEER PANELLING** | | | | | |
| | Providing and Fixing of wooden Panelling of wall and column made of 2 MM thick Aluminium tube frame The sections are placed @ 600 x 600 MM C/C both ways and additionally at openings or ends as required. Sections are joined by Aluminium angle cleats and the frame is fixed to wall, floor & ceiling with suitable aluminium angles and fastened with steel screws.Frame size 25 x 50 MM with 9 MM thick BWR Ply with 4 mm veneer in two or more colours approved colour,design, shape and size, inculding Skirting and Anti Termite Treatment.Complete in all respect and satisfacation of Architect/Engg.. the panelling to be polished with MF P.U Matt finish after preparing base as per manufacturer's specifications. Rate shall include cost of making of all cut-outs for light fixtures, switchboards gadgets, gizmo, groovesas per EIC instruction at site. | 20.00 | Sq.Mt. | | | |
| h | Same as item no 6 a- providing and fixing Charcol sheet intead of laminate on paneling | 80.00 | Sq.Mt. | | | |
| | | | | | | |
| 7 | **DECORATIVE FILM ON GLASS** | | | | | |
| a | **FILM :-** Providing and fixing of 3M film Digital colour Printed as per design on toughfened glass in cabines door etc. complete as per direction. | 100.00 | Sq. m. | | | |
| b | Providing & Fixing up of Sun Control window film of Garware/ 3M inrequired sizes having the followingspecification: Reflective SilverIf used 1/8 inch clear glass followingparameter should be fulfilledThickness-02 mil(50 microns)Visible light transmittance-16% Visible light reflectance- 65%Solar Energy Transmittance 15%;Solar Energy reflectance-58%;Solar Energy Absorbance-27%;Ultraviolet transmittance < 2%;Glare reduction -82%;Shading coefficient 0.25E missivity-0.66; U Factor(BTU/hr./Sq.ft.)-1.03Total Solar Energy rejection-78%Complete job to be carried out as per thespecification and direction of Engineer-incharge. | 360.00 | Sq. m. | | | |
| 8 | **DOORS** | | | | | |
| a | Providing and fixing frame less patch fitting Single/Double door for with 12mm thick toughened & etched Glass (As per approved design & name/logo) with frame less glass fittings & two way floor springs . The item includes providing and fixing S.S. handle 400mm long on both side of glass, locks and fittings as per the manufacturer's specifications. complete to the satisfaction of Architect/Bank's Engg | 48.00 | Sq. m. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| b | Single Leaf Flush Door with frame and finish with laminate :Providing and fixing in position 40 mm thick solid core wooden single leaf flush doors of approved make having waterproof ply facing on both sides and finished with 1 mm thick laminate as approved , Hardware system of ( Hinges , Consealed door closer , Door handle ,lock , Door stopper ) . work complete including all type of hardware, fittings , fixtures and teak wood door frame 75 x 50 mm finish with matching polish, including frame ply covering with laminate finish as per instruction of Client/ Architect/PMC etc complete as per detailed drawings and specifications. sample mock shall be approved from Architect/Client. The item includes Item includes all following items / finishes: hardware such as 4 nos. 125mm SS hinges, SS tower bolts,Door Closer,glass vision panelMortise Locks with SS handles. | 25.00 | Sq. m. | | | |
| 9 | Acoustic door- Providing and fixing solid wooden doors in the Classroom. The door frame shall be made from 150 mm x 100 mm teak wood section as per details given in the drawings. The 75mm thick shutter frame shall consist of 45 mm x 150 mm wide top rail & bottom rail and Lock rail of 45 mm x 200 mm . It shall consist of 45 mm x150 mm wide vertical rails / Jambs. It shall have an infill of 32mm x 45 mm Horizontal Teak Wood one number vertical member and Five Horizontal member at Equal Distance. Gaps between shall be infill with 50 mm thk. Fiber glass wool slabs having 24Kg./Cu.M. Density. 12mm BWP marine plywood with 4mm thick natural veneer fixed on it with Adhesive on the both side and 200mm dia Glass view in the door. The shutter shall be anchored with 25mm x 80 mm Teak wood beading all around. All exposed wooden members and Veneer shall be finished in first quality melamine polish after staining of approved shade,complete as per instructions given by the consultant / EIC. Rate shall be inclusive of consealed door closer and all major / minor civil & repair work required to be carried out in order to execute the aforesaid item. | 5.80 | Sq. m. | | | |
| 10 | **CARPET TILES FLOORING** | | | | | |
| | Providing and Laying 100 % Nylon Multilevel loop pile Carpet Tiles of shade approved make as per make list, in 18oz Quality having 100 % solution dyed, of 1/12th gauge having pile thickness of 3mm total thickness 6.5mm. PIt should be antimicrobial and with soil/stain protection. Tile size 50cm x 50cm and tile backing should be of glass bac having minimum 32 % recycle content includingminimum 30 % post consumer content. Product should comply with CRI Green lable plus standards. Floor carpet for inside Hall flooring which shall be free from dust completed as per Architect instruction anddesign/approval. | 1350.00 | Sq. m. | | | |
| 11 | **False Ceiling:** | | | | | |
| | Suspending system and frame work shall match to complimentthe layout of A.C. Ducts / grills, electrical / fire protection wiring / fixtures, Return /supply Air grills etc. Rate to include provision of extra frame work needed due to layout referred above and fixtures etc. Rates to include necessary scaffolding and all. | | | | | |
| a | **GYPSUM BOARD FALSE CEILING** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | Providing & fixing Gypsum Board False ceiling with Saint Gobain "ULTRA" Main ceiling sections at 1200 c/c & Cross members at 450 c/c. The grid work to be suspended from ceiling with Hangers at every 1200 c/c both directions, as per manufacturer's specifications. False ceiling is finished with 12.5 mm thk. to be screwed to the frame. The board is finished with filling the tapered edges of the board with jointing compound and finishing with PAPER tape of INDIA GYPSUM. The ceiling is finished with acrylic Emulsion Paint inculding base as per approved manufacturer. The item includes all necessary cut outs for electrical / air conditioning grills and necessary frame work for them. | 900.00 | Sq. m. | | | |
| b | **ARMSTRONG FIBRE SUSPENDED CEILING (GRID)** | | | | | |
| | ARMSTRONG CEILING :- Providing & Fixing of Armstrong Mineral Fibre Suspended Ceiling System with Dune RH 99 (Bevelled Tegular) Edge Tiles with Armstrong 15mm exposed GRID. Size-600x600x16mm.The tiles should have Humidity Resistance (RH) of 99%, NRC 0.5,Light Reflectance 83%, Thermal Conductivity k = 0.052 - 0.057 w/m K, Colour White, Fire Performance UK Class 0/Class 1 (BS 476 Part 6 & 7), in module size of 600x600 x 16mm with Anti Microbial coating on the face of the tile, suitable for Green Building application,with Recycled content of 39%.The tile shall be laid on Armstrong Suprafine XL 38 with 15MM wide T - section flanges colour white having rotary stitching on all T sections i.e. the Main Runner & 1200 mm Cross Tees with a web height of 38mm and a load carrying capacity of 14Kgs/M2 & minimum pull out strength of 100Kgs. . The T Sections have a Galvanizing of 90 grams per M2 and need to be installed with Suspension system of Armstrong make. INSTALLATION: To comprise main runner spaced at 1200mm centres securely fixed to the structural soffit using Armstrong suspension system (specifications below) at 1200mm maximum centre. The First/Last Armstrong suspension system at the end of each main runner should not be greater than 450mm from the adjacent wall. | 1100.00 | Sq. m. | | | |
| | Flush fitting 1200mm long cross tees to be interlocked between main runners at 600mm centre to form 1200 x 600 mm module. Cut cross tees longer than 600mm require independent support. 600x600mm module to be formed by fitting 600mm long flush fitting cross tees centrally between the 1200mm cross tees. Perimeter trim to be Armstrong wall angles of size 3000x19x19mm, secured to walls at 450 mm maximum centres. Installation to be carried out by Armstrong Trained Installation team & Installation should be carried out as per Armstrong recommended procedure.**ARMSTRONG SUSPENSION SYSTEM**<br>accessories manufactured and supplied by Armstrong World Industries consisting of M6 Anchor Fasteners with Vertical Hangers made of Galvanised steel of size 26 x 26 x 25 x 1.2mm with a Galvanised Thickness of 80gsm, A pre tightened Hanger wire of dia – 2.5 mm of 1.8 m length., thickness of 80gsm and a tensile strength of 344-413 MPa, along with Adjustable hook clips of 0.8mm thick, galvanised spring steel for 2.68 mm with a minimum pull strength of<br>110 kg. The adjustable clip also consists of a 3.5 mm aquiline wire to be used with the main runner. (ARMSTRONG "DUNE RH 99 (Bevelled Tegular) EDGE TILES WITH ARMSTRONG 15mm Exposed" SYSTEM) | | | | | |
| c | **TRAP DOOR** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | Providing & fixing trap doors or AC units made of 12mm BWR ply fixed to 25mmx50mm aluminium frame all around. The door such made to be hinged to additional aluminium frame of 25mmx50mm section fixed in false ceiling frame. The 12mm ply to be finished with 1.0mm laminate / as per architect suggetion of approved colour. Item includes all hardware such as hinges, bolts etc. complete. | | | | | |
| (i) | size 600 mm x 600 mm | 4.00 | Sq. m. | | | |
| (ii) | size 1200 mm x 1200 mm | 4.00 | Sq. m. | | | |
| | | | | | | |
| d | Providing fixing istallation of Flexible Ceiling including making frame by using 6 mm flexible ply , 12 mm BWR ply and betten LED light as per standard requirement. Complete including all respect. | 15.00 | Sqmt | | | |
| | | | | | | |
| e | Wooden ceiling finish with veneer: Providing and fixing 12 mm thick BWR plywood false ceiling as per drawing & instruction & sample approved (complete with frame work). finish with 4 mm thick veneer gurjan base ply ICA waterbased PU spray polish. Plywood shall be fixed with required fabrication work and ply frame work with all necessary acessories Rate shall include cost of making of all cutouts for light fixtures, gadgets, gizmo, pelmets, grooves, beads and also provide support/template where ever requiredThe rate shall be in sq.mt for all floors and at all heights including all costs the shop drawing (or a sample mock of 5 Sqm minimum of the frame work and ceiling) shall be approved from 5mm Groove shall be provided at the junction of the false ceiling & the wall. ( considering all levels with require all fabricataion work and fitiing from RCC slab to false ceiling level) | 30.00 | Sq.Mt. | | | |
| | | | | | | |
| 12 | **FURNITURE** | | | | | |
| | | | | | | |
| a | CONFERENCE ROOM TABLE | | | | | |
| | CONFERENCE: Providing and fixing as per detail shape and size | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | table unit consist table with all required necessary accessories.<br>Approx Table size : 20000x750x750mm As mentioned in layout plan<br>1. ALL Top: 40-45 MM th top Made from 12mm thick Acrylic solid surface with round edge complete+ 12 MM th 303 BWR ply + 12 MM th 303 BWR ply mm + 4mm thick veneer gurjan base ply with . All top edges finish with Acrylic solid surface approved .<br>2.Verticle support: As per detail drawing and reference image made 100 mm thk end support with 19 mm thk BWR ply with 4mm thick veneer veneer gurjan base ply including required teakwood frame and 50 mm thk intermidiate support with 19 mm thk 303 BWR ply with 4 mm veneer and require teak wood cornice or 12mm thick Acrylic solid surface .<br>3.Wire management : Rate inclusive of fixing As per approved and requirement of schocket and quantity Pop up tabletop electrical WIRE MANAGEMENT BOX .<br>The work shall be done as per the approved shop drawing, specifications, sample approved and as directed by the Architect/Client . The rate shall be for complete item inclusive of all material, labour, wastages, necessary tools & tackles, adhesives consumable hardware & required SS 304 grade hardware/accessories of approved make for all floors, all heights, all levels and all places within campus. Contractor shall do all the needful and shall fulfill Architect's design intent. No additional claims will be entertained for this. The unit shall be manufactured in parts and these parts shall be assembled at site.Including finish with ICA water based PU spray selected by the engineer / Architect/Client in charge . (Table Top surface area shall only be | 16.00 | Sq.Mt | | | |
| b | **MEETING ROOM TABLE** | | | | | |
| | Providing and fixing as per detail shape and size table unit consist table with all required necessary accessories.<br>Size Approx : 3650mm x 1100 mm<br>Top: 35-40 MM thick top Made from 12 mm of corian + 12 MM th BWR ply +12mm th ply+ 1 mm thick laminate<br>2.Verticle support/box- As per detail drawing and reference image made form 19 MM th 303 BWR ply boxing 75 mm wide with 1mm thick laminate. as per Architect/Client suggestion<br>3.Wire management with race ways : Rate inclusive of fixing As per approved and requirement of schocket and quantity Pop up table top electrical WIRE MANAGEMENT BOX. The work shall be done as per the approved shop drawing , specifications, sample approved and as directed by the Architect /Client. The rate shall be for complete item inclusive of mock sample ,all material, labour, wastages, necessary tools & tackles, adhesives consumable hardware & required SS 304 grade hardware/accessories of approved make for all floors, all heights, all levels and all places within campus. Contractor shall do all the needful and shall fulfill Architect's design intent. No additional claims will be entertained for this. | 5.00 | Sq.Mt. | | | |
| c | **CENTER TABLE** | | | | | |
| | Providing and fixing Center table made of 18-19mm BWR ply. The top finished with 12mm Acrylic Soild Surface thermoformed including all edges and the sides to be finished with 6 mm Acrylic Soild Surface thermoformed . as/ approved design.compete in all respect and instructed by Architect/Engg. Table size **900x900x450** | 4.00 | Nos | | | |
| d | **CORNER TABLE** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | Providing and fixing Corner table made of 18-19mm BWR ply top to be finished with 6mm Acrylic Soild Surface thermoformed inculding all edges and the sides to be finished with 6mm Acrylic Soild Surface thermoformed as/ approved design ; complete in all respect and instructed by Architect/Engg. Table size **500x500x450** | 10.00 | Nos | | | |
| e | **RECEPTION TABLE** | | | | | |
| | Providing and fixing May I help YOU Table in with 19mm BWR Ply /Board and 1.0 mm laminate in two or more shades. The Customer top, which is at 230 mm higher than working top, customer top & front to be finished in 12mm thk corian solid surface thermoformed and fixed over 12 mm BWR Ply with provision for LED strip in cove as per design & Details. The table size to be 1800x750x750 inculding drawers godrej multipurpose locks,Cpu Trolly etc Teak lipping to be provided at channels for key board,and drawers to be provided on L.H.S/R.H.S..every exposed section of board and ply, Sliding channels for key board,and drawers to be provided. complete in all respect.( As per Architectural drawing) | 1.00 | Nos | | | |
| f | DISPLAY CABINET | | | | | |
| | Display cabinet in Reception area 380 mm deep in made of 18-19 mm BWR ply inculding openable shutters/glass shutter, 12 mm thk toughened glass for shelves and 12mm phenol bonded ply and 6mm phenol bonded ply with 1 mm designer laminate including all hardware , designer handles , , hinges , locks, channels including painting and polishing from inside and all visible areas with white laminate of 1mm thick instead of polishing.Complete in all respect. inculding Anti Termite Treatment. All internal surfaces to be finished with white paint | 10.78 | Sq Mts | | | |
| g | DINING TABLE | | | | | |
| | Providing and fixing cafeteria 900 mm Dia Round or 750x1200 mm rectangle tables (as decided by architect) with base structure made from 50mm SS round pipes and 6m SS strips. The top frame to be of 35x35mm Square SS pipes. The table top to have 18mm BWR ply finished with 12mm thick acrylic solid surface thermoformed to give rounded edge complete. complete in all respect.( As per Architectural drawing) All bottom surface of table to be finished with white Paint. | 10.00 | Nos | | | |
| | | | | | | |
| h | **GM Table:-** Providing and fixing table unit consist main table with side storage ,back storage with pedestal unit with all necessary accessories keyboard (ebco Make), CPU stand ,cable manager, modesty panel etc with all required necessary accessories.Basic rate of 4mm thick veneer.<br>Main table-2400x1050x750 Side/return table-1200x550x750<br>Back storage-3900x400x900<br>Pedestal unit-400x470x750<br>1. Main Table Top: 45 MM thick top Made from 6mm thick corian + 19 MM th 303 BWR ply + 19 mm th 303 BWR ply+4mm thick veneer finish with Matt PU polish<br>2.Main table front : As per detail drawing and reference image made form 19 mm th 303 BWR ply with 4mm thick veneer finish<br>3.Verticle support: As per detail drawing and reference image made form 19 MM th 303 BWR ply boxing 150 mm wide with 4mm thick veneer gurjan base ply with require edge finish teak wood/SS as per Architect/Client suggestion | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | ~~edge finish teak wood/SS as per Architect/Client suggestion~~<br>Side storage: Storage body is made of 19mm 303 BWR ply with 4mm thick veneer finish and inner side 1 mm thick laminate finish,top 6mm thick corian including require nos of drawer and shutter all type of fittings , fixtures, hardware Hettich/Haffle make etc complete .SS 304 grade conceal handle shall be provide as per approved selection &detailed drawing and instruction of Architect/Client/PMC .<br>4.Wire management: one way or two way open able flip top box mounted (Pop up box legrand make) on table top squeeze :A special flexible rubber component that allows easy and safe passage of wires<br>5.BACK STORAGE: Storage body is made of 19mm 303 BWR ply with 4mm thick veneer finish ,top 6mm thick corian and inner side 1 mm thick laminate finish including require nos of drawer and shutter all type of fittings , fixtures, hardware Hettich/Haffle make etc complete .SS 304 grade conceal handle shall be provide as per approved selection &detailed drawing and instruction of Architect/Client/PMC .<br>6.Pedestal unit(400x470X545):Pedestal bodys made of 19mm 303 BWR ply with 4mm thick veneer finish and inner side 1 mm thick laminate finish including require nos of drawer with all type of fittings , fixtures, hardware Hettich/Haffle make etc complete .SS 304 grade conceal handle shall be provide as per approved selection &detailed drawing and instruction of Architect/Client/PMC .<br>The work shall be done as per the approved shop drawing | 1.00 | Nos | | | |
| | | | | | | |
| i | **DGM and AGM Table**-Providing and fixing table unit consist main table with side storage ,back storage with pedestal unit with all necessary accessories keyboard (Ebco Make), CPU stand ,cable manager, modesty panel etc with all required necessary accessories. (all Top-thickness-40 MM)<br>Main table-2100x900x750 Side/return table-1100x400x750<br>Back storage-3500x400x900<br>Pedestal unit-400x470x750<br>1. ALL Top: 40 MM th top Made from 19 mm 303 BWR ply + 12 mm 303 BWR ply with top 6 mm corian with give rounded edge complete,1mm thick laminate finish on both side.<br>2.Main table front : As per detail drawing and reference image made form 19 mm th 303 BWR ply with with 1mm thick laminate finish.<br>3.Verticle support: As per detail drawing and reference image made form 19 MM th 303 BWR ply boxing 150 mm wide with 1mm thick laminate with require edge finish teak wood/SS as per Architect/Client suggestion.<br>4.Wire management: Rate inclusive of fixing As per approved and requirement of schocket and quantity Pop up tabletop electrical WIRE MANAGEMENT BOX .<br>5.BACK STORAGE: Storage body is made of 19mm 303 BWR ply with top 6 mm corian,1mm thick laminate finish and inner side 1 mm thick laminate finish including require nos of drawer and shutter all type of fittings , fixtures, hardware approved make etc complete .SS 304 grade conceal handle shall be provide as per approved selection &detailed drawing and instruction of Architect/Client.<br>6.Pedestal unit(400x470X545):Pedestal bodys made of | 2.00 | Nos | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | 19mm 303 BWR ply with 1mm thick laminate finish and inner side 1 mm thick laminate finish including require nos of drawer with all type of fittings , fixtures, hardware approved make etc complete .SS 304 grade conceal handle shall be provide as per approved selection &detailed drawing and instruction of Architect/Client/PMC.<br>The work shall be done as per the approved shop drawing , specifications, sample approved and as directed by the Architect/Client/PMC. The rate shall be for complete item inclusive of all material, labour, wastages, necessary tools & tackles, adhesives consumable hardware & required SS 304 grade hardware/accessories of approved make for all floors, all heights, all levels and all places within campus.<br>Contractor shall do all the needful and shall fulfill Architect's design intent. No additional claims will be entertained for | | | | | |
| j | **Executive dining Table-**Providing and fixing as per detail shape and size table unit consist table with all required necessary accessories.<br>Table size :2400 x 1100 x 750mm<br>1. ALL Top: 40-45 MM th top Made from 12mm thick Acrylic solid surface + 12 MM th 303 BWR ply + 12 MM th 303 BWR ply mm + 1mm thick laminate . All top edges finsih with Acrylic solid surface approved .<br>2.Verticle support: As per detail drawing and reference image made 100 mm thk end support with 19 mm thk BWR ply with 1mm thick laminate and 50 mm thk intermidiate support with 19 mm thk 303 BWR ply with 1mm thick laminate ...<br>The work shall be done as per the approved shop drawing, specifications, sample approved and as directed by the Architect/Client . The rate shall be for complete item inclusive of all material, labour, wastages, necessary tools & tackles, adhesives consumable hardware & required SS 304 grade hardware/accessories of approved make for all floors, all heights, all levels and all places within campus.<br>Contractor shall do all the needful and shall fulfill Architect's design intent. No additional claims will be entertained for this. The unit shall be manufactured in parts and these parts shall be assembled at site.Including finish with ICA water based PU spray selected by the engineer / Architect/Client in charge . | 1.00 | Nos | | | |
| k | **Research room table** | | | | | |
| | Providing and fixing 900 mm Dia Round tables with base structure made from 50mm SS round pipes and 6m SS strips. The top frame to be of 35x35mm Square SS pipes. The table top to have 18mm BWR ply finished with 6mm thick acrylic surface thermoformed to give rounded edge complete. complete in all respect.( As per Architectural drawing) All bottom surface of table to be finished with white 1.0mm laminate. | 2.00 | Nos | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| l | **Visitor cabin Discussion Table-**Providing and fixing as per detail shape and size table unit consist table with all required necessary accessories.<br>Table size :1800 x 750 x 750mm<br>1. ALL Top: 25-30 MM th top Made from 6mm thick Acrylic solid surface with give rounded edge complete + 19 MM th 303 BWR ply mm + 1mm thick laminate . All top edges finsih with Acrylic solid surface approved .<br>2.Verticle support: As per detail drawing and reference image made 100 mm thk end support with 19 mm thk BWR ply with 1mm thick laminate and 50 mm thk intermidiate support with 19 mm thk 303 BWR ply with 1mm thick laminate ...<br>The work shall be done as per the approved shop drawing, specifications, sample approved and as directed by the Architect/Client . The rate shall be for complete item inclusive of all material, labour, wastages, necessary tools & tackles, adhesives consumable hardware & required SS 304 grade hardware/accessories of approved make for all floors, all heights, all levels and all places within campus.<br>Contractor shall do all the needful and shall fulfill Architect's design intent. No additional claims will be entertained for this. The unit shall be manufactured in parts and these parts shall be assembled at site.Including finish with ICA water based PU spray selected by the engineer / Architect/Client in charge . | 2.0 | Nos | | | |
| | | | | | | |
| m | **Dealing room Curve Shape Table** | | | | | |
| | Providing and fixing curve shape table unit with pedestal unit with all necessary accessories ebco keyboard, CPU stand ,cable manager, modesty panel etc with all required necessary accessories.<br>Main curve shape table -L =as required x W=600mmx H=750 mm As per layout plan and detail given by Architect<br>1. Main Table Top: 50-55 MM thick top Made from 12mm thick corian + 19 MM th 303 BWR ply + 19 mm th 303 BWR ply+4mm thick veneer finish with Matt PU polish<br>2.Main table front : As per detail drawing and reference image made form 19 mm th 303 BWR ply with 4mm thick veneer finish<br>3.Verticle support: As per detail drawing and reference image made form 19 MM th 303 BWR ply boxing 150 mm wide with 4mm thick veneer gurjan base ply with require edge finish teak wood/SS as per Architect/Client suggestion.<br>4.Wire management: 2 nos. S.S. squre cable manager on each table (Total 60 nos.)<br>5.Pedestal unit(400x450X750):Pedestal bodys made of 19mm 303 BWR ply with 4mm thick veneer finish and inner side 1 mm thick laminate finish including require nos of drawer with all type of fittings , fixtures, hardware Hettich/Haffle make etc complete .SS 304 grade conceal handle shall be provide as per approved selection &detailed drawing and instruction of Architect/Client/PMC .<br>The work shall be done as per the approved shop drawing (to be prepared by contractor), specifications, mockup | 45 | Rmt | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | (to be prepared by contractor), specifications, mockup sample approved and as directed by the Architect and Engineer-in-charge. The rate shall be for complete item inclusive of all material, labour, wastages, necessary tools & tackles, adhesives consumable hardware & required SS 304 grade hardware/accessories of approved make for all floors, all heights, all levels and all places within campus. Contractor shall do all the needful and shall fulfill Architect's design intent. No additional claims will be entertained for this. The unit shall be manufactured in parts and these parts shall be assembled at site. | | | | | |
| n | **Sofa** | | | | | |
| | Providing and fixing sofa as per Description below :<br>The basic structure of sofa shall be made of solid wood members with flat spring and 12mm thick commercial ply and wooden frame. It shall be made out of 100mm thick PU foam of 32 densities in seat and back in 75mm thick rubber foam with 25mm thick high density PU foam rounded as per design with approved 48" to 54" wide upholstery fabric of Rs 600/- per meter complete as per design and instructions from engineer-in-charge. | 20.00 | Rmt | | | |
| o | **Book rack** | | | | | |
| | Providing and fixing Book rack as per detail drawing/Shape and Size as per ref image and instruction of Architect /Client. Storage body is made of 35mm thick MDF interior grade finish with both side 1 mm thick laminate .<br>The back of the unit is made from 9mm prelaminated board. Shelves: 35 mm thick MDF interior grade finish with both side 1 mm thick laminate.<br>All the exposed edges are with 2mm PVC egde Imported banding & sealed edges are with 0.8mm thick PVC Imported edge banding.<br>The rate shall be for complete item inclusive of all material, labour, wastages, necessary tools & tackles,approved make for all floors, all heights, all levels and all places within campus. Contractor shall do all the needful and shall fulfill Architect's design intent. No additional claims will be entertained for this. The unit shall be manufactured in parts and these parts shall be assembled at site. Front elevation area shall be measured for payment. | 4.00 | Sq.Mt. | | | |
| | | | | | | |
| p | **False Flooring** | | | | | |
| | Providing & fixing false flooring upto 300mm height made of Metallic Cementious tile with anti static high pressure laminate on top of size 600 x600 x 33 mm with supporting systems as per manufacturers specification (contactor has to provide manufacturers specification & test report for the material of work above) for UDL 1350 Kg and point load of 450 kg. alongwith suitable ramp to connect false floor with normal floor with M-floor / Kebao make as approved by Engineer-in-Charge( contactor has to provide one no. double cup panel lifter for future maintenance) | 35.00 | Sq Mts | | | |
| 13 | **Modular Furniture** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| a | **CUBICAL HEAD TABLE**: Supply and installation of Table (1800 X 750mm X 750mm) + Side Return Unit 1050-1200X 450 X 750 + Pedestal Drawer Unit + Metal Keyboard Tray 19" with Mouse Pad (ebco make) and Metal CPU Trolley completely made up of particle board conforming to IS : 12823 Interior Grade with post formed finish. Table Top are with 25mm thk boards with post formation on 2 sides and 2mm PVC edge banding with enhanced scratch resistance supported on 25mm thk. Gable ends and 18mm thk Modesty panels. exposed edges are in 2mm thk PVC edge banding & sealed edges are in 0.8mm thk PVC edge banding. Separate provision for mounting switches below the table adjoining the tables shall be made by customer as the tables do not come with switch mounting facility. Wire routing / wire management groumets (Patented Squeezee) shall be provided on main or side table as specified by customer. Key board Tray Metal 19" with mouse pad + Metal CPU Trolley | | | | | |
| | SIDE RETURN UNIT:- 1050- 1200(w) x 450(D) x750(H) : completely made up of particle board conforming to IS : 12823 Interior Grade with PVC edge banding. Top is in 25mmthk baord with 2mm post formation on 2 sides and 2mm PVC edge banding supported on 25mm thk. Gable ends and 18mm thk. Modesty panel.Having sliding shutter for storage. Exposed edges are in 2mm thk PVC edge banding & sealed edges are in 0.8mm thk PVC edge banding. Separate provision for mounting switches on the wall adjoining the tables shall be made by customer as the tables do not come with switch mounting facility.<br>PEDESTAL DRAWER UNIT:- The Pedestal Unit of Dimensions 400W x 470D x675mmH is made of 18mm thick pre laminated partical Board conforming to IS : 12823Interior Grade. All the exposed edges are sealed with 2mm thick PVC Imported edge banding on sides and bottom. The top and drawer facia are sealed with 2mm thick PVC edge. The drawer unit consists of 2 box drawer and 1 file drawer. The sides of Inside drawer box are of prelam particle board. The drawer box is fitted with roller Slide for freemovement. The drawer unit is provided with seprate locking system, where in the three<br>drawer are locked with one key.PVC recessed handles are provided for easy opening and closing of drawer. PVC edge banding are imported from Rehau or Dolken of Germany. The complete furniture unit is factory assembled with knock down fittings. The pedestal is fitted with additional (5th) | 12 | Nos | | | |
| b | **WORKSTATION -LINEAR TYPE (1350 x 600 mm)** | | | | | |
| | Manufacture, supply and Installation in position 'Linear' shape unit as directed Modular workstation comprising of partitions, work surface, gable end.Linear work station will be module of sittings both side/one side As per layout plan attached . the end of the linear work station to have partition as specified above. also the leaner work station to have 10 mm toughened glass parttion/ divider in frame. (Laminate-Century Green Royal Touch) | | | | | |
| | SIZE :- (1350 (L) x 600 (W) x 750mm /1200mm (H) | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | Panel based Partitions :-Vertical partition members made of aluminium extrusion alloy of minimum 60x60 mm size having thickness of min 1.2mm for vertical members and that of 1.00mm thick for horizontal members duly finished with powder coating in desired shade/colour. Both the faces of vertical partition to be fiished with laminate/fabric panels. Top caps of partition shall be slightly curved/flat shape of aluminium alloy duly finished with powder coating in desired shade/colour. The partition should have the raceways for carrying voice and data wire and power cable, which sholuld be separate from each other in the panel.(power switch should be above table). The panel abovethe work surface should be on tackable board with fabric panels. The height of partition shall be of min. 1200mm. All partition shouldhave the provision of level adjuster toadjust the height of + 10mm. All metal components will be finished with powder coated indesired shalde/colour.100mm high metal skirting. | | | | | |
| | 1200mm min. high partition thick panel based systems 1200mm(HT).Base shall be formed as approved powder coating on aluminium & fabric panel. Workstation along corridor / Pasaage. | | | | | |
| | 1200mm min. high partition with laminate finish below the worktop, fabric above work top towards Inside and Outside of Workstation in return partition / handshake Only end to end of workstation. | 70 | Nos | | | |
| | Work Top:- Worktop shall be of 25mm thick prelaminated particle board with 2mm thick PVC edge banding finish with as per approved laminate colour. | | | | | |
| | Work top shall have 2mm PVC edging of approved make quality shade and colour on exposed area and 1mm on covered area. | | | | | |
| | The top shall be supported with suitable M.S. bracket of standard size made of CRCA sheet of minimum 2mm thick Grade D as per IS 513 with power coated finish of approved colour. | | | | | |
| | Powder coating will be in Epoxy powder coating will be minimum 50 micron. | | | | | |
| | Gable Ends shall be of 25mm thick prelaminated particle board with 2mm thick PVC edge banding finish with as per approved laminate color. | | | | | |
| | Gable end Bracket will be of minmum 2.0mm thick CRCA steel Grade D as per IS 513 with metal insert | | | | | |
| | Round Wire manager for wire management od dia 60-70mm shall be finished same as per table top. | | | | | |
| | the leaner work station to have 10 mm toughened glass parttion/ divider in frame. | | | | | |
| | KEY BOARD TREY WITH MOUSE PAD & CPU TROLLEY (Ebco make) | | | | | |
| | 3 Drawer pedestal with levellors :- Prelaminated 3Drawer Pedestal (2D+1F) 400Lx450Dx685Ht. Carcass & Facia made up of 18mm thick Pre-laminated particle board. Back Panel from 9mm PPB. All exposed edges are sealewd with 2mm thick PVC edgeband & Non-exposed edges with 0.8mm thick PVC edge-band | | | | | |
| c | **WORKSTATION -L- TYPE L=(1500x1500)x W=600 mm** | | | | | |
| | Same as item no 13 b -for L shape L=1500x1500mm ,W= 600 mm (Refer layout plan) | 40 | Nos | | | |
| 14 | **STORAGE** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| a | Providing and fixing Storage cabinet 380mm deep and 750/1200 mm high length as/deign as shown in details with all sides, shelves to be 18-19 mm thk. BWR ply with 12mm BWR ply to be fixed at the back finished with 0.8mm laminate. The shutters to be 18-19mm BWR ply, with 1mm laminate. All internal surfaces to have 0.8m laminate but the top surface finished with 6mm Acrylic Soild Surface thermoformed at edges in front side 25mm thk. All edges of sides, shelves and shutters to have 2mm PVC Edge binding tape as per details, complete including S.S. long handles, self closing hinges, locks, etc. complete to the satisfaction of Architect /Bank's Engg. (Only front elevation to be considered for area calculation) | 30.00 | Sq. m. | | | |
| b | Providing and fixing Storage cabinet 450mm deep and 2400mm/up to false ceiling high length as/deign as shown in details with all sides, shelves to be 18-19 mm thk. BWR ply with 12mm BWR ply to be fixed at the back. The shutters to be 18-19mm BWR ply, with 1.0 mm laminate. All internal surfaces to have 0.8m laminate. All edges of sides, shelves and shutters to have 2mm PVC Edge binding tape as per details, complete including S.S. long handles, self closing hinges, locks, etc. complete to the satisfaction of Architect /Bank's Engg. Only front elevation to be considered for area calculation. | 25.00 | Sq. m. | | | |
| 15 | **ROLLER BLIND** | | | | | |
| | Providing & fixing roller blinds comprising of polymer coated fibre fabric with minimum openness factor of 3% as per AS standards. The fabric shall be fire retardant and have high heat reflection ratios. The roller mechanism shall be a moulded unit made from engineering grade plastic polymer with steel spring support. The fabric shall be finished on the sides with edge tape duly welded for waviness control. The fabric shall be attached to the roller tube with high quality self adhesive tape. Average width of blinds shall be 2000mm and fall of 3000mm with manual operation. | 350 | Sq. m. | | | |
| | Headrail: shall be .812" high x 2" deep extruded aluminum headrail with a wall thickness of 0.045" and painted to coordinate with fabric color. | | | | | |
| | Cord lock: shall be a snap-in design of injection-molded thermoplastic incorporating a metal, free-floating, serrated cord-locking roller. | | | | | |
| | Lift cord: shall be 1.2mm polyester and concealed for a clean appearance. A snap tassel and joiner ball connect to a single Danskord for raising and lowering the shade. Cord, tassel and joiner ball are color coordinated with fabric. | | | | | |
| | Installation: Bracket shall be low profile, hidden snap-in design made of 0.025" zinc-plated spring steel. | | | | | |
| | Bottomrail: shall be 0.375" high x 2" deep extruded aluminum with a wall thickness of 0.045" and painted to coordinate with fabric color. | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | Fabrication Shades shall be fabricated according to specifications and accurate to tolerance established by SWF engineering standards<br>Make: Hunter douglas/ Roselle/winfab/vista . | | | | | |
| b | Providing and fixing 300mm height and 150mm width "U' shape pelmet made of 18mm thk. Bwr ply finihed with 1mm thk laminate. IS 303, every section fixed wooden margin supported from Rcc slab /beam soffits by Ms Flat Gi wire at 1.0mt c/c spacing as approved complete in all respect as per detail and as Instructed by Architect/Engg. | 130.00 | RM | | | |
| c | Providing & fixing and pasting Wall paper as per design & details. The item includes making base by appliing oil base primer including surface preparation and all to get a uniform smooth surface. (base Price Rs 150/sqft) The fixed area of wall paper shall be considered for payment and not the area of procured material. | 60.00 | Sq. m. | | | |
| 16 | **Miscellaneous Work** | | | | | |
| a | Providing and fixing BANK OF BARODA Back light LED with logo in hindi & English in SS Plate 304grade 16gauge as per Bank's Instructions. Height of the letters should be 7"-8" The Plate to be fixed on Wall/Glass/Paneling with SS spacers as per details Complete. | 1.00 | Nos | | | |
| b | Providing & fixing decorative wall Paintings in wooden frames on wall as approved of base prize Rs. 3000-3500/- each (Size 300/450 to 600/900) | 10.0 | Nos | | | |
| c | Providing and fixing world map 8 mm thk acrylic sheet on existing paneling/partition of wall as per the detailed drawing CNC cutting work / Engraving /colour approved by EIC | 4.00 | SMT | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| d | Providing and fixing notice boards with 19mm BWR Ply sides with 1.0mm laminate finish and 8mm clear glass Shutters fixed on pivots. The back to have 6mm thk BWR Ply and 12mm soft board covered with cloth of approved shade. Item includes all hardware such as push catcher, lock for glass shutters etc complete including polishing the teak surfaces. Size 1200x600mm & 150deep | 1.00 | Nos | | | |
| e | Providing & fixing ready made Pin up boards with 12mm celotex boards 600mmx 900 mm with suitable cloth on top, board is fixed with aluminum frame complete with polish. | 3.00 | Nos | | | |
| f | Providing and fixing of 8-9mm thick Laminated wooden flooring/skirting with a surface abrasion resistance of class AC4, with 0.2mm thick wear layer on top of a High Density Fibre substrate core of plank having uniline locking arrangement with an made of Armstrong natural colour foam, with accessories like Skirting, end profile, door profile, transition profile, reducer etc. complete. Make-ARMSTRONG/ AMBIENCE PLUS/ PERGO/vista. Length and breadth of superficial areas of the finished work shall be measured for payment. | 75 | Sq Mts | | | |
| | | | | | | |
| g | Providing and fixing PANTRY/TOILOET Mirror on wall with 6mm thick clear glass mirror with bevelled edge fixed over 6mm water proof ply finished in teak wood moulding 2”x1”. The moulding to be finished in melamine polish (complete as per the direction of Engineer-in-charge) | 3.00 | Sq Mts | | | |
| h | Providing and fixing Flower pot size 12"x12" made by 12 mm BWR ply finish with 6mm thk corian..All Acrylic Soild Surface thermoformed surfaces to be buffered.as/design and specification | 10.00 | Nos | | | |
| i | Providing and fixing Flower pot size 15"x15" made by 12 mm BWR ply finish with 6mm thk corian..All Acrylic Soild Surface thermoformed surfaces to be buffered.as/design and specification | 8.00 | Nos | | | |
| j | Planter type 2 : Providing and fixing 12mm thk BWR ply finish with 6mm Acrylic Soild Surface Flower planter 12" wide 12" height & lenth as reqired as/design and instruction. | 6.00 | RMT | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| k | SS Dustbin 12" dia 1'-3" height | 20.00 | Nos | | | |
| l | LED Signage with aluminium frame for Department (Aprrox Size 100mmx 450mm) Reference image   | 20.00 | Nos | | | |
| | | | | | | |
| m | Providing and making provision of Drinking Water & fixing storage type water cooler, Bluestar/voltas, stainless steel front panel, C.P. brass push cock, inlet float valve with all plumbing and electrical accessories, inlet, outlet, overflow & PVC drain out connection to floor drain. Coolling capacity 80 litres | 1.00 | Nos | | | |
| 17 | Brick work with 2nd class good quality brick in 1:5 cement mortar (1 cement: 5 c.sand) including racking out of joints, scaffolding, making provision for opening in walls for switches, water lines, watering, curing etc. complete as directed by the Architect/Engineer incharge. Item to also include, all accessories, men material for a lift up to 10th floor in the building for materials, pre-application preparation cleaning after the finish etc. complete. | 10.00 | Cu. m. | | | |
| 18 | Providing 15mm thick **Cement Plaster** in single coat on brick/concrete wall fointerior plastering at various floor level as below, finished even and smooth including application of rough backing coat of cement mortar 1:4 with trowel finish as direction. complete as directed by the Architect/Engineer incharge. Item to also include, all accessories, men material for a lift up to 10th floor in the building for materials, pre-application preparation cleaning after the finish etc. complete. | 30.00 | Sq. m. | | | |
| 19 | Providing M-10 (1: 3 : 6) Grade Lean Concrete complete all respect under the floor tiles. complete as directed by the Architect/Engineer incharge. Item to also include, all accessories, men material for a lift up to 10th floor in the building for materials, pre-application preparation cleaning after the finish etc. complete. | 270.00 | Cu.m. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 20 | Providing & laying 125/150mm thick IPS floor with required slope finished with cement mortar 1:4 (1 cement :4 sand) with neat cement slurry, curing etc. including making junction vata etc. complete as per direction. | 2.00 | Cu. m. | | | |
| 21 | **Flooring :-** | | | | | |
| a | Providing and laying 10-12mm thick Vitrified tiles of (600x600 ) Johnson /Somany/kajaria make or approved equivalent and of approved shade of size as per drawing in floors over 20mm (average) base of cement mortar 1:4 ( 1 cement :4 coarse sand) required thickness to match finished floor level mentioned with cement pest /chamical and to match the neighboring floor finish and jointed with epoxy grout of approved shade from as/existing or equivalent brand all complete as directed complete. Rate to include forming pattern in the flooring like border, skirting, cut tiles, Protecting of the tile till hand over date by Polypropylene 2 mm Floor Protection ., etc complete in all respect. complete as directed by the Architect/Engineer incharge. Item to also include, all accessories, men material for a lead/ lift up to 10TH floor in the building for materials, pre-application preparation cleaning after the finish etc. complete. | 1620.00 | Sq. m. | | | |
| b | **Flooring** :-Providing and laying 10-12 mm thick Vitrified tiles of (1200x600 ) Johnson /Somany/kajaria make or approved equivalent and of approved shade of size as per drawing in floors over 20mm (average) base of cement mortar 1:4 ( 1 cement :4 coarse sand) required thickness to match finished floor level mentioned with cement pest /chamical and to match the neighboring floor finish and jointed with epoxy grout of approved shade from as/existing or equivalent brand all complete as directed complete. Rate to include forming pattern in the flooring like border, skirting, cut tiles, Protecting of the tile till hand over date by Polypropylene 2 mm Floor Protection ., etc complete in all respect. complete as directed by the Architect/Engineer incharge. Item to also include, all accessories, men material for a lead/ lift up to 10TH floor in the building for materials, pre-application preparation cleaning after the finish etc. complete. | 80.00 | Sq. m. | | | |
| c | Providing and fixing 300x600 ceramic tiles dado on walls in two or more colours as per design in toilets and kitchen. The tiles to be fixed with white cement on the base plaster. The joints in the tile to be filled with white cement mixed in colour pigment to match the colour of tiles. (Base rate of Vitrified tiles Rs.600/- per Sq.mt ).(complete as per the direction of Engineer Incharge) | 10.00 | Sq Mts | | | |
| d | Providing and fixing 300x600 ceramic tiles dado on floor two or more colours as per design in toilets and kitchen. The tiles to be fixed with white cement on the base plaster. The joints in the tile to be filled with white cement mixed in colour pigment to match the colour of tiles. (Base rate of Vitrified tiles Rs. 800/- per Sq.mt ).(complete as per the direction of Engineer Incharge) | 10.00 | Sq Mts | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 22 | Providing and fixing 0.80 meter wide sand which type platform including supplying and fixing granite stone 18 mm thick mirror polished Granite stone in top and side position and vertical strip at front over 25 mm thick polished kota stone platform fixing in top and sides and intermediates supports fixing with cement mortar using cementinious Adhesive Materials as per EIC and adhesive jointed with Matching epoxy grout finishing. including making recess for Kitchen/Laboratory sink etc. rubbing, polishing, Moulding/Rounding of edges complete as approved drawing and directed by engineer incharge (Useing maximum Size i.e in one piece ) in wash basin /Pantry counter.Incl. all accessories, men material for a lift up to 10th floor in the building for materials, pre-application preparation cleaning after the finish etc. complete. as instructed by Architect/Engg. (base rate of granite 350/Sft) | 8.00 | Sq Mts | | | |
| 23 | Applying general insecticide pest control treatment with 5 years guarantee for carrying out floor treatment including spraying with chemical solution in oil base including labour and material etc. complete. | 1700.00 | Sq. m. | | | |
| 24 | Providing and doing **core cutting in RCC slab/Beam** at given location as per architectural instructions inluding necessary tools and machinaries, scaffolding, watering, rate also included carting away the debris from site time to time or disposing the material as directed and specified by the Architect | | | | | |
| I) | 100 MM | 3.00 | Nos | | | |
| II) | 150 MM | 3.00 | Nos | | | |
| III) | 200 MM | 3.00 | Nos | | | |
| **25** | **PAINT WORK** | | | | | |
| a | **PLASTIC ACRYLIC EMULSION PAINT** | | | | | |
| | Providing and applying three coats of pre-approved Plastic acrylic emulsion paint to walls, partitions etc. including surface preparation with two coats of putty, primer and sanding all complete. With the necessary drying periods for each coat. The final finish should be of a uniform and neat finish to the satisfaction of the Architect. Cost to inculde for all heights and surfaces , complete in all respect (Low VOC contain paint) | 1500.00 | Sq. m. | | | |
| b | **PLASTER OF PARIS (POP)** | | | | | |
| | Providing and applying plaster of paris (super fine quality) punning with minimum thickness of 6mm and finish the surface smooth in line and also making groove, level to the entire satisfaction of Architect including scraping and hacking the existing finished surfaces, scaffolding etc. complete in all respect | 10.00 | Sq. m. | | | |
| c | ENAMEL PAINT | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | Painting two coats of enamel paint (Asian/BERGER ) including scrubbing, sand paper, making base applying primer etc complete in all respect in , grills etc.complete in all respect | 10.00 | Sq. m. | | | |
| d | providing and fixing 2mm thick pvc sheet at joints of glazing and slab.The sheet to be properly fixed with slab and glazing structure with proper adesive and properly finish.complete in all respect. | 60.00 | Sq. m. | | | |
| 26 | **PLUMBING WORK FOR PANTRY/TOILET** | | | | | |
| a | Providing and fixing white vitreous china wash basin including making all connections but excluding the cost of fittings :wash basin of size 610x500mm. Parryware Code C8418 | 2.00 | Nos | | | |
| b | Providing & fixing following size approved quality CP brass Bottle trap connection pipe upto the wall and wall flanges including jointing with white zinc and spun yarn & testing the joints for leak proofness etc. complete. | | | | | |
| i) | 32 mm dia | 2.00 | Nos | | | |
| ii) | 40mm dia | 2.00 | Nos | | | |
| c | Providing & fixing following size, approved quality CP brass Waste coupling with brass check nuts conforming to IS 2963, including jointing with white zinc and spun yarn and testing the joints for leak proofness all complete. | 3.00 | Nos | | | |
| d | Providing and fixing brass bib cock of approved quality: (Jaguar Model Florentine) | | | | | |
| | 15 mm nominal bore | 3.00 | Nos | | | |
| e | Angle Cock Jaguar Florentine | 3.00 | Nos | | | |
| f | Master stop cock Jaquar/ Hindware/Grohe make, heavy duty | 2.00 | Nos | | | |
| g | Providing, fixing, testing and commissioning of PVC angle valve with PVC wall flange, Nut and Washer etc. complete as required. | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| i) | 15 mm dia | 2.00 | Nos | | | |
| ii) | 25 mm dia | 2.00 | Nos | | | |
| h | Providing and fixnig liquid soap dispenser JAGUAR (CAN-1135N soap dispenser glass bottle) including fixing to the wall with wooden cleats and CP brass screws, cutting walls and making good the same, (complete as per the direction of Engineer-in-charge) | 2.00 | Nos | | | |
| i | Pantry Sink Nirali /elegant make in 610mmx510 bowl depth without Drain. | 1.00 | Nos | | | |
| | **WATER LINE** | | | | | |
| j | CPVC 15 mm nominal outer dia Pipes including socket, T, L-Bow complete all respects | 20.00 | RM | | | |
| k | CPVC 19/20 mm nominal outer dia Pipes including socket, T, L-Bow complete all respects | 15.00 | RM | | | |
| l | CPVC 25 mm nominal outer dia Pipes including socket, T, L-Bow complete all respects | 30.00 | RM | | | |
| | **DRAINAGE** | | | | | |
| m | Providing and fixing UPVC soil pipes confirming to IS:1729 on walls including filling the joints with specialised jointing solutions and fixed with G.I. clamps embedded in cement concrete blocks 100x100x100 of 1:2:4 (1 cement :2 coarse san:4 stone aggregate) including cutting holes and making good the walls etc. item includes Providing and fixing UPVC pipes specials such as door bend, horn bend, plain bend, cowls, sockets, door "T", 'Y' and 'T' junctions(both single and double etc. including fixing with cement jute admixture complete as directed | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| i) | For 100mm pipes | 10.00 | R/mt | | | |
| ii) | For 150mm pipes | 5.00 | R/mt | | | |
| iii) | For 75mm pipes | 20.00 | R/mt | | | |
| | For 50mm pipes | 30.00 | R/mt | | | |
| n | Providing and fixing in position 75 mm N.B. Cl. Nahni traps of self cleaning design including 125 mm dia CP grating, joining, embedding in concrete etc. complete. Rate to include making of opening in floor, marble / tiles, for fixing grating. | 3.00 | Nos | | | |
| o | C.P. towel ring:- Providing & fixing 15 mm dia C.P. towel ring for wash hand basin of approved make etc. complete.as approved by Architect/Engineer-in-charge, Item to include screws, rollplugs and all fixing accessories,installed complete. Item to be completed in all respects as per drawings & instructions from Project- in- charge/Architect. | 5.00 | Nos | | | |
| p | C.P.Toilet paper holder:-Providing & fixing C.P.Toilet paper holder of approved make continental range as perinstructions of engineer in charge etc. complete as approved by Architect/Engineer-incharge.<br>Item to include screws, rollplug and all fixing accessories,installed complete.Item to be completed in all respects as per drawings & instructions from Project-incharge/Architect. | 5.00 | Nos | | | |
| | | | | | | |
| **27** | **CHAIRS** | | | | | |
| a | Cabin Officers Chair PCH 7000 (GODREJ),MHB Premium series(Methodex), Bodyline HBG (featherlite) Eurocaustic, Amardeep or as approved by Bank Basic Rate Rs 15000/- | 6.00 | Nos | | | |
| b | Lunch area chairs Café-01 ( Methodex) , Staq (GODREJ),Magna without Castor (CP)(featherlite) Eurocaustic, Amardeep or as approved by Bank Basic Rate - Rs 5000/- | 28.00 | Nos | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| b | Chiar for executive Lunch Room (Basic Rate - Rs 5000/-) | 8.00 | Nos | | | |
| | | | | | | |
| | **TOTAL AMOUNT FOR FURNITURE / CIVIL WORK** | | | | | |
| | | | | | | |
| **2** | **FIRE FIGHTING WORKS** | | | | | |
| | **AUTOMATIC SPRINKLER SYSTEM:** | | | | | |
| | | | | | | |
| 1.0 | Providing, fixing, testing and commisioning of M.S. black steel heavy duty (Class `C') pipes (IS:1239 Part-I), and fitting like flanges (MS steel flanges at every 15 M length and as required) tees, elbows, bends, Junctions, Reducers, union, adaptor, rubber gasket, GI NUT Bolt, Washe etc; clamps / structural steel supports hangers of required design as required/directed at site including cutting & making good the walls, RCC work etc including painting the exposed pipes with 2 coats of desired shade of enamel over a coat of primer and signages. Pipe upto 50mm dia will be with threaded joint using Teflon tape. Joint for pipe and fitting above 50mm dia shall be welded joint with approved fitting. | | | | | |
| | | | | | | |
| a) | 25 mm dia | 200.00 | RM | | | |
| b) | 32 mm dia | 105.00 | RM | | | |
| c) | 40 mm dia | 80.00 | RM | | | |
| d) | 50 mm dia | 80.00 | RM | | | |
| e) | 65 mm dia | 78.00 | RM | | | |
| f) | 80 mm dia | 50.00 | RM | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| g) | 100 mm dia | 50.00 | RM | | | |
| h) | 150 mm dia | 20.00 | RM | | | |
| | | | | | | |
| 2.0 | Providing, fixing, testing and comminsioning 15mm dia, Quartzoid bulb type G.M. Sprinkler Head (Pendent/Upright/Conventional, as required) (UL/FM/LPC listed/ Approved chrome plated quick response type. | | | | | |
| a) | Set to operate at 68$^{O}$C pendent | 270.00 | Each | | | |
| | | | | | | |
| 3.0 | Providing, fixing, testing and comminsioning 15mm dia, quartzoid bulb type G.M. Chrome plated side wall, sprinkler head set to operate at 68$^{O}$C (UL/FM/LPC listed/Approved) quick response type. | | | | | |
| a) | Side wall | 26.00 | Each | | | |
| | | | | | | |
| 4.0 | Providing, fixing, testing and commissioning UL Listed S.S. Braided Flexible pipe for sprinkler drop complete with flare nuts on both end with washer and supporting rods and clamps 25mm dia upto 1.5 Mtr. Long. | 270 | Each | | | |
| | | | | | | |
| 5.0 | Supply and installing clean agent modular ceiling mounted Fire Extinguisher CE certified fire extinguisher filled with HFC 236FA clean agent gas complete in all respects including all fittings.(**In server room)** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| a) | 5 Kgs. | 6.00 | Each | | | |
| 6.0 | Supply and installing clean agent(stored pressure)type Fire Extinguisher ISI marked IS :15683 filled with HFC 236FA clean agent gas, Complete with squeeze grip release valve , locking arrangement, pressure gauge, operation manual and bracket. Complete in all respects. Operating temperature 0 deg C to + 55 deg C.(**outside server & electrical room.)** | | | | | |
| a) | 4 Kgs. | 6.00 | Each | | | |
| 7.0 | Supply and installing clean agent(stored pressure)type Fire Extinguisher ISI marked IS :15683 filled with HFC 236FA clean agent gas, Complete with squeeze grip release valve , locking arrangement, pressure gauge, operation manual and bracket. Complete in all respects. Operating temperature 0 deg C to + 55 deg C. | | | | | |
| a) | 2 Kgs. | 6.00 | Each | | | |
| | | | | | | |
| **2** | **TOTAL AMOUNT FOR FIRE FIGHTING WORKS** | | | | | |
| Note : | Approval of fire hydrant and sprinkler system from local fire authority at initial and various stages of works including preparation of report./ drawings as per local fire authority contractor shall include cost of all liaison works which are not explicitly mentioned above but are mandatory to have fire authority approval.(Any Statutory Charges shall be re-imbursed by the owner as actual upon submission of recipt / documantry proof. | | | | | |
| **3** | **Electrical work** | | | | | |
| | | | | | | |
| **A)** | **MV PANEL BOARDS** | | | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | Design, fabrication, loading, unloading at store, installaton, testing & commissioning as directed by Engineer-in-Charge, of LT Panels fabricated out of **2mm thick** for structural members (Load bearing members) and 1.6mm thick for door and covers (Non load bearing members) CRCA sheet in cubicle compartmentalize free standing floor mounted, dust and vermin proof with reinforcement of suitable size angle iron, channel 'T' irons and / or flats wherever necessary, **16 gauge CRCA** sheet steel shall be used for final distribution panels. Cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with all anticorrosive process before painting as per specifications with 2 coats of zinc chromate primer and final approved shade of enamelled paint. 2 Nos. earthing terminals shall be provided for all distribution panels. Panels shall be suitable for 415V, 3-phase, 4-wire, 50Hz supply system and with 15% spare space, lifting hooks shall also be provided in case of large panels. Panel must be BMS/FAS Compatible. | | | | | |
| | | | | | | |
| | Approval shall be taken for each panel before fabrication. Galvanized hardwares with zinc passivation shall be used in fabrication of panels. | | | | | |
| | **General Notes:** | | | | | |
| | | | | | | |
| 1 | **MCCB:** | | | | | |
| | MCCBs shall be used with Thermal Magnetic Based releases upto 250A and microprocessor based Over Load, Short Circuit / Earth Fault release. | | | | | |
| | | | | | | |
| 2 | Breaking capacity mentioned is Ics value. | | | | | |
| | | | | | | |
| 3 | This BOQ to be read in conjunction with technical specifications and Single Line Diagram (attached for reference). If any discrepancy occurs that should be brought to the notice of Client/Consultant before quoting the price otherwise stringent condition will be deemed to have been considered. | | | | | |
| | | | | | | |
| 4 | All MCCBs shall be provided with rotary operating handle and ON/OFF lamps. | | | | | |
| | | | | | | |
| 5 | All meters shall be digital type (unless otherwise specified) with RS 485 Port. | | | | | |
| | | | | | | |
| 6 | All Incoming and outgoing breaker must have provision of Potential free contacts for BMS/FAS. | | | | | |
| | | | | | | |
| 7 | All MCBs shall be motor duty type. | | | | | |
| | | | | | | |
| 8 | All current/voltage transformer shall be cast resin type. | | | | | |
| | | | | | | |
| 9 | All indicating lamps shall be LED type. | | | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 10 | Current density for CU. bus bars shall not be more than 1.6A/Sqmm. Rating of Bus bar is after considering all derating factors. (Bus bar sizing calculation to be submitted for approval.) | | | | | |
| | | | | | | |
| 11 | All internal control wiring shall be heat resistant type. | | | | | |
| | | | | | | |
| 12 | All TP feeders shall be provided with Isolable neutral link. | | | | | |
| | | | | | | |
| 13 | Bus bar chamber & cable entry both shall be provided at top only. | | | | | |
| | | | | | | |
| 14 | All feeders shall be provided with door interlocked with door defeat, pad lock facility. | | | | | |
| | | | | | | |
| 15 | Live parts shall not be accessible after opening the door, Transparent acrylic sheet to be provided to cover the same. | | | | | |
| | | | | | | |
| 16 | Spare contacts of MCCBs / Relay / Contactor shall be wired upto terminal block. | | | | | |
| | | | | | | |
| 17 | 20% spare control terminal to be provided. | | | | | |
| | | | | | | |
| 18 | All incoming/outgoing cables shall be terminated on links/terminals. | | | | | |
| | | | | | | |
| **1** | **MAIN PANEL :** | | | | | |
| | Supply,Installation, testing & commissioning of compartmentalized Fabricated type powder coated Power & Lighting Distribution boards as per Drawing, Specification. The unit rate shall include loading/unloading, shifting from site store to the place of installation, assembling the Panel including mounting & wiring of loose parts by manufacturers, interconnection of shipping sections, installation on readymade Cable trench (provied support for panel mounting) or directly on floor, assembling of loose accessories supplied by the manufacturer, wiring & connection of auxiliary circuits, installation, testing & commissioning of all Panel, interlocking and supply of all necessary hardware. Aligning, levelling, grouting, testing and setting of relays and meters including all hardware. ( 400Amp Cu Busbar 100% Neutral) | 1 | Nos. | | | |
| | INCOMER :-- | | | | | |
| | 1No. 400Amp. FP MCCB (36KA) with rotary handle, sperader link , on-off, trip indicator… | | | | | |
| | 1 No. digital Multifunction Meter for measurement with all pera meters, RS-485 port, BMS compitible with selector Push button and one set of CTs of ratio 400A/5A, CL 1.0, 15VA (ELF 3259 of Conserv or Equivalent) | | | | | |
| | 400AMP. FP ATS FOR FULL LOAD DG CAPACITY :--01 | | | | | |
| | 250AMP. FP ATS FOR CRITICAL LOAD DG :--01 NO. | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | OUTGOING :-- | | | | | |
| | 125AMP. FP MCCB :--03 NO. | | | | | |
| | 63AMP. FP MCCB :-- 12 NO. | | | | | |
| | 32AMP. FP MCCB :-- 06 NO. | | | | | |
| | APFC relay system with 8 step Relay with 2No. 15 KVAR APP heavy duty capcitor,2No.10KVAR capacitor & 2No.5 KVAR capacitor with auto-manual switch,push-button,capacitor duty contactor,25-32amp. TP MCB :--06 No.with control wiring etc as per IS norms. | | | | | |
| | **Busbar** | | | | | |
| | 400A **FP COPPER** busbar of short circuit withstand capacity 36 kA. Bus bar shall be insulated with heat shrinkable sleeves and shall be color coded. | | | | | |
| 1.01 | UPS PANEL : | | | | | |
| | **Incomer** | | | | | |
| | 2 Nos. 160A, 4P MCCB 36KA , with rotary handle, sperader link , on-off, trip indicator… | | | | | |
| | 1 No. digital Multifunction Meter for measurement of voltage and current with selector Push button and one set of CTs of ratio 125A/5A, CL 1.0, 15VA (ELF 3259 of Conserv or Equivalent) | 2 | Nos. | | | |
| | **Busbar** | | | | | |
| | 160A **FP COPPER** busbar of short circuit withstand capacity 36 kA. Bus bar shall be insulated with heat shrinkable sleeves and shall be color coded. | | | | | |
| | **Outgoing** | | | | | |
| | 3Nos. 63A 4P MCCB. | | | | | |
| | 2 Nos. 40/63A DP MCB. | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For A)** | | | | | |
| **B)** | **MV CABLES** | | | | | |
| | | | | | | |
| 1 | Supplying, Laying, testing & commissioning of the following sizes of XLPE Al. Conductor armoured cables of 1.1KV grade on the surface of wall or on existing cable trays complete with hangers, properclamps fixing hardware etc. as required | | | | | |
| a) | 3.5 C x 185 Sq. mm Al. Cable | 75 | Mtrs | | | |
| b) | 3.5 C x 70 Sq. mm Al. Cable | 50 | Mtrs | | | |
| c) | 4 C x 50 Sq. mm Al. Cable | 75 | Mtrs | | | |
| d) | 4 C x 35 Sq. mm Al. Cable | 50 | Mtrs | | | |
| e) | 4 C x 25 Sq. mm Al. Cable | 50 | Mtrs | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| f) | 4 C x 16 Sq. mm COPPER Cable | 150 | Mtrs | | | |
| g) | 4 C x 10 Sq. mm Cu. Cable | 150 | Mtrs | | | |
| h) | 4 C x 6 Sq. mm Cu. Cable | 150 | Mtrs | | | |
| i) | 4 x 16 sqmm Copper Wire with conduit ( For, UPS input ) | 50 | Mtrs | | | |
| | | | | | | |
| 2 | Suppling, making, testing & commissioning of end termination with brass mettalic double compression glands suitable for the following sizes of XLPE Al. conductor arnoured cables including proper sizes of copper thimbles etc. as required. | | | | | |
| | | | | | | |
| a) | 3.5 C x 185 Sq. mm Al. Cable | 4 | Nos. | | | |
| b) | 3.5 C x 70 Sq. mm Al. Cable | 4 | Nos. | | | |
| c) | 4 C x 50 Sq. mm Al. Cable | 6 | Nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| d) | 4 C x 35 Sq. mm Al. Cable | 8 | Nos. | | | |
| e) | 4 C x 25 Sq. mm Al. Cable | 4 | Nos. | | | |
| f) | 4 C x 16 Sq. mm COPPER Cable | 12 | Nos. | | | |
| g) | 4 C x 10 Sq. mm Cu. Cable | 10 | Nos. | | | |
| h) | 4 C x 6 Sq. mm Cu. Cable | 16 | Nos. | | | |
| i) | 4 x 16 sqmm Copper Wire with conduit | 4 | Nos. | | | |
| | | | | | | |
| 3 | Supply and installation of following sizes of perforated GI cable tray made cut of 2 mm thick GI sheet, suspended from the ceiling or fixed on wall/column etc complete with suspenders, runners and fixing hard ware etc. as required. | | | | | |
| a) | 50 mm x 300mm x 50 mm | 100 | Mtrs | | | |
| b) | 50 mm x 150 mm x 50 mm | 75 | Mtrs | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | | | | | | |
| 4 | Fabricating supplying to site of installation, in floor including chase cutting of floor,leveling, refilling and making good the same from 1.6 mm thick and 2 mm thick cover pregalvanised MS CRCA sheet, totally enclosed, height 40 mm . The two lengths of raceways shall be fitted with Collars , 50 mm wide, 3 mm thick , press fit type. The raceways shall be clamped to the floor slab with GI clamps , 3mm thick and shall be screwed to the floor slab. The joint between raceway and junction box will be made with GI flexible strip( 3 nos), 3 mm thick, 4 inches long ,15 mm wide which will be nut bolted to the Junction box complete as required etc. | | | | | |
| a) | 50MM X 38MM x1.6 MM | 80 | Mtrs | | | |
| b) | 100MM X 38MM x1.6 MM | 150 | Mtrs | | | |
| c) | 150MM X 38MM x1.6 MM | 150 | Mtrs | | | |
| d) | 300MM X 38MM x1.6 MM | 250 | Mtrs | | | |
| | | | | | | |
| 5 | Fabricating supplying to site of installation, Junction boxes for Floor and Ceiling raceways made from 2 mm thick , with 2.5 mm thick GI cover including providing neoprene gaskets between the cover and the junction box, cadmium plated flat/round head screws, height as per site condition,totally enclosed. Proper cutouts shall be made in the side walls for raceway entry wherever required. The junction box shall be all side walls should be welded expect top cover and all side walls shall have suitable size of rectangular knock out holes for taking raceways / conduits as required and not a complete cut out. The top cover should be sealed with M Seal to make it dust and water proof complete as required etc. | | | | | |
| c) | 150MM X 150MM x 60-75 MM | 25 | Nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| d) | 250MM X 250MM x 60-75 MM | 25 | Nos. | | | |
| e) | 350MM X 350MM x 60-75 MM | 35 | Nos. | | | |
| | | | | | | |
| 6 | Supply and installation of SS 304 grade 2 to 2.5mm thick SS floor plate on junction box 400mm x 400 mm with champhered edges | 35 | nos. | | | |
| 7 | Supply and installation of SS 304 grade 2 to 2.5mm thick SS floor plate on junction box 300mm x 300 mm with champhered edges | 25 | nos. | | | |
| 8 | Supply and installation of SS 304 grade 2 to 2.5mm thick SS floor plate on junction box 200mm x 200 mm with champhered edges | 25 | nos. | | | |
| 9 | 100x50MM PVC trunking with end cap and coplar Supply & Fixing. | 45 | Mtr. | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For B)** | | | | | |
| | | | | | | |
| **C)** | **SAFETY EQUIPMENTS** | | | | | |
| | | | | | | |
| 1 | Supplying & fixing or Rubber matting of 12 mm thick, 1 Mtrs wide suitable for voltage of 1.1 KV etc. as required. | 10 | Sq.Mtrs | | | |
| | | | | | | |
| 2 | Supplying & fixing of Shock treatment chart printed in atle;ast three languages i.e, Hindi, English and a local language fitted in wooden frame and glass at front side and hard board at back side etc. as required. | 1 | Nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | | | | | | |
| 3 | Providing & fixing of MV / HV Danger Notice Plate of 200 mm x 150 mm ,made of mild steel at least 2mm thick and vitreous enameled, white on both side & with inscription in signal red colour on front side as required. | 2 | Nos. | | | |
| | | | | | | |
| 4 | Supplying and fixing of carbon dioxide type fire extinguisher 4.5 kgs. capacity of approved make with wall mounting bracket (Push type) as required conforming to IS: 15683-2006 (Latest ammended) . | 2 | Nos. | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For C)** | | | | | |
| | | | | | | |
| **D)** | **DISTRIBUTION BOARDS** | | | | | |
| | | | | | | |
| | Supplying, installation, testing & commissioning of following type wall mounted Horizontal TPN/SPN distribution board of double door type design made out of MS sheet with supplying and fixing following accessories including painting, interconnections, painting, earthing and labeling etc. as required. | | | | | |
| | | | | | | |
| 1 | 12 WAY TPN DB (LDB/PDB/ACDB/UPSOUTPUT DB) | 6 | Set | | | |
| | **Incoming** | | | | | |
| a) | 63Amp TPN MCB (10KA) - 1 No | | | | | |
| | 63Amp DP RCCB (30mA) - 3 Nos | | | | | |
| | **Outgoing** | | | | | |
| a) | 10/16/20/25 Amp SP MCB (10KA) - 30 Nos | | | | | |
| | Neutral links - 3 Nos (Separate for each phase) | | | | | |
| | | | | | | |
| 2 | 8 WAY TPN DB | 2 | Set | | | |
| | **Incoming** | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| a) | 63Amp TPN MCB (10KA) - 1 No | | | | | |
| | 63Amp DP RCCB (30mA) - 3 Nos | | | | | |
| | **Outgoing** | | | | | |
| a) | 10/16/20/25 Amp SP MCB (10KA) - 18 Nos | | | | | |
| | Neutral links - 3 Nos (Separate for each phase) | | | | | |
| | | | | | | |
| 3 | 6 WAY TPN DB | 2 | Set | | | |
| | **Incoming** | | | | | |
| a) | 63Amp TPN MCB (10KA) - 1 No | | | | | |
| b) | 63Amp DP RCCB (30mA) - 3 Nos | | | | | |
| | **Outgoing** | | | | | |
| a) | 10/16/20/25 Amp SP MCB (10KA) - 12 Nos | | | | | |
| b) | Neutral links - 3 Nos | | | | | |
| | (Separate for each phase) | | | | | |
| | | | | | | |
| **4** | 400 Amp. 4 P ,50 KA MCCB & 16 SWG Fabricated Powder Coated Box As per Required Approx Size ( 1200H x 600W x 600D ) With 400 Amp Cu Busbar Rotery Handale With Spredar set. | 2 | Set | | | |
| 5 | 125 Amp. 4 P ,25KA MCCB with Box for UPS | 4 | Set | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For D)** | | | | | |
| | | | | | | |
| **E)** | **POINT WIRING** | | | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 1 | Wiring for switch controlled Light Point with 3 x 1.5 Sq. mm PVC insulated FRLS multistrand copper conductor 1100 Volt grade wires in **recessed/surface MMS FRLS PVC conduit** with accessories including cost of providing saddles etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting and including the cost of supplying and fixing a 6 Amp 240 Volt grid plate mounted switch with moulded cover plate in zinc chromate passivated MS box, and costing circuit wiring with 3 x 2.5sq. mm 1100 volt grade PVC insulated FRLS Multistrand copper conductor wires, in PVC conduit complete as per specifications and as required. | | | | | |
| | | | | | | |
| (i) | Primary Point | 75 | nos. | | | |
| | | | | | | |
| (ii) | Secondary Point | 50 | nos. | | | |
| | | | | | | |
| 2 | Wiring for MCB controlled Light Point with 3 x 1.5 Sq. mm PVC insulated FRLS multistrand copper conductor 1100 Volt grade wires in **recessed/surface MMS FRLS PVC conduit** with accessories including cost of providing saddles etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting. | | | | | |
| | | | | | | |
| (i) | Primary Point | 40 | nos. | | | |
| | | | | | | |
| (ii) | Secondary Point | 125 | nos, | | | |
| | | | | | | |
| 3 | Wiring for 5 pin 6 A Light plug point with 3 x 1.5 Sq.mm PVC insulated FRLS multistrand copper conductor 1100 Volt grade wires in **recessed/surface MMS FRLS PVC conduit** with accessories including cost of providing saddles etc for surface conduiting and/or cost of cutting & filling chases for recessed conduiting, including the cost of providing & fixing 1 No. Modular type 3 pin 6 A socket outlet controlled by 6 A switch in zinc chromate passivated MS box, and circuit wiring with 3 x 2.5 sq mm complete as per specfications and as required. | 50 | nos. | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 4 | Wiring for 3 nos. 5 pin 6 A Light plug point below table, controled by 16 A Switch on table top with 3 x 2.5 Sq.mm PVC insulated FRLS multistrand copper conductor 1100 Volt grade wires in **recessed/surface MMS FRLS PVC conduit** with accessories including cost of providing saddles etc for surface conduiting and/or cost of cutting & filling chases for recessed conduiting, including the cost of providing & fixing 1 No. Modular type 3nos.5 pin 6 A socket outlet controlled by 6 A switch in zinc chromate passivated MS box, and circuit wiring with 3 x 2.5 sq mm complete as per specfications and as required. | 250 | nos. | | | |
| | | | | | | |
| 5 | Wiring for following. 16 A Socket controlled by 1 No. 16A Switch with 3 x 2.5 Sq. mm PVC insulated FRLS multi strand copper conductor 1100 Volt grade wires in **recessed/surface MMS FRLS PVC conduit** with accessories including cost of providing saddles etc for surface conduiting and/or cost of cutting chases for recessed conduiting, including the cost of providing & fixing 1 No. Modular type 20 A socket outlet controlled by 1 No. 6 A switch in zinc chromate passivated MS box, complete as per specification and as required. | 15 | nos, | | | |
| | | | | | | |
| 6 | Wiring for following. 2 Nos. 5 pin 6 A Power plug point controlled by 1 No. 16A Switch with 3 x 2.5 Sq. mm PVC insulated FRLS multi strand copper conductor 1100 Volt grade wires in **recessed/surface MMS FRLS PVC conduit** with accessories including cost of providing saddles etc for surface conduiting and/or cost of cutting chases for recessed conduiting, in zinc chromate passivated MS box, complete as per specification and as required. | 150 | nos. | | | |
| | | | | | | |
| 7 | Wiring for ceiling/wall fan Point with 3 x 1.5 Sq. mm PVC insulated FRLS multi strand copper conductor 1100 Volt grade wires in surface / recessed, PVC conduit with accessories including cost of providing saddles etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting and including the cost of supplying and fixing a 6 Amp 240 Volt grid plate mounted switch & 300W electronic regulator with moulded cover plate in zinc chromate passivated MS box, and including the cost of circuit wiring with 3 x 2.5sq. mm 1100 volt grade PVC insulated FRLS multi strand copper conductor wire, inPVC conduit complete as per specifications and as required. | 10 | nos. | | | |
| | | | | | | |
| 8 | Wiring for exhaust fan Point with 3 x 1.5 Sq. mm PVC insulated FRLS multi strand copper conductor 1100 Volt grade wires in surface / recessed PVC conduit with accessories including cost of providing saddles etc for surface conduiting and/or cost of cutting and filling chases for **recessed/surface MMS FRLS PVC conduit** and including the cost of supplying and fixing a 6 Amp 240 Volt grid plate mounted switch with moulded cover plate in zinc chromate passivated MS box, and including the cost of circuit wiring with 3 x 2.5sq. mm 1100 volt grade PVC insulated FRLS multi strand copper conductor wire, complete as per specifications and as required. | 6 | nos. | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 9 | Wiring for 16A Single Phase metal clad socket outlet with 3 x 2.5 sqmm PVC insulated FRLS multistrand copper wire of 1100 volt grade in **recessed/surface MMS FRLS PVC condu**it with accessories including supply and fixing 16A 3 pin metal clad plug and socket and 16A SP MCB (MD) in IP 44 Poly carbonate box complete as per specification and as required. | 2 | nos. | | | |
| | | | | | | |
| 10 | Wiring for 20A Single Phase metal clad socket outlet with 2 x 4 +1 x 2.5 sqmm PVC insulated FRLS multistrand copper wire of 1100 volt grade in **recessed/surface heavy duty FRLS PVC conduit** with accessories including supply and fixing 20A 3pin metal clad plug and socket and 20A SP MCB (MD) in IP 44 Poly carbonate box complete as per specification and as required. | 2 | nos. | | | |
| | | | | | | |
| 14 | Providing and fixing of following sizes of **PVC Flexibale Conduits** suitable for various applications, halogen free, oil and petrol resistant, flame retardant, self extiguishing, high compressive strength and good wearing properties along with connectors complete with conduit gland & all accessories required. | | | | | |
| a) | 25mm dia | 250 | RM | | | |
| 2 | Supply & fixing the following sizes of PVC conduit in recessed or on surface of wall . False ceiling including cutting the wall and making good the same as required. | | | | | |
| a) | 25 mm dia | 750 | Mtrs | | | |
| | | | | | | |
| 15 | Supply, Laying & connection of 3X1.5 sq.mm copper flexible FR wires from DB/Panel to switch board / Power Point in 25mm Dia. MMS PVC conduit in wall / slab / floor. The unit rate shall include rate of Supply, Laying & connection of pipes & wires. | 625 | RM | | | |
| | | | | | | |
| 16 | Supply, Laying & connection of 2X2.5 sq.mm & 1X1.5 sq.mm copper flexible FR wires from DB/Panel to switch board / Power Point in 25mm Dia. MMS PVC conduit in wall / slab / floor. The unit rate shall include rate of Supply, Laying & connection of pipes & wires. | 2850 | RM | | | |
| | | | | | | |
| 17 | Supply, Laying & connection of 2X4.0 sq.mm & 1X2.5 sq.mm copper flexible FR wires from DB/Panel to switch board / Power Point in 25mm Dia. MMS PVC conduit in wall / slab / floor. The unit rate shall include rate of Supply, Laying & connection of pipes & wires. | 200 | RM | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For E)** | | | | | |
| | | | | | | |
| **F)** | **LV SYSTEM (DATA/TELE)** | | | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | **LAN SYSTEM** | | | | | |
| 1 | Supplying and drawing of UTP 4 pair CAT 6 LAN Cable in the existing surface/ recessed steel/PVC conduit as required. 4 Pair CAT6 Unshielded, Twisted Pair (U/UTP) Cable 305 mtr per Box. | 21000 | Mtrs. | | | |
| | | | | | | |
| 2 | Supplying, installing, testing and commissioning of Cat 6 RJ 45 Data I/o Socket . | 500 | Nos. | | | |
| | | | | | | |
| 3 | Supplying, installing, testing and commissioning of 24 port Cat 6 patch panels with required material. | 22 | Nos. | | | |
| | | | | | | |
| 4 | Supplying, installing, testing and commissioning of following length of Cat - 6 patch cord. 4 Feet : make d link, Molex, Legrand | 500 | Nos. | | | |
| | | | | | | |
| 5 | Supplying, installing, testing and commissioning of following length of Cat - 6 patch cord. 7 Feet : make d link, Molex, Legrand | 500 | Nos. | | | |
| | | | | | | |
| 6 | Supplying and fixing following Modular base & cover plate on existing modular metal boxes etc. as required. | 50 | nos | | | |
| | | | | | | |
| 7 | 1 Module : Single Module Face Plate | 10 | Nos. | | | |
| | | | | | | |
| 8 | 2 Module : Dual Module Face Plate | 220 | Nos. | | | |
| | | | | | | |
| 9 | Supplying and drawing of UTP 4 pair CAT 6 LAN Cable in the existing surface/ recessed steel/PVC conduit as required. 4 Pair CAT6 Unshielded, Twisted Pair (U/UTP) Cable 305 mtr per Box. | 8500 | Mtrs. | | | |
| | | | | | | |
| 10 | Supplying, installing, testing and commissioning of Cat 6 RJ 11 Voice I/o Socket . | 200 | Nos. | | | |
| | | | | | | |
| 11 | Supplying, installing, testing and commissioning of 24 port Cat 6 patch panels with required material. | 10 | Nos. | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 12 | Supplying, installing, testing and commissioning of following length of Cat - 6 patch cord. 4 Feet : | 200 | Nos. | | | |
| | | | | | | |
| 13 | Supplying, installing, testing and commissioning of following length of Cat - 6 patch cord. 7 Feet : | 200 | Nos. | | | |
| | | | | | | |
| 14 | Supplying and fixing following Modular base & cover plate on existing modular metal boxes etc. as required. 1 or 2 Module Face Plate. | 200 | Nos. | | | |
| | | | | | | |
| 15 | Supplying, installing, testing and commissioning of Cabinet. Size 2026 X 800 X 800 mm (HXWXD) following accessories, Width (mm) 800, Depth (mm) 800, Approx.Net Wt (kg) 150, CRCA 'D' Grade thickness (mm) 1.2, RAL 9017(Matt Black), Glass: 4mm Toughened Tinted Glass Door,Injected one piece polyurethane gasket on frame, Accessories: Cooling Fan (230V A/C 90 CFM) - 4 Nos, Cable Manager Metal- 4 Nos,PDU 230VAC - 1 No (12 nos. 6A/16A sockets with plugs 6A/16A - 1/1pc & MCB 16A/32A -0/1 Pc), cable channel 100mm wide 42U- 2 Nos,Heavy Duty Stationary shelf M6 screws,washer,cage nuts (nickel coated))3 Nos. Earthling Strips 150mm H - 1 No, Door Lock - 1 No, Castor Wheels (with Brake) - 2 Nos, Castor Wheels (without Brake) - 2 Nos, Front Metal Band - 1 No. Packing: 5 ply cardboard & Inside 28 ply EP foam. In the rack there must be maintained 1 U = | 1 | Nos. | | | |
| | | | | | | |
| 19 | OM3 6 Core Fiber Cable in PVC Conduite Supply & Laying. | 10 | Mtr | | | |
| | | | | | | |
| 20 | FIBER SLIDING DRW liu 24 PORT, LC ADAPTER PLATE MM 12 PORT, BLANKS FOR LIU, FUFION SPLICE, PIGTAIL SUPPLY & FIXING | 1 | Set | | | |
| | | | | | | |
| 21 | OM 3 LC Patch coard 3 Mtr Supply & Fixing. | 2 | Nos. | | | |
| | | | | | | |
| 22 | 300 Pair Telephone Tag Box With Krone Strip Supply & Fixing. | 4 | Nos. | | | |
| | | | | | | |
| 23 | 100 Pair Jelly Arm Cable Supply & Laying. | 5 | Mtr. | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For F)** | | | | | |
| | | | | | | |
| **G)** | **CCTV SYSTEM** | | | | | |
| | | | | | | |
| 1 | Supplying and drawing of UTP 4 pair CAT 6 LAN Cable in the existing surface/ recessed steel/PVC conduit as required. 4 Pair CAT6 Unshielded, Twisted Pair (U/UTP) Cable 305 mtr per Box. | 1000 | Mtrs. | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 2 | IP Fixed Dome camera with 2mp, 1/3" CCD/CMOS, Progressive/De-interlace, Very High Definition resolution (1920 x 1080), min. Dual streaming, 25 FPS, H.264 compression support, 2.8 mm fixed focal lens, 1.5 lux, Tamper detection, Wide dynamic Range, PoE & standard 12VDC/24VAC power input, indoor surface mount enclosure, as per detailed specifications. | 10 | Nos | | | |
| | | | | | | |
| 3 | HD Outdoor WDR Fixed Bullet Network Camera<br>High quality imaging with 2 MP resolution<br>Efficient H.265+ compression technology<br>Clear imaging against strong back light due to 120 dB true WDR technology<br>Water and dust resistant (IP67)<br>Robust structure design with full metal/PVC materials. | 1 | Nos | | | |
| | | | | | | |
| 4 | 32 Channel Network Video Recorder Embedded OS Linux CPU ARM Processor Flash 256 MB RAM 1 GB Watchdog Hardware + Software Power Restoration System Restart Automatically after Power Recovery HDD Devices Internal x 2 HDD Max. Capacity 4 TB x 2 Disk Management Create, Format and Remove Disk HDD | 1 | Nos | | | |
| | | | | | | |
| 5 | Supply, installation , testing & commissioning of 42" LCD colour monitors etc | 1 | nos. | | | |
| | | | | | | |
| 6 | 16 Port POE switch 10/100/1000 MBPS Gigabit | 2 | Nos | | | |
| | | | | | | |
| 7 | HDMI cable 15 mtr. Length | 1 | set | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For G)** | | | | | |
| | | | | | | |
| **H)** | **ACCESS CONTROL SYSTEM** | | | | | |
| | | | | | | |
| 1 | **ACS Controller:**<br>Supply, installing, testing and commissioning of Standalone Controller :- 2.4-inch TFT color screen and Touch keys, Ultra thin and elegant design With Builtin Wifi Fingerprint Identification Fingerprint Capacity: 3,000 Log Capacity: 30,000 Communication:TCP/IP,RS232/485,USB Host Access Control Interface for electric lock,door sensor,alarm,exit button and door bell. Wiegand input&output | 2 | Nos. | | | |
| | | | | | | |
| 2 | Exit Reader :- Finger Print Reader Weather Proof<br>Read Fingerprint and Proximity card Communication: RS485 with inBIO controller or Fingerprint devices DIP switch for RS485 address | 6 | Nos. | | | |
| | | | | | | |
| 3 | RFID Cards :- ISO RFID Cards | 200 | Nos. | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 4 | Bracket :- U Bracket For Glass Door | 5 | Nos. | | | |
| | | | | | | |
| 5 | Bracket :- L Bracket For Locks | 1 | Nos. | | | |
| | | | | | | |
| 6 | Lock :- Single Electromagnetic Locks - 600 lbs as per specifications | 6 | Nos. | | | |
| | | | | | | |
| 7 | Egress :- No Touch Exit Sensor<br>Exit No Touch Sensor-Stainless steel | 6 | Nos. | | | |
| | | | | | | |
| 8 | Enrollment Unit :- Finger print Enrollment device, is a stable and excellent fingerprint reader. The device can capture fingerprint image and upload to the PC by USB interface. High-performance, maintenance-free optical fingerprint sensor. | 1 | Nos. | | | |
| | | | | | | |
| 9 | Software :- Web Base ACS & Time-attendance software | 1 | Nos. | | | |
| | | | | | | |
| 10 | Supply, installing, testing and commissioning of Emergency Break Glass with required accessories as per technical specifications | 6 | Nos. | | | |
| | | | | | | |
| 11 | **Cables**: Supply, installing, testing and commissioning of : All the cables Should be weatherproof, outdoor grade & as per BIS standard. | | | | | |
| | | | | | | |
| a) | 8 core 20 to 22 AWG, 6 or 8-conductor, stranded, shielded armoured cable with required accessories | 50 | Mtrs. | | | |
| | | | | | | |
| b) | 6 core, 2-conductor 20 to 22 AWG, stranded, shielded armoured cable with required accessories | 50 | Mtrs. | | | |
| | | | | | | |
| c) | 4 core, 2-conductor 20 to 22 AWG, stranded, shielded armoured cable with required accessories | 200 | Mtrs. | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For H)** | | | | | |
| | | | | | | |
| **I)** | **SENSOR SYSTEM** | | | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 1 | Supplying of Digital PIR LightSpot HD Switching Sensors Ceiling Mount 360 degree. High Sensitivity Range 10 m Dia at height of 2.5 meter ( 7 m dia Micro Sensitivity 3 m macro) and . Current Capacity 10A. Digital Remote IR based Commissioning with hand held programmer for following programmable features: Absence mode, OFF delay time 10 Sec - 96 hrs, photocell and power up (status of luminaires when power is applied). It shall have provision to manually override luminary ON/OFF status using hand held remote control, similar to Honeywell LS3200R or equivalent | 5 | Nos | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For I)** | | | | | |
| | | | | | | |
| **J)** | **TV SYSTEM** | | | | | |
| | | | | | | |
| 1 | Supply , Installation , Testing and Commissioning of Full HD 55" LED Professional Display Panel Contras Ratio -4000:1, H/W - Tempreture Sensor, Pivot Display, Clock Battery (168 hrs Clock keeping) Built in speaker ( 10W 2ch) IP5x, Wifi S/W - Auto source Switching & Recovery, LFD Home UI, Button lock, hot key option , Plug & Play initial Setting. ( Equivalent to Samsung QB55N ) | 2 | Nos. | | | |
| | | | | | | |
| 2 | Supply , Installation , Testing and Commissioning of Full HD 72" LED Professional Display Panel Contras Ratio -4000:1, H/W - Tempreture Sensor, Pivot Display, Clock Battery (168 hrs Clock keeping) Built in speaker ( 10W 2ch) IP5x, Wifi S/W - Auto source Switching & Recovery, LFD Home UI, Button lock, hot key option , Plug & Play initial Setting. ( Equivalent to Samsung QB72N ) | 1 | NOS. | | | |
| | | | | | | |
| 2 | Wiring for TV point with RG-6 TV coaxial cable in ExistingPVC conduit including supply of all metarials complete as required. | 200 | Mtrs | | | |
| | | | | | | |
| 3 | Supply & fixing the following sizes of PVC conduit in recessed or on surface of wall . False ceiling including cutting the wall and making good the same as required. | | | | | |
| | | | | | | |
| a) | 25 mm dia | 75 | Mtrs | | | |
| | | | | | | |
| 4 | Supply & laying of RG-11 TV co-axial cable for cable TV system in 25 mm dia PVC conduit pipe in recess or on surface of wall including cutting the chases as making good the damage etc as required. **(For Vertical & Horizontal runs)** | 75 | Mtrs | | | |
| | | | | | | |
| 5 | Supply & fixing of co-axial type TV socket in zinc chromate passivated M.S. Box & Moduler plate including making connections etc. complete as required. | 2 | Nos. | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 6 | Supply & fixing the following type of splitter box / Tape Off box in recess in wall or ceiling or on surface etc as required. | | | | | |
| a) | 2 way splitter / Tape Off box | 2 | Nos. | | | |
| b) | 4 way splitter / Tape Off box | 1 | Nos. | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For J)** | | | | | |
| | | | | | | |
| **K)** | **LIGHTING FIXTURES** | | | | | |
| | | | | | | |
| 3 | Supply site installation installation, testing & commissioning of 48/36" ceiling fans complete with all accessories such as blades, canopy etc. including wiring the down rod with 3 x 1.5 sq mm FRLS PVC insulated multistranded copper conductor wires and earthing the fans etc. complete as required. | 1 | Nos. | | | |
| | | | | | | |
| 4 | Supply installation, installation, testing & commissioning of 12/9" exhaust fans on existing opening in wall including all fixing hardware, louvers, shutters etc. Connection with 3 x 1.5 Sqmm FRLS PVC insulated multistranded copper conductor wire from the socket outlet to the fan earthing etc. complete as required. | 4 | Nos. | | | |
| | | | | | | |
| 5 | Supply & installation of self illuminated Exit / Fire Exit Signs boards (Glolite/Prolite make) hung from ceiling or on wall as per site conditions complete with all accessories etc. as required | | | | | |
| | | | | | | |
| a) | Two Sided 11" x 4" | 2 | Nos. | | | |
| | | | | | | |
| b) | One Sided 11" x 4" | 2 | Nos. | | | |
| | | | | | | |
| 6 | Supply of following LED Lighting Fixture | | | | | |
| | | | | | | |
| a) | Supply, installation, testing and commissioning of LED 36 watt (600mm x 600mm) Recess Mounted Luminaire with making earthing connection complete to be recessed in false ceiling with all necessary hardware, hanging frame arrangement, chains, hook etc., complete. (with minimum -03- Years warranty) Make ( Wipro / Philips / Havells / Halonix ) | 140 | Nos. | | | |
| | | | | | | |
| b) | Supply, installation, testing and commissioning of 6"/9" dia. of 12 W LED Downlighter to be recessed in false ceiling with all necessary hardware, chains, hook etc., complete. (with minimum -03- Years warranty) ( Wipro / Philips / Havells / Halonix ) | 40 | Nos. | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| c) | Supply, installation, testing and commissioning of 6"/9" dia. of 15 W LED Downlighter to be recessed in false ceiling with all necessary hardware, chains, hook etc., complete. (with minimum -03- Years warranty) ( Wipro / Philips / Havells / Halonix ) | 25 | Nos. | | | |
| | | | | | | |
| c) | LED 4ft. 18 Watt ( Equivalent to. Wipro cat No D53206500K ) | 8 | Nos. | | | |
| | | | | | | |
| d) | 1200MM led recess type Light 30 Watt ( Equivalent to Wipro cat No. LM 30-301-xxx-57-LENIOSE) | 25 | Nos. | | | |
| | | | | | | |
| e) | 5 watt / mt. 50/50 LED Strip Light With Driver (Equivalent to Wipro cat No. D45040 4000K ) | 35 | Mtr. | | | |
| | | | | | | |
| f) | 9Watt Spot Light ( Equivalent to Wipro cat No D 120940) | 25 | Nos. | | | |
| | | | | | | |
| g) | Lunch Hall Decorative Hanging Light With Hanging arrangement. ( Basic Rate Rs 4000 per no) | 20 | Nos. | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For K)** | | | | | |
| | | | | | | |
| **L)** | **FIRE ALARM SYSTEMS** | | | | | |
| | | | | | | |
| 171 | Supply, installation , testing & commissioning of Microprocessor based 2 loops analogue addressable Netwokable type fire alarm control panel with 168 character LCD display, our access levels, 1000 event historical logging, flash EPROM sufficient numbers of programmable relay controls, 240 volts AC power supply, automatic battery charger, 24 volts sealed lead acid batteries sufficient for 24 hours normal working and then be capable of operating the system for 2 hours during an emergency condition.Each Loop can accomodate 125 Detectors or 125 Devices , etc . | 1 | nos. | | | |
| | | | | | | |
| 175 | Supply, installation , testing & commissioning of Intelligent addressable type Multisensor type smoke detectors with standard base etc. | 75 | nos. | | | |
| | | | | | | |
| 175 | Supply, installation , testing & commissioning of Intelligent addressable type Multisensor type Heat detectors with standard base etc. | 4 | nos. | | | |
| | | | | | | |
| 178 | Supply, installation , testing & commissioning of Addressable sounder with strobe etc. | 4 | nos. | | | |
| | | | | | | |
| 177 | Supply, installation , testing & commissioning of Addressable type Manual Call Point unit etc. | 4 | nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | | | | | | |
| 173 | Supply, installation , testing & commissioning of Addressable Fault isolator Module etc sutabile for the above system. | 8 | nos. | | | |
| | | | | | | |
| | Supply, installation , testing & commissioning of Addressable Control Relay modules etc sutabile for the above system. | 8 | | | | |
| | | | | | | |
| 174 | Supply, installation , testing & commissioning of Monitor Module etc sutabile for the above system. | 2 | nos. | | | |
| | | | | | | |
| 8 | Supply, installation, connecting, testing and commissioning of Response indicator. | 50 | Nos | | | |
| | | | | | | |
| 10 | Providing and fixing in position 1.2mm thick PVC outlet boxes for housing smoke detectors/heat detectors including providing 3 mm thick hylam sheet cover as required | 12 | Nos | | | |
| | | | | | | |
| a. | 75mm x 75mm x 75mm | 12 | Nos | | | |
| | | | | | | |
| 11 | Supply & laying of following grade with copper conductor armoured FIRE SURVIVAL cable with (EPR) Ethylene Propylene rubber insulation as per IEC-60502:2004 Part-1 (Armoured), Retain circuit integrity as per BS 6387 C.W.Z (armoured), BS- 8491:2008, BS 8434-2: 2009 (armoured), (Resistance to fire at 950º C for 3 hours), as per specifications in cable trays, clamped including anchor fastners to wall with suitable clamps, saddles fixing bolts,2 cable glands for each detector back box, complete in all respect as required as per specifications.(Red Colour) | | | | | |
| | | | | | | |
| a. | 2 core x 1.5 sq. mm | 650 | RM | | | |
| | | | | | | |
| 12 | Hilti Make - CP 601s Firestop silicone sealant With Required Material & Labour etc.( with Hilti Certification/bill ) | 5 | Sq.Mt. | | | |
| | | | | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For L)** | | | | | |
| | | | | | | |
| **M)** | **PA SYSTEM FOR FIRE ALARM** | | | | | |
| | | | | | | |
| 1 | Supply, Installation, Testing & Commissioning of 2 Way Communication Fire Fighter's Telephone Jack. | 1 | Nos. | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 2 | Supply, Installation, Testing & Commissioning of 2 Way Communication Fire Fighter's Handset | 1 | Nos. | | | |
| | | | | | | |
| 3 | SITC of followings with commnication cable and accessories as required for system. Voice Zone Controller as required for system. suitable Zone selector with micro phone including keypad as required for system. Router as required for system. System compressive of above as required | 1 | NOS. | | | |
| | | | | | | |
| 4 | SITC of Pagging microphone Min 6 Zone for interface with controller including communication cable and all accessories. | 1 | NOS. | | | |
| 5 | SITC of rack mounted dual Channel Power Amplifier capable of delivering 300 W RMS power output or 480 W RMS burst output; complete with 100 V Line Matching Transformer, built-in fan for temperature control, Distortion typically 0.03% @ 1 KHz, Hum and Noise 90 dB below rated output selection facility,provision for hookup with Fire Alarm Panel, complete with connections and required circuitry | 1 | NOS. | | | |
| 6 | Supply, Installation, Testing And Commissioning of Wireless microphone | 2 | NOS. | | | |
| 7 | Supply, Installation, Testing And Commissioning of Ceiling loudspeaker, 6/3W, Frequency response of 110 Hz - 18 kHz. | 45 | NOS. | | | |
| 8 | Supply, Installation, Testing And Commissioning of wall mount loudspeaker, 6/3W, Frequency response of 200Hz - 20KHz | 4 | NOS. | | | |
| 9 | Supply, Installation, Testing and Commissioning of 2 Core X 1 Sq.mm flexible cable. | 850 | MTRS | | | |
| 10 | Supply, installation, testing and commissioning of 25mm pvc conduits for laying of above cable. | 600 | MTRS | | | |
| 11 | Supply, installation, testing and commissioning of 18U (600 x 600) floor mount closed rack with front glass door, fan tray on top, perforated rear doors, keyboard tray with shelf. Casters & 2 nos vertical power strip with std. accessories. | 1 | NOS | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For M )** | | | | | |
| | | | | | | |
| **N)** | **EARTHING** | | | | | |
| | | | | | | |
| 1 | 1 x 16sqmm copper wire for UPS/Server | 300 | Mtrs | | | |
| | | | | | | |
| 2 | Supplying and laying of 8 SWG G.I. Wire on surface / recess as required. | 150 | Mtrs | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | | | | | | |
| 3 | 25x3 Hot Dip Gi strip Supply & Laying. | 75 | Mtrs | | | |
| | | | | | | |
| 4 | 25x3 Cu Strip Supply & Fixing. | 30 | Mtrs | | | |
| | | | | | | |
| 5 | 50mm Dia Pipe in pipe Earthing 3 mtr long with 25 kg Chamical Bag Supply & fixing. | 1 | Nos | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For N)** | | | | | |
| | | | | | | |
| **O)** | **BMS SYSTEM** | | | | | |
| 1 | Supply, installation , testing & commissioning of Building Management System The Specification of the BMS System including all as below | | | | | |
| | | | | | | |
| A | BMS Computer System (Higherend configuration core i7 or above SSD Hard Disc, 3 year Antivirous, Keyboard, mouse etc. ) | 1 | Set | 1 | | |
| | | | | | | |
| B | BMS System Software : Windows based Graphical Software with at least 5 concurrent licence | 1 | 1 | 1 | | |
| | | | | | | |
| i | System Integration Unit for interfacing DDCs to PC (should be capable of connecting to TCP/IP network) and must provide hardware features as must provide the following hardware features as a minimum: a) Ethernet Port - 10 / 100 Mbps b) One RS-485 port c) Battery Backup e) Flash memory for long term data backup (If battery backup or flash memory is not supplied, the controller must contain a hard disk with at least 1gigabyte storage capacity) f) Capable of Calendar functions.Scheduling, Trending.Alarm onitoring and routing, Time synchronization. | | | | | |
| | | | | | | |
| ii | Required Software and/or hardware for BACnet /IP & Hardware Interface for Modbus RTU Unit, Open Protocol Software Integration for following :- | | | | | |
| | | | | | | |
| C | For VAV Units 5 nos | 1 | Set | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| ii | DDC Controller with I/O module etc., The controllers shall be 32 bit microprocessor based standalone and net workable type with real time clock. The DDC's shall be capable of peer to peer communication without help of system interface controller or PC. with locable mounting cabinets duly powder coated connector strip, internal wiring and space to house controller & relays, connector strip current transformer, MCB, internal wiring. (Contractor shall confirm his I/O provision w.r.t requirement on basis of data point) | | | | | |
| | | | | | | |
| ii | Split Units (Assuming 4 nos. Split untis On/Off command, On/Off status, Trip Status. All starter panels of split AC to be provided with requried PFC for assuemd IO. Any extra unit shall be extra at actuals) | | | | | |
| | | | | | | |
| 2 | 2 Core 1.0 Sqmm,armoured ATC conductor multistranded, Un-shielded cable as per specification | 650 | Mtr | | | |
| | | | | | | |
| 3 | 3 Core 1.5 Sqmm,armoured ATC conductor multistranded, cable for Powering DDC , Actuators as per specification | 350 | Mtr | | | |
| | | | | | | |
| 4 | 2 Core 1.0 Sqmm,armoured ATC conductor multistranded, Shielded cable as per specifications | 150 | Mtr | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For O )** | | | | | |
| | | | | | | |
| **P)** | **FLOODING SYSTEM** | | | | | |
| 1 | Supply & installation of 120Ltrs Cylinder Assembly with Valve etc, | 1 | nos. | | | |
| | | | | | | |
| 2 | Supply, filling & installation of Novec 1230 agent , | 70 | Kg | | | |
| | | | | | | |
| 3 | Supply, installation,testing & commissioing of cylinder bracket for 120L seamless cylinder | 2 | nos. | | | |
| | | | | | | |
| 4 | Supply, installation,testing & commissioing of electric actuator shipping assembly complete | 1 | nos. | | | |
| | | | | | | |
| 5 | Supply, installation,testing & commissioing of Local Manual Actuator | 1 | nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | | | | | | |
| 6 | Supply & installation of Actuation Hose, 600mm length, 1/4 in. NPT x 7/16-20 in. F Flare | 1 | nos. | | | |
| | | | | | | |
| 7 | Supply & fixing of Male Adaptor, Master Tank Pilot Port complete | 1 | nos. | | | |
| | | | | | | |
| 8 | Supply & fixing of Male Straight Connector, 7/16 - 20 x 1/4 in. NPT complete | 1 | nos. | | | |
| | | | | | | |
| 9 | Supply, installation,testing & commissioing of Nozzle 32 BR 360 degree.complete | 1 | nos. | | | |
| | | | | | | |
| 10 | Supply, installation,testing & commissioing of Nozzle 20 BR 360 degree. | 1 | nos. | | | |
| | | | | | | |
| 11 | Supply & fixing of Warning Plate for Use Inside Room | 1 | nos. | | | |
| | | | | | | |
| 12 | Supply & fixing of Warning Plate for Use Outside Room | 1 | nos. | | | |
| | | | | | | |
| 13 | Supply, installation,testing & commissioing of Cylinder Low Pressure Switch | 1 | nos. | | | |
| | | | | | | |
| 14 | Supply & fixing of Flexible Discharge Hose, 50mm dia. | 1 | nos. | | | |
| | | | | | | |
| 15 | Supply, installation,testing & commissioing of Switch, Pressure, DPST, Weather Proof (50mm - 80mm. Outlets), Latching complete | 1 | nos. | | | |
| | | | | | | |
| 16 | Supply, installation,testing & commissioing of 2 zone conventional fire alarm panel with power supply etc, | 1 | nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | | | | | | |
| 17 | Supply & laying of Piping, Fiting & accessories | 1 | Set | | | |
| | | | | | | |
| 18 | Supply & laying of XLPE insulated PVC sheathed copper conductor, 1.1 kV grade armoured schielded cable confoming to IS:7098, as per approved make in ground/ trench/ surface/ pipe, etc. whereever required as per direction of Engineer In-charge. Note: The rate of Installation should be inclusive of Cable clamps, tags Saddles, Consumables etc. Trays/pipes, trenches,conduting etc | | | | | |
| | 2C x 1.5 sq.mm cooper FRLS armoured shielded cable. | 75 | metre | | | |
| | | | | | | |
| 19 | Supply, installation,testing & commissioing of Manual Abort Station | 1 | nos. | | | |
| | | | | | | |
| 20 | Supply, installation,testing & commissioing of Manual Release Station | 1 | nos. | | | |
| | | | | | | |
| 21 | Supply, installation,testing & commissioing of Conventional Smoke Detector with base | 2 | nos. | | | |
| | | | | | | |
| 22 | Supply, installation,testing & commissioing of Hooter | 1 | nos. | | | |
| | | | | | | |
| 23 | Supply, installation,testing & commissioing of Manual call point | 1 | nos. | | | |
| | | | | | | |
| 24 | Supply, installation,testing & commissioing of Remote indicator with double LED in PVC housing | 1 | nos. | | | |
| | | | | | | |
| | **TOTAL CARRIED OVER TO SUMMARY (For P)** | | | | | |
| | **TOTAL ELECTRICAL WORK AMOUNT** | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **4** | **HVAC AND ALLIED WORK** | | | | | |
| | | | | | | |
| | CHW System | | | | | |
| | S/E/T/C of various CHW based IDUs /AHUs along with insulated MS CHW piping, valves etc … Chilled water is available from DCS of GIFT City. AHUs/IDUs to be designed for 5'C in - 14'C out & ΔT=9'C at coil. The system shall be operated & controlled through centralised BAS | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| | CHILLED WATER based AHUs (ZECO/VTS/NUTECH) | | | | | |
| 1 | S/E/C/T of AHU supplied with cooling coil for CHW based AC system. Assembly of AHU at site with civil work required for mounting. | | | | | |
| | Moduler Double Skinned Air Handling Unit (thermal - break type) of 'AL' sections with GI powder coated panels of double skinned construction internally insulated by 43 mm rigid PU foam having sandwich type access door, SS 304 drain pan with vibration free operation. | | | | | |
| | Suitable Plug Fan having 1.5" WC st.head of approved make housed in a suitable Fan section with mounting frame. | | | | | |
| | Filter section with required quantity of of HDP washable filters - of 10 micron capacity. | | | | | |
| | Chiled water cooling coil with ΔT=9'C of of suitable size with header & standard end flanges to maintain room condition of 24`C / 55-60 % RH. approx 1.5 GPM per TR. | | | | | |
| | Direct drive TEFC, squirrel cage induction motor of suitable HP with guards & operating through VFD of suitable capacity | | | | | |
| **a** | Capacity : 11000 cfm/ 24 TR (1.5" WC static head) | 1 | no | | | |
| **b** | Capacity : 11000 cfm/ 26 TR (1.5" WC static head) | 1 | no | | | |
| **2** | Supply, installing, testing and commissioning of 3 way CHW valve with actuater & lever operated butterfly valve of size - suitable for each AHU (with bypass connections) | 2 | nos. | | | |
| 3 | HMI based Central monitoring & controlling of all the parameters of AC system with communication cabling for AHUs / IDUs. Digital display type one point BAS shall be located at BMS room to maintain inside conditions by controlling 3 way valves, VFD etc ... | 1 | nos. | | | |
| 4 | Drain piping of sch40, UPVC of ISI make of 2" dia. It should be covered with 6mm nitrile sleeve while exposed insulation to have UV protective coating (For AHU) | 25 | rmt. | | | |
| | **CHILLED WATER IDU'S** | | | | | |
| 2a | chilled water(5'C-14'C & ΔT=9'C at coil) based wall mounted IDU(Hi wall) with Ball valve, strainer & all pipe fittings . Each IDU to be fitted with 2 way valve-actuater assembly & Pressure Independent Control Valve (PICV) of suitable size. | | | | | |
| **a** | 1.6 TR capacity | 1 | nos. | | | |
| **b** | 2.0 TR capacity | 1 | nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 2b | chilled water(5'C-14'C & ΔT=9'C at coil ) based One Way Cassette of Ball valve, strainer & all pipe fittings . Each cassette to be fitted with 2 way valve-actuater assembly & Pressure Independent Control Valve (PICV) of suitable size. | | | | | |
| **a** | 1.0 TR capacity | 2 | nos. | | | |
| **b** | 1.6 TR capacity | 4 | nos. | | | |
| 2c | chilled water(5'C-14'C & ΔT=9'C at coil ) based Cassette of Ball valve, strainer & all pipe fittings . Each cassette to be fitted with 2 way valve-actuater assembly & Pressure Independent Control Valve (PICV) of suitable size. | | | | | |
| **a** | 1.3 TR capacity | 1 | nos. | | | |
| **b** | 1.6 TR capacity | 3 | nos. | | | |
| **c** | 2.0 TR capacity | 5 | nos. | | | |
| **d.** | 2.6 TR capacity | 5 | nos. | | | |
| **e.** | 3.0 TR capacity | 2 | nos. | | | |
| **2d** | Drain piping of sch40, UPVC of ISI make of ISI make of various size. It should be covered with 6mm nitrile sleeve while exposed insulation to have UV protective coating (For IDUs) | 200 | rmt. | | | |
| 3 | **CHILLED WATER PIPING** | | | | | |
| A) | Supply, erection with supporting frames and testing of following appx. quantity of MS, CLASS C piping | | | | | |
| **a.** | 15 mm NB | 150 | mt. | | | |
| **b.** | 19 mm NB | 70 | mt. | | | |
| **c.** | 25 mm NB | 120 | mt. | | | |
| **d.** | 32 mm NB | 125 | mt. | | | |
| **e.** | 38 mm NB | 75 | mt. | | | |
| **f.** | 50 mm NB | 40 | mt. | | | |
| **g.** | 65 mm NB | 15 | mt. | | | |
| **B)** | Thermal insulation of piping with 32 mm thk Al faced -nitrial rubber foam | | | | | |
| **a.** | 15 mm NB | 150 | mt. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| **b.** | 19 mm NB | 70 | mt. | | | |
| **c.** | 25 mm NB | 120 | mt. | | | |
| **d.** | 32 mm NB | 125 | mt. | | | |
| **e.** | 38 mm NB | 75 | mt. | | | |
| **f.** | 50 mm NB | 40 | mt. | | | |
| **g.** | 65 mm NB | 15 | mt. | | | |
| 4 | Supply, erection and testing with Thermal insulation of 32 mm thk Al faced -nitrial rubber foam quantity of CI flanged fitted lever operated wafer type valve with "O" ring, seat & internal lining of EPDM having Zinc platted notch plate to adjust the lever. | | | | | |
| **a.** | 65 mm NB lever operated Butterfly valve | 4 | nos. | | | |
| **b.** | 50 mm NB lever operated Butterfly valve | 4 | nos. | | | |
| **c.** | 32 mm NB lever operated Butterfly valve | 4 | nos. | | | |
| **d.** | 38 mm NB lever operated Butterfly valve (For AHU Line) | 8 | nos. | | | |
| **e.** | 25 mm NB lever operated Butterfly valve | 2 | nos. | | | |
| **f.** | 19 mm NB lever operated Butterfly valve | 4 | nos. | | | |
| **g.** | 38 mm NB Y Stainer (For AHU Line) | 2 | nos. | | | |
| **h.** | Thermometers with port (For AHU Line) | 4 | nos. | | | |
| **i.** | Pressure gauge with port (For AHU Line) | 4 | nos. | | | |
| **j.** | Automatic Brass Air Purge Valve assembly/ drain valve at the test points | 2 | nos. | | | |
| 5 | AIR DISTRIBUTION SYSTEM | | | | | |
| | SHEET METAL DUCT | | | | | |
| | Duct fabrication from GI with VCD, MS hangers & angle frame at all flanges having 2 mm rubber gasket fixed in between, angle braces to control duct vibration & other low side work. The quantity is appx. with minor civil work like making & filling of wall cutouts /holes. (on site fabricated) | | | | | |
| **a** | 22 swg. | 1150 | smt. | | | |
| **b** | 24 swg. | 600 | smt. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| c | SA/RA Grills & Diffusers of extruded 'Al' duly powder coated with VCD with related frame fixing work | 17 | smt. | | | |
| d. | 12 mm thick accoustic internal duct lining of Nitrile Rubber open cell foam or semi open convoluted elastomeric nitril /EPDM rubber foam with fire safety rating class 1 (BS476 part7), IS 15061 & to pass fungi resistance as per ASTM G21 & Bacterial resistance as per ASTM 2180. It should have high density range of 140-180 kg/cu.m. & to withstand 100'C surface temp. | 150 | smt. | | | |
| e. | Thermal duct insulation of 32 mm thk. Class O EPDM rubber of density 40 kg/cm. It should be free from CFC,HCFC,VOC & Nitrosamine contents as per US FDA norms. | 1750 | smt. | | | |
| f. | Inline booster Fans to boost the Fresh air drawn from the Central duct Capacity - 1000 CFM,1" st.pr. | 2 | nos. | | | |
| 6 | Fresh air Supply through set of PVC piping of medium rating with various fitting like elbow, Tee, etc .. Duly insulated with 25 mm thk. Class O EPDM rubber of density 40 kg/cm. It should be free from CFC,HCFC,VOC & Nitrosamine contents as per US FDA norms. | | | | | |
| a | 4" dia | 120 | mt. | | | |
| b | 5" dia | 50 | mt. | | | |
| c | 6" dia | 40 | mt. | | | |
| d. | 7" dia | 45 | mt. | | | |
| e. | 8" dia | 50 | mt. | | | |
| f. | 10" dia | 25 | mt. | | | |
| g. | 12" dia | 35 | mt. | | | |
| 7 | Disc valve of 4" dia for Fresh air supply | 35 | nos. | | | |
| a | Disc valve of 6" dia for Fresh air supply | 5 | nos. | | | |
| 8 | S/E/C/T of Motorize Fire Damper of 16 guage GI duly configured with Fire Alarm System (BAS) | 2 | smt. | | | |
| 9 | Flexible Reqzine with 5" zip | 4 | nos. | | | |
| | | | | | | |
| 10 | 65mm Y Stainer with Flange for Main Header in AHU Room total Set complete as directed. | 4 | Nos | | | |
| 11 | Main Header Tapping T in AHU Room for Extra Flange | 4 | Nos | | | |
| | | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 12 | Supply, installation, testing and commissioning of motorised combined **smoke & fire damper** complete with control panel, inter connecting wiring at locations shown in approved shop drawings and as per specifications. | | | | | |
| | | | | | | |
| **a** | Smoke & Fire Dampers. | 5 | Sqm | | | |
| | | | | | | |
| **b** | Actuators & Control Panel | 2 | Nos. | | | |
| | | | | | | |
| **c** | 3 core x1.5 Sq.mm Wiring | 200 | RM | | | |
| | | | | | | |
| 13 | **Insulated Flexible Ducting** | | | | | |
| | | | | | | |
| | Supplying, installing & testing of insulated flexible duct made of a double lamination of film permanantly bounded to a coated spring steel wire helix. The outer jacket made of double laminated film, wrapping of fibre glass insulation including necessary supports, flexible hangers with isolators, flexible connections, dampers and vanes, volume control dampers etc. complete as per specification in accordance with the approved shop drawings and required by the specifications. | | | | | |
| | | | | | | |
| **a** | 100 mm dia | 40 | RM | | | |
| **b** | 150 mm dia | 40 | RM | | | |
| **c** | 250 mm dia | 70 | RM | | | |
| | | | | | | |
| | S/E/T/C/ loading-unloading of Air Cooled VRV/VRF type central Air Conditioning system. The operation & control shall be through central BMS. | | | | | |
| 1 | Outdoor unit : | | | | | |
| **a** | 24 HP unit | 1 | no. | | | |
| | | | | | | |
| 2 | Indoor unit (with remote): | | | | | |
| **2a** | Hi-Wall type - 1.6 TR capacity | 3 | nos. | | | |
| **2b** | Hi-Wall type - 2 TR capacity | 1 | nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| **2c** | Cassette type - 2.6 TR capacity | 2 | nos. | | | |
| **2d** | Cassette type - 3.0 TR capacity | 1 | nos. | | | |
| **2e** | Cassette type - 4.0 TR capacity | 2 | nos. | | | |
| 3 | 18 swg hard Refrigerant copper piping including refnets duly insulated with 19mm thick nitrile rubber sleeve & cabling connecting O/D & I/D units. Exposed insulation to have UV protection coating (measured once along the route). | | | | | |
| **a** | 41.3mm OD | 15 | RM | | | |
| **b** | 34.9mm OD | 25 | RM | | | |
| **c** | 28.6mm OD | 105 | RM | | | |
| **d** | 25.4mm OD | 110 | RM | | | |
| **e** | 22.2mm OD | 90 | RM | | | |
| **f** | 19.1mm OD | 100 | RM | | | |
| **g** | 15.9mm OD | 250 | RM | | | |
| **h** | 12.7mm OD | 250 | RM | | | |
| **i** | 9.5mm OD | 150 | RM | | | |
| **j** | 6.4mm OD | 80 | RM | | | |
| | | | | | | |
| 4 | HMI based Central monitoring & controlling of all the parameters of AC system with communication cabling for ODUs IDUs. Digital display type one point BAS shall be located at BMS room. | 1 | nos. | | | |
| 5 | 1" dia. drain piping of sch.40, U PVC duly insulated with 6mm nitrile rubber foam sleeve. Exposed insulation to have UV protection coating | 85 | RM | | | |
| **6** | "Y" joints for Ref. piping distribution | 14 | nos. | | | |
| **7** | Refrigerant /oil | 1 | kg. | | | |
| **8** | MS black colored floor mounted frame work for system ODUs | 1 | nos. | | | |
| **9** | BTU meter | 4 | nos. | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| **10** | Miscellaneous for civil work for ducting or piping like dismanteling of wall, making & filling of wall holes & fitting work | 1 | lumpsum | | | |
| 11 | Supply, installation, testing and commissioning of 100A, 4P on load isolator in lockable powder coated 2mm thick wall mounted type enclosure **(Weather Proof)** having provision of incoming and outgoing cable of the size 1 no. of 3.5C x 35 Sqmm. Al. conductor XLPE insulated armoured with all fixing hardwares etc. as required. **(For outdoor unit )** | 2 | No | | | ` |
| | | | | | | |
| 12 | Supply, installation, testing and commissioning of 63A, 4P on load isolator in lockable powder coated 2mm thick wall mounted type enclosure **(Weather Proof)** having provision of incoming and outgoing cable of the size 1 no. of 3.5C x 16 Sqmm. Al. conductor XLPE insulated armoured with all fixing hardwares etc. as required. **(For outdoor unit )** | 1 | No | | | |
| | | | | | | |
| 13 | Providing & fixing control cum transmission wiring in medium duty MS Conduit between indoor and outdoor units. | | | | | |
| **a** | 2C x 1.5 Sqmm Cu Cable | 100 | RM | | | |
| **b** | 3C x 1.5 Sqmm Cu Cable | 100 | RM | | | |
| | | | | | | |
| **4** | **TOTAL AMOUNT FOR HVAC AND ALLIED WORK** | | | | | |
| | | | | | | |
| **1.0** | **PREAMBLE TO BOQ:** | | | | | |
| | **Tendered Rates all Inclusive in Indian Rs.** | | | | | |
| 1 | Unless otherwise provided in the Bill of Quantities, the rates tendered by the Contractor for all items of the work shall be all inclusive and shall apply to all heights, lifts, leads and depths, in all positions of the building. | | | | | |
| 2 | Rates/prices quoted in this tender shall be inclusive of cost of materials, labours, supervision, installation, testing and commissioning, materials erection, tools, plant appliances, scaffolding, sleeves, cutting, patching, excavation and backfilling, painting, storage of material, service connections, transport to site, taxes, duties, transit insurance octroi and levies, all relevant insurance charges, ESI, PF, breakage, wastage and all such expenses as may be necessary and required for the satisfactory completion of all the items of the work and final guarantee testing and to put there in working conditions and all other requirements as called for in all the parts of these Tender Documents. | | | | | |
| 3 | All rates quoted must be for complete items inclusive of all such accessories, fixtures and fixing arrangements, supports, nuts, bolts, hangers as are a standard part of the particular item except where specially mentioned otherwise. | | | | | |
| 4 | All rates quoted are inclusive of cutting holes and chases in walls and making good the same with cement mortar / concrete / water proofing of appropriate mix and strength. Rates are inclusive of holes, sleeves, recesses in the concrete and masonry work as the Work proceeds except foundation work. | | | | | |
| 5 | All rates quoted shall include marking of grills/diffusers. | | | | | |
| 6 | Nothing extra shall be payable to Contractor on account of any of the above factors. | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 7 | The client reserves the right to supply directly any of the items listed in the BOQ. For all such items, if desired by the Owner, installation, testing and commissioning shall be the responsibility of the Contractor. | | | | | |
| 8 | Making and closing of all HVAC associated openings in walls shall form part of HVAC works. All quoted prices should be inclusive of this aspect. | | | | | |
| 9 | Wooden frame work for mounting grills on walls shall be in the scope of HVAC works and nothing shall be paid extra for this. However, frame work for mounting grills/diffusers on false ceiling shall be provided by other agencies. | | | | | |
| 10 | The grills/diffusers shall be measured and charged on actual area basis and $0.1m^2$ shall not be accepted as the minimum chargeable area. | | | | | |
| 11 | Before quating the rate please read all tender specifications,technical specification , Make list, basic rate list mentioned at page no SSC 15 of item etc. Basic Rate either payable or recoverable on the basis selected item rate. Basic Rate of Material means Landed Cost (Discounted Rate) including all Govt. Duties, Taxes excluding GST, Transportation, Loading, Unloading, local carting , Handling etc. | | | | | |
| 12 | The bidder should quote as per the equipment/ materials given in BOQ. Any suggested deviations can only be given as an option with proper justification. | | | | | |
| 13 | Pre dispatch inspection at factory for Electrical panels, AHU and Modular furniture all the expencess shall be born by contractor for one representative of project Architect and two representative of Bank. | | | | | |
| 14 | The work shall be executed as per relevant specification and drawings. | | | | | |
| 15 | All material and equipment shall be as per specification and as per approved makes of material. Where specifications are not available the material shall be as per Indian standard specifications. The quantities and capacities of the equipments shall meet the requirement for successful completion of the work. | | | | | |
| 16 | The installation and testing shall also be as per specifications and as per direction and satisfaction of Bank. | | | | | |
| 17 | Contractor shall submit the shop drawings for approval by consultants / Engineer in charge. The work shall be carried out as per the approved shop drawings. | | | | | |
| 18 | Panels shall be fabricated as per specifications after approval of fabrication drawings by consultant / Engineer in charge. | | | | | |
| 19 | All Electrical panel must have provision of potential free contacts for BMS/FAS. | | | | | |
| 20 | Approval of all makes of material to be supplied out of approved list, shall be obtained by the contractor. Sample of the material shall be kept at site to check with the material actually installed at site. | | | | | |
| 21 | Engineer in charge may get the material tested at authorized labs. In case material is found under specifications as per IS, same shall be replaced by the contractor. The test fee for $1^{st}$ test shall be borne by the client but for subsequent test, fee due to failure of first sample, would be borne by the contractor. | | | | | |
| 22 | Testing and commissioning shall be carried out as per IS 732-1989 for the installation. The record of test results shall be maintained and submitted to the engineer in charge who would check the same at random. | | | | | |
| 23 | The tender shall be filled in ink and any cutting / overwriting shall be attested by the tenderer. Rates shall be quoted both in figures and words. If there is discrepancy between the rates in figures and words, then rates in words shall be final. | | | | | |
| 24 | Totaling errors or missing amounts shall be corrected and incorporated in tendered amount. | | | | | |
| 25 | Continuous earth wire shall run alongwith circuit wiring and point wiring. All switch boxes and fixtures shall be earthed. Only solid conductor earth wire shall be used for earthing. | | | | | |
| 26 | Where only conduits are laid for other services 16 SWG steel wire shall run in the conduit for pulling the wires at later date, by other agencies. | | | | | |
| 27 | Tenderer may note that there are lot of RCC walls in which conduits and outlet boxes switch boxes are to be provided. Costing of such walls shall be done with mixer shutterings. Conduits and boxes shall be laid before pouring the concrete. The outlet boxes, J.boxes, switch boxes shall be touch welded to the reinforcement before concreting. Only deep metallic J.boxes shall be used with PVC conduit as well. | | | | | |
| 28 | All connections shall be through, aluminium ferrules for aluminum conductors and copper ferrules for copper conductor cables. | | | | | |
| 29 | Earth wire with point wiring, circuit wiring, shall be of green colour with solid conductor. | | | | | |
| 30 | DBs shall be circuit numbered. | | | | | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 31 | As built drawing shall be prepared by the contractor after successful completion of the work these drawings shall incorporate the actual layouts, routes of cables and conduits with sizes, locations of outlets, DBS switch rooms panel, Tag blocks EPABX, Switches servers, fire detectors, zonal and main fire panels, location of CCTV cameras, monitors, etc. sets of blue prints of switch drawings shall be submitted to the Engineer incharge for verification with actual layout at site and for record. | | | | | |
| 32 | If any deviation observed in the specification mentioned in BOQ and technical sepcifications then specification mentioned in BOQ shall be considered for execution or the decision taken by the EIC shall be final. | | | | | |
| 33 | Measurement shall be carried out as per IS 1200 | | | | | |

| | |
|---|---|
| 1 | The work shall be executed as per relevant specification and drawings. |
| | |
| 2 | All material and equipment shall be as per specification and as per approved makes of material. Where specifications are not available the material shall be as per Indian standard specifications. The quantities and capacities of the equipments shall meet the requirement for successful completion of the work. |
| | |
| 3 | The installation and testing shall also be as per specifications and as per direction and satisfaction of Engineer in charge. |
| | |
| 4 | Contractor shall submit the shop drawings for approval by consultants / Engineer in charge. The work shall be carried out as per the approved shop drawings. |
| | |
| 5 | Panels shall be fabricated as per specifications after approval of fabrication drawings by consultant / Engineer incharge. |
| | |
| 6 | All Electrical panel must have provision of potential free contacts for BMS/FAS. |
| | |
| 7 | All Electrical panel must have digital type energy meter with RS 485 port. |
| | |
| 8 | The rates of all the items of the BOQ shall include the cost of :- |
| | |
| i) | All materials, fixing hardware, accessories, tools and plants, freight, insurance, labour, taxes, duties, testing commissioning and of the work, as per specifications and drawings. |
| | |
| ii) | Wastage on material and labour. |
| | |
| iii) | Loading, unloading, handling charges, hoisting the material to all upper levels. |
| | |
| iv) | Execute the work as per specifications and drawings to the full satisfaction of engineer incharge. |
| | |
| v) | All liabilities, obligations and risks arising out of conditions of contract. |
| | |
| vi) | All requirements for successful completion of the work whether mentioned in BOQ, specifications land drawings or not. |
| | |
| vii) | In the event of conflict between BOQ, specifications and drawings, the most stringent shall apply. The decision of Architect / Engineer incharge / Consultant shall be final and binding. |
| | |
| 9 | The quantities of the items in the BOQ are for general guidance only based on the consultants drawings and documents. The contractor shall be paid for actual quantities as per schedule rates. |
| | |
| 10 | Contractor shall visit the site before quoting the rates and satisfying himself about the working conditions. Since this is a tall building, hoisting the material to upper levels may be taken into account white quoting the rates. No extra claim on this account shall be entertained. |
| | |
| 11 | Approval of all makes of material to be supplied out of approved list, shall be obtained by the contractor. Sample of the material shall be kept at site to check with the material actually installed at site. |
| | |
| 12 | Engineer in charge may get the material tested at authorized labs. In case material is found under specifications as per IS, same shall be replaced by the contractor. The test fee for 1$^{st}$ test shall be borne by the client but for subsequent test, fee due to failure of first sample, would be borne by the contractor. |
| | |
| 13 | Testing and commissioning shall be carried out as per IS 732-1989 for the installation. The record of test results shall be maintained and submitted to the engineer in charge who would check the same at random. |
| | |

| Sr.No. | DESCRIPTION OF ITEM | Quantity | UNIT | RATE IN FIGURES (Rs.) | RATE IN WORDS (Rs) | AMOUNT (Rs.) |
|---|---|---|---|---|---|---|
| 14 | The tender shall be filled in ink and any cutting / overwriting shall be attested by the tenderer. Rates shall be quoted both in figures and words. If there is discrepancy between the rates in figures and words, then rates in words shall be final. PA system - as per specifications attached, As per service provider norms HT/LT, CCTV as per specifications, Access control system - as per specifications, UPS - as per specification, Fire alarm as per specifications, HDMI cable - BLACK I, MX, | | | | | |
| | | | | | | |
| 15 | Totaling errors or missing amounts shall be corrected and incorporated in tendered amount. | | | | | |
| | | | | | | |
| 16 | Continuous earth wire shall run alongwith circuit wiring and point wiring. All switch boxes and fixtures shall be earthed. Only solid conductor earth wire shall be used for earthing. | | | | | |
| | | | | | | |
| 17 | Where only conduits are laid for other services 16 SWG steel wire shall run in the conduit for pulling the wires at later date, by other agencies. | | | | | |
| | | | | | | |
| 18 | Tenderer may note that there are lot of RCC walls in which conduits and outlet boxes switch boxes are to be provided. Costing of such walls shall be done with mixer shutterings. Conduits and boxes shall be laid before pouring the concrete. The outlet boxes, J.boxes, switch boxes shall be touch welded to the reinforcement before concreting. Only deep metallic J.boxes shall be used with PVC conduit as well. | | | | | |
| | | | | | | |
| 19 | All connections shall be through, aluminium ferrules for aluminum conductors and copper ferrules for copper conductor cables. | | | | | |
| | | | | | | |
| 20 | Earth wire with point wiring, circuit wiring, shall be of green colour with solid conductor. | | | | | |
| | | | | | | |
| 21 | DBs shall be circuit numbered. | | | | | |
| | | | | | | |
| 22 | As built drawing shall be prepared by the contractor after successful completion of the work these drawings shall incorporate the actual layouts, routes of cables and conduits with sizes, locations of outlets, DBS switch rooms panel, Tag blocks EPABX, Switches servers, fire detectors, zonal and main fire panels, location of CCTV cameras, monitors, etc. sets of blue prints of switch drawings shall be submitted to the Engineer incharge for verification with actual layout at site and for record. | | | | | |

**Datasheet of 10 KVA Online UPS Systems with battery back up time**

| Sr No. | Description | Technical Specification |
|---|---|---|
| **1** | **Rating (in KVA)** | **10 KVA / 10 KW** |
| **2** | **Make** | APC / Vertiv / EATON |
| **3** | **Model** | Vendor to specify |
| ***[ A ]*** | ***Input*** | |
| 1 | Rectifier Design | IGBT Based Rectifier |
| 2 | Nominal Voltage | 415 VAC |
| 3 | Nominal Frequency | 50 Hz |
| 4 | Input Power Factor | 0.99 |
| 5 | Input Voltage Range | 160-300VAC on full load |
| 6 | Frequency Range | 40 to 70 Hz |
| 7 | THDi | < 5% |
| ***[ B ]*** | ***Output*** | |
| 1 | Invertor Design | IGBT Based Technology |
| 2 | Voltage | 220 / 230 / 240 V AC |
| 3 | Waveform | Pure Sine wave |
| 4 | Total Harmonic Distortion | < 1% for linear load & <3 % for non linear load |
| 5 | Crest Factor | 3 :1 |
| 6 | Overload capacity | 125% for 10 min, 150% for 30 Sec |
| 7 | Power Factor | Unity |
| ***[ C ]*** | ***Environmental*** | |
| 1 | Operational Temperature | 0 to 40 Deg. |
| 2 | Altitude | 1000m above sea level |
| 3 | Relative Humidity | 0 to 95%, no condensation allowed |
| ***[ D ]*** | ***Physical*** | |
| 1 | Enclosure Protection | IP 20 |
| 2 | Cooling | Vendor to specify |
| 3 | Colour | Vendor to specify |
| 4 | Cable Entry | Vendor to specify |
| ***[ E ]*** | ***Bypass*** | |
| 1 | Phase | 1 Phase |
| 2 | Static Bypass | Auto |
| 3 | Voltage | 230 V AC |
| 4 | Frequency | 50Hz |
| 5 | Transfer | No Break |
| ***[ F ]*** | ***Battery*** | |
| 1 | Type | Sealed Maintenance Free |
| 2 | DC Voltage | Vendor to specify |

| | | |
|---|---|---|
| 3 | Recharge Time | 8-10 hrs |
| 4 | VAH | 15600 |
| 5 | Battery Backup | 60 min |
| 6 | Minimum Charger Capacity | 10% of the battery AH capacity |
| 7 | Battery make | Exide / Quanta |
| 8 | Charger | upto 10 amp |

| | | |
|---|---|---|
| ***[ G ]*** | ***General*** | |
| 1 | Overall Efficiency on Full load | 95% |
| 2 | High Efficiency mode | 98.0% |
| 3 | Acoustic Noise (in dbA) | < 60 dBA @ 1 Meter |
| 4 | Alarms | Audible Alarm required for Mains Failure, Low Battery, Inverter Trip, Over Temperature, Over Load |
| 5 | Electrical Protection | Required |
| 6 | Parallel Redudancy | Parallel Compitible up 3 units |
| 7 | Display Panel | Provided |
| 8 | Battery rack | M.S. Angle stand |
| ***[ H]*** | ***Approx. Dimensions(mm)*** | |
| ***A.*** | ***UPS (mm)*** | |
| 1 | Width | Vendor to specify |
| 2 | Depth | Vendor to specify |
| 3 | Height | Vendor to specify |
| 4 | Approx. Weight (Kg) | Vendor to specify |
| ***B.*** | ***Battery Stand (mm)*** | |
| 1 | Width | Vendor to specify |
| 2 | Depth | Vendor to specify |
| 3 | Height | Vendor to specify |
| 4 | Approx. Weight (Kg) | Vendor to specify |
| ***[ I ]*** | ***Standard*** | |
| 1 | Safety | CE |
| 2 | Enregy Saving | CQC |
| ***[ J ]*** | ***Warranty*** | |
| 1 | UPS | 2 Years |
| 2 | Battery | 2 Years |

# C.C.T.V. SYSTEM

## 1. SCOPE

This section covers the design, supply, installing, testing and commissioning of Closed Circuit Television system comprising CCD Cameras, DVR and Monitors.

## 2. CCD FIXED INDOOR CAMERAS (DOME TYPE)

The CCD Cameras shall have the following

features:- i. It shall be general purpose colour

video cameras.

ii. It shall have standard resolution with excellent sensitivity for fine performance at low light levels.

iii. It shall have signal to noise ratio of more than 48 dB.

iv. It shall be provided with linear shutter and back light compensation.

v. The linear electronic shutter shall be capable of automatically selecting integration period appropriate for the illumination level. The range of speeds shall be 1/50-
1/100,000 seconds.

vi. **Video Characteristics**

a. Image Device : 1/3-inch interline transfer CCD

b. Sensitivity : 0.1 to .002 lux Scene illumination.
Conditions: usable video (50 IRE)

output c. Resolution : EIA: 510 lines horizontal.

vii. Electronic Shutter : EIA speed range: 1/50 sec to

1/100,000 sec. viii. **Backlight**

a. Compensation : Switch selectable, on-off.

b. Geometric Distortion : 0%

ix. Signal-to-Noise Ratio : Greater than
48 dB (SNR)

x. Video Signal Output : 1.0 v p-p (140 IRE) composite video, consisting of 714 mV (100 IRE) of luminance and of negative-goingsync signal of 286 mV (40 IRE)

xi. White Balance : ATW or AWB

xii. Synchronization : Line locking with vertical phase

adjustment. xiii. Automatic Gain Control : Required.

**3. COLOUR MONITOR**

The colour Closed circuit Video monitor shall be suitable for providing high 450 TV lines horizontal, resolution, high contrast picture on a 55" inch diagonal screen. The monitor shall have solid state circuitry. It shall be include video loop through connectors with a switchable high-2 Nos. 75-ohm out put (one for extension) termination on the rear panel. The monitor shall be suitable for 240 V, 50 Hz. The monitor shall be housed in an enameled steel cabinet with a recessed plastic carrying handle. The monitor shall be provided with controls for brightness, contrast, vertical hold, horizontal hold and power on/off. These shall be located at the front of the unit. The monitor shall comply with UL standard 1410. It should have SVHS input / output.

**4. DIGITAL VIDEO RECORDER**

a) The system will combine the functions of a multiplexer, VCR and telemetry switcher for system versatility and functional use a with large system. It shall offer full triplex operation.

b) It shall use the latest high performance Wavelets ™ compression technology, and record pictures up to a resolution upto SVHS standard.

c) It shall use the built-in hard disk drive or external archive medium to both record to, and play back from these media.

d) The unit will support connection to Ethernet networks/IP Connectivity.
Software will permit view of either live pictures or playback from the Hard Disks Recorder, while simultaneously recording.

e) It will have Ethernet compatibility, 10/100 MBPS Base-T network interfacecard on Ethernet units

f) It will permit video transmission via Ethernet.

g) It will have 2 selectable record levels: VHS & S-VHS. It will have user-friendly
Windows™ style menus, SCSI port for VAIDe, AIT1, AIT2 and CD-RW arching

devices h) It will have capability of VMD and activity detection

**5. PTZ INDOOR CAMERAS**

**a) It shall be colour integrated speed dome camera.**

b) It shall be remotely configurable with integrated telemetry receiver.

c) It shall have $360^0$ continuous pan and $180^0$ continuous tilt..

d) It shall have minimum 50 pre-set positions.

e) It shall have auto tour facility for automatic operation.

f) It shall have sector tilting / camera tilting.

g) It shall have auto IRIS / auto focus. h)

It shall have minimum 450 TV lines.

i) Sensitivity shall be 1-lux, usable video.

## 6. OUTDOOR P/T/Z WEATHER PROOF DAY / NIGHT DOME CAMERA

a) It shall be colour integrated weather proof IP-65 outdoor.

b) It should be suitable to operate both in day / night mode with low luxsensitivity. Day mode shall be 2-lux and Night mode shall be 0.016

lux. c) It shall have optical zoom 18x and digital zoom 10x.

d) It shall have $360^0$ continuous pan and $180^0$ continuous tilt..

e) It shall have auto IRIS / auto focus.

f) It shall have minimum 450 TV lines.

g) It shall have auto tour facility for automatic operation.

## MODE OF MEASUREMENTS

1.0 Wiring light points, fan points, exhaust fan points, call bell points, socket outlets, telephone / TV outlets shall be measured and paid on point basis as per BOQ, and as elaborated below unless stated otherwise.

2.0 In case of group control light points i.e. more than one light points controlled by switch or MCB, wiring from switch / MCB upto first point shall be primary light point and subsequent points in the group shall be deemed as secondary light points and paid as per item in BOQ. The rate shall include all the items mentioned in the BOQ. Wiring point shall include circuit wiring from DB to $1^{st}$ tap off point includingthe earth wire.
6A socket outlet points, power points, fan points, bell points shall be paid on point basis at schedule rates.

3.0 Telephone outlets points shall include wiring from Tag block to 1st tap off point and 1st tap off point to subsequent telephone outlet points. This would include conduit with conduit accessories telephone wire outlet box, with cover plate and telephone jack.

4.0 Wiring for TV outlet shall include wiring from Tap / Splitter box to the 1st outlet and1st outlet to subsequent outlets. In case DTH connectivity conduit from switcher to various outlets shall be paid on linear measurement basis. The outlet box with cover plate shall be paid separately as per item of BOQ. Wiring shall be drawn by service provider and would not be in the scope of electrical contractor.

5.0 Wiring for fire alarm system shall be measured and paid on linear basis at schedule rates.

6.0 Submain wiring and cables, conduits for various services shall be measured on linear basis and paid as per item of the work.

## 1.0 TESTING OF THE INSTALLATION

### 1.1 Installation Completion Tests

At the completion of the work, the entire installation shall be subject to the following tests:

1. Wiring continuity test
2. Insulation resistance test
3. Earth continuity test
4. Earth resistivity test
5. Polarity test

Besides the above, any other test specified by the local authority shall also be carried out. All tested and calibrated instruments for testing, labour, materials and incidentals necessary to conduct the above tests shall be provided by the contractor athis own cost.

### 1.2 Insulation Resistance Test

The insulation resistance shall be measured between earth and the whole system conductors, or any section thereof with all protection in place and all switches closed and except in concentric wiring all lamps in position of both poles of the installation otherwise electrically connected together, a direct current pressure of not less than twice the working pressure provided that it does not exceed 1100

volts for medium voltage circuits. Where the supply is derived from AC three phase system, the neutral pole of which is connected to earth, either direct or through added resistance, pressure shall be deemed to be that which is maintained between the phase conductorand the neutral. The insulation resistance measured as above shall not be less than 50mega ohms divided by the number of points provided on the circuit the whole installation shall not have an insulation resistance lower than one mega ohm.

The insulation resistance shall also be measured between all conductors connected to one phase conductor of the supply and shall be carried out after removing all metallic connections between the two poles of the installation and in those circumstances the insulation shall not be less than that specified above.

The insulation resistance between the frame work of housing of power appliances and all live parts of each appliance shall not be less than that specified in the relevant standard specification or where there is no such specification, shall not be less than half a Megaohm or when PVC insulated cables are used for wiring 12.5 Megaohms divided by the number of outlets. Where a whole installation is being tested a lower

value than that given by the above formula subject to a minimum of 1 Megaohms is acceptable.

## 1.3 Wiring Continuity Test

All wiring systems shall be tested for continuity of circuits, short circuits, andearthing after wiring is completed and before installation is energized.

## 1.4 Testing Of Earth Continuity Path

The earth continuity conductor including metal conduits and metallic envelopes of cable in all cases shall be tested for electric continuity and the electrical resistance of the same alongwith the earthing lead but excluding any added resistance of earth leakage circuit breaker measured from the connection with the earth electrode to any point in the earth continuity conductor in the completed installation shall not exceed one ohm.

## 1.5 Testing Of Polarity Of Non-Linked Single Pole Switches

In a two wire installation a test shall be made to verify that all non-linked single pole switches have been connected to the same conductor throughout, and such conductor shall be labeled or marked for connection to an outer or phase conductor or to the non- earthed conductor of the supply. In the three of four-wire installation, a test shallbe made to verify that every non-linked single pole switch

is fitted to one of the outeror phase conductor of the supply. The entire electrical installation shall be subject to the final acceptance of the Project Manager as well as the local authorities.

## 1.6 Earth Resistivity Test

Earth resistivity test shall be carried out in accordance with latest IS Code of Practice for earthing.

## 1.7 Polarity Test

1.7.1 In two wire installation, a test shall be made to verify that all the switches in every circuit have been fitted in the same conductor throughout, and such conductor shall be labeled or marked for connection to the phase conductor, or to the non-earthed conductors of the supply. In a three wire or a four wire installation, a test shall be made to verify that every non-linked single pole switch is fitted in a conductor which is labeled, or marked for connection to one of the phase conductors of the supply.

1.7.2 The installation shall be connected to the supply for testing. The terminals of all switches shall be tested by a test lamp, one lead of which is connected to the earth. Glowing of test lamp to its full brilliance, when the switch is in “on” position irrespective of appliance in position or not, shall indicate that the switch is connected to the right polarity.

## 1.8 Performance

Should the above tests not comply with the limits and requirements as above the contractor shall rectify the faults until the required results are obtained. The contractor
shall be responsible for providing the necessary instruments and subsidiary earths for carrying out the tests. The above tests are to be carried out by the contractor without any extra charge.

## 1.9 Tests And Test Reports

The Contractor shall furnish test reports and preliminary drawings for the equipment to the Project Manager for approval before commencing supply of the equipment. The Contractor should intimate with the tender the equipment intended to be supplied with its technical particulars. Any test certificates etc., required by

the local Inspectors or any other Authorities would be supplied by the Contractor without any extra charge. All test reports shall be approved by the Project Manager prior to energizing of installation.

# TECHNICAL SPECIFICATION ADDRESSABLE FIRE DETECTION AND VOICE EVACUATION SYSTEM

## 1.0 SITE CONDITIONS, SPECIAL CONDITIONS AND GENERAL DESCRIPTION

The Fire Alarm System supplier shall furnish and install a fully integrated Fire Detection cum Voice Evacuation system.

It is proposed to have a single, unified and integrated Fire Alarm cum Voice Evacuation system to meet the Life Safety Standards defined in NFPA standards and NBC standards.

The Fire Alarm System shall consist of Smoke detectors, Heat Detectors, and combination detectors selected as per specific requirements of the area to be installed in, as well as various input / output modsules.

It is proposed to have Fire Detection Panels distributed at various floors, in the LV shafts.

Distributed on the floors are also the Voice and Fire Fighter's Telephone command Centers, in direct peer-to-peer network with the Fire Alarm Panels.

Every Staircase shall be provided with a Fire Fighter's telephone station comprising of a Firefighters telephone and jack, and a cabinet to house the same securely.

Voice evacuation speakers to meet the sound pressure levels as decreed by NFPA 72, NFPA 101 shall be deployed in the entire complex. Exit sounders, which shall emit a distinct temporal sound signature to help occupant evacuate the floor shall be deployed at the Fire Exit Staircases.

Digital Voice amplifiers shall be deployed on floor levels as per the attached schematics.

Touch Screen Panels, which shall enable the Fire Fighters to have immediate first hand information of any fire scenario, along with the facility to display auxiliary information which shall be programmed to facilitate fire fighting, shal lbe deployed at the entrances to the individual sections of the building, as depicted in the Schematic.

In Conclusion, a Truly Peer to Peer network of intelligent nodes shall be deployed to ensure life safety of the occupant of the building, and shall be programmed to ensure the fastest detection and safe evacuation of the occupants.

The fire alarm system shall comply with requirements of NFPA Standard 72 for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.

The system shall be an active/interrogative type system where each addressable device is repetitively scanned, causing a signal to be transmitted to the main fire alarm control panel (FACP)

indicating that the device and its associated circuit wiring is functional. Loss of this signal at the main FACP shall result in a trouble indication as specified hereinafter for the particular input.

The facility shall have an emergency voice alarm communication system. Digitally stored message sequences shall notify the building occupants that a fire or life safety condi tion has been reported. Message generator(s) shall be capable of automatically distributing up to eight (8) simultaneous, unique messages to appropriate audio zones within the facility based on the type and location of the initiating event. The Fire Command Center (FCC) shall also support Emergency manual voice announcement capability for both system wide or selected audio zones, and shall include provisions for the system operator to override automatic messages system wide or in selected zones.

The system shall be support additional, alternate Fire Command Centers, which shall be capable of simultaneous monitoring of all system events. Alternate Fire Command Centers shall also support an approved method of transferring the control functions to an alternate Fire Command Center when necessary. All Fire Command Centers shall be individually capable of assuming Audio Command functions such as Emergency Paging, audio zone control functions, and Firefighter's Telephone communication functions.

Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Fire Command Center (FCC) and designated personnel in other buildings at the site via a multiplex communication network.

The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

## 2.0 SCOPE OF WORK

A. A intelligent reporting, microprocessor controlled fire detection cum Voice Evacuation system shall be installed in accordance with the specifications and drawings.

The basic system comprises of Main Addressable Intelligent fire alarm panels, Voice and Fire Fighters Telephone Command Systems, Network Repeaters,Touch Screen Displays, networked on a peer to peer network as the headend of the System.

The Low side of the System shall comprise of the intitiating devices such as the smoke / Heat / Combination Sensors, Manual Pull Stations etc.

Notification Applicances shall include Hooter cum Strobes, Speakers and Speaker cum Strobes, Flashers, Alarm Bells etc.

All the above components shall be connected by interconnecting flexible copper cables, Fire
Survival PVC grade, laid in GI conduits, or Armoured Cable for physical protection.

The scope shall include laying of the cables described above, citing of the various components to the direction of the architects and consultants, networking and programming to achieve the desired functionality.

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B. The system shall be designed such that each signaling line circuit (SLC) is limited to only 80%
of its total capacity at initial installation.

1. Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit.

2. On Style 6 or 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
3. Alarm signals arriving at the FACP shall not be lost following a primary power failure
(or outage) until the alarm signal is processed and recorded.
4. Speaker circuits may be controlled by NAC outputs built into the amplifiers, which shall function as addressable points on the Digital Audio Loop.
5. Notification Appliance Circuits (NAC) speaker circuits shall be arranged such that there is a minimum of one speaker circuit per floor of the building or smoke zone which ever is greater.
6. Audio amplifiers and tone generating equipment shall be electrically supervised for
normal and abnormal conditions.
7. Notification Appliance Circuits (NAC) speaker circuits and control equipment shall be arranged such that loss of any one (1) speaker circuit will not cause the loss of any other speaker circuit in the system.
8. Two-way emergency telephone communication circuits shall be supervised for open and short circuit conditions.
9. Speaker circuits shall be arranged such that there is a minimum of one speaker circuit per smoke zone.
10. Speaker circuits shall be electrically supervised for open and short circuit conditions. If a short circuit exists on a speaker circuit, it shall not be possible to activate that circuit.
11. Audio amplifiers and tone generating equipment shall be electrically supervised for abnormal conditions. Digital amplifiers shall provide built-in speaker circuits, field configurable as four Class B (Style Y), or two Class A (Style Z) circuits.
12. Digital amplifiers shall be capable of storing up to two minutes of digitally recorded audio messages and tones. The digital amplifiers shall also be capable of supervising the connection to the associated digital message generator, and upon loss of that connection shall be capable of one of the following system responses:

    a. The digital amplifier shall automatically broadcast the stored audio message.
    b. The digital amplifier shall switch to a mode where a local bus input on the digital amplifier will accept an input to initiate a broadcast of the stored message. This bus input shall be connected to a NAC on a local FACP for the purpose of providing an alternate means of initiating an emergency message during a communication fault condition.
    c. Speaker circuits shall be either 25 VRMS or 70VRMS. Speaker circuits shall have 20% space capacity for future expansion or increased power output requirements.

d. Two-way emergency telephone (Fire Fighter Telephone) communication shall be supported between the Audio Command Center and up to seven (7) remote Fire

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Fighter's Telephone locations simultaneously on a telephone riser.

e. Means shall be provided to connect FFT voice communications to the speaker circuits in order to allow voice paging over the speaker circuit from a telephone handset.

f. The digital audio message generator shall be of reliable, non-moving parts, and support the digital storage of at least 16 or 32 minutes of tones and emergency messages, shall support programming options to string audio segments together to create up to 1000 messages, or to loop messages and parts of messages to repeat for pre-determined cycles or indefinitely.

C. Basic System Functional Operation

When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

1. The System Alarm LED shall flash.
2. A local piezo electric signal in the control panel shall sound.
3. The 640-character LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
4. Printing and history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
5. All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

6. The audio portion of the system shall sound the proper audio signal (consisting of tone, voice, or tone and voice) to the appropriate zones

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## 3.0 CODES AND STANDARDS

The publications listed below form a part of this specification. The publications are referenced in text by the basic designation only.

A. Underwriters Laboratories Inc. (UL) - USA:

| | |
|---|---|
| No. 50 | Cabinets and Boxes |
| No. 268 | Smoke Detectors for Fire Protective Signaling Systems |
| No. 864 | Control Units for Fire Protective Signaling Systems |
| No. 268A | Smoke Detectors for Duct Applications. |
| No. 521 | Heat Detectors for Fire Protective |
| No. 228 | Door Closers-Holders for Fire Protective Signaling Systems. |
| No. 464 | Audible Signaling Appliances. |
| No. 38 | Manually Actuated Signaling Boxes. |
| No. 346 | Waterflow Indicators for Fire Protective Signaling Systems. |
| No. 1481 | Power supplies for Fire Protective Signaling Systems. |
| No. 1076 | Control Units for Burglar Alarm Proprietary Protective Signaling Systems. |
| No. 1971 | Visual Notification Appliances. |

NFPA CODE 70 (NEC) NFPA
72 Fire Alarm Code NFPA
101 Life Safety Code

B. National Building Code of India, 2005.
C. All requirements of the Authority Having Jurisdiction (AHJ).

### 3.1 APPROVALS

3.1.1 The system shall have proper listing and/or approval from the following nationally recognized agencies:

UL Underwriters Laboratories Inc /
FM Factory Mutual

3.1.2 The Fire Alarm Control Panel and all transponders shall meet the modular listing requirements of Underwriters Laboratories, Inc.

3.1.3 Each sub-assembly, including all printed circuits, shall include the appropriate UL modular label.

3.1.4 This includes all printed circuit board assemblies, power supplies, and enclosure parts. Systems that do not include modular labels may require return to the factory for system upgrades, and are not acceptable.

## 4.0 PRODUCT / MATERIAL SPECIFICATIONS

### 4.1 General

This section of the specification includes the furnishing, installation, and connection of a microprocessor controlled, analog addressable, intelligent fire alarm equipment required to form a complete coordinated system ready for operation.

It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, auxiliary control devices, annunciators, power supplies, and wiring as shown on the drawings and specified herein.

The panel shall further extend fire and fault outputs, and on line data of status of all compoenents, to the BMS for critical alarm monitoring, and it shall be possible to connect a interface card for open Protocol based (Commonly BACnet, Modbus or eqv.) output to enable a software level integration with the BMS System.

The Panel shall be with integral voice evacuation cum Fire Fighters telephone system to relay evacuation messages in case of a fire emergency.

Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Central Monitoring Stations ( Fire Command Center Room) and designated personnel, and if required, in other buildings at the site via a multiplex communication network.

The system shall also support independent gas release circuits for activation of various Fire Suppression systems, as required.

The system shall include hardware, modules to facilitate cross zoning of specific sensors, abort release functions, time delay and inputs for pressure switch and 24V output for Output operations.

The system and its components shall be Underwriters Laboratories, Inc. listed under the appropriate UL testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL listing.

The main panel is to be located in the BMS Room on the Lower Basement Floor. All the other panels shall be distributed throughout the building complex, and shall be of multiple loops to accommodate all the sensors and devices with the spare loop capacity of 20% on every loop.

All the sensors and devices are connected to floor panels and all output circuits are activated from the same.

The Hooters cum Strobes / Speaker Strobes (Refer layout plans) are located at strategic locations to ensure audible alarm and voice messages reach every corner of the floor.

The panel shall be capable to zone all the sensors and devices and shall be able to activate outputs against activation of zone.

Wherever Applicable, The sensors located in Server Room shall be programmed in 2 separate zones per room to facilitate cross zoning, time delay and output to Gas Release system Panel in these rooms.
The panels shall be supplied with UPS power 230V AC and shall have its in-built battery backup and battery charger for 24 hours of standby operation, and the system shall be able to function for 30 minutes in full Alarm Condition, even during a Power Failure.

**4.2 Basic Performance:**

- Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on NFPA Style 6 (Class A) Signaling Line Circuits (SLC).

- Initiation Device Circuits (IDC) shall be wired Class A (NFPA Style D) as part of an addressable device connected by the SLC Circuit.

- Notification Appliance Circuits (NAC) shall be wired Class A (NFPA Style Z) as part of an addressable device connected by the SLC Circuit.

- On Style 6 or 7 (Class A) configurations a single ground fault or open circuit on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.

- Alarm signals arriving at the FACP shall not be lost following a primary power failure (or outage) until the alarm signal is processed and recorded.

When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:

The System Alarm LED shall flash.

A local piezo electric signal in the control panel shall sound.

The LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.

All system output programs assigned via control-by-event interlock programming to be activated by the particular point in alarm shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

The audio portion of the system shall sound the proper signal (tone or voice) to the appropriate zones.

The fire alarm system shall detect all changes in status of monitored points and shall initiate appropriate acts to alert/evacuate occupants, provide event annunciation and activate auxiliary controls as specified herein.

The system shall accept process and evaluate the following types of input signals:

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- Automatic Fire Detectors
- Manual Alarms

- Supervisory (Tamper ) Condition
- Trouble

The system shall store a record of alarm, supervisory and trouble events in non-volatile history file. This file shall contain the most recent 1000 events, with time and date of each event. It shall be possible to select the number of events to be viewed in the history file by date, so the entire file does not have to be downloaded. The history file shall remain intact in the event of a loss of AC and battery power.

The system shall be capable of being expanded and field reprogrammed at any time up to the predetermined maximum capacity of the system, without the requirement to return the operating system to the factory for program changes. All field programming shall be done by an authorized manufacturer's representative.

Intelligent, Analog and Addressable input devices shall receive power and communication protocol signals over a single pair of wires per channel (SLC) from the control unit.

Each channel (SLC) shall support Minimum of 125 analog and/or addressable devices.

Channels shall be field programmable for NFPA 72(1993) Style 4 and 6 operations, with capability for Style 7 when used with approved loop isolation units.

Photoelectric, Laser and Thermal detectors shall be of the Intelligent, analog addressable type, and shall provide dual level alarm and pre-alarm reporting. Pre-alarm shall serve as early warning of an impending alarm condition, and shall generate a trouble condition in the panel.

Each detector head shall incorporate a microprocessor which provides for distributed system intelligence. The micro shall provide full monitoring and control of the device with memory for storage of pre-set sensitivity levels and other detection device parameters. For security purposes and system integrity no mechanical addressing switches shall be allowed for field devices. All setting of device parameter shall be done electronically.

System Power shall be adequate to accommodate all connected addressable and analog input devices in alarm simultaneously and shall be capable of operating all connected addressable output relays while all addressable inputs are in alarm. Prior to owner / contractor acceptance of installed system, manufacturer or his representative shall demonstrate 100% system alarm status with no loss of performance.

Activation of any manual alarm station or any other approved alarm initiating device (excluding Automatic Fire Detectors which will be described later) shall immediately result in the following:

Display the alarm condition on the LCD Displays of all the Peer-to-Peer networked Panels, Network Repeaters and Slave Repeaters, Touch Screen Displays.

Visual alarm signals shall be provided as indicated on the plans.

System shall shutdown/redirect all HVAC system fans, dampers, etc.; close fire doors, recall elevators, etc., in accordance with the schedule provided and with appropriate local/national code.

Operation of the system alarm silence switch shall silence all alarm audible connected to the system, with the exception of circuits programmed for the non-silence waterflow feature. When

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properly configured, a silence command shall not extinguish visual alarm appliances. Circuits containing alarm visual circuits shall not be silenceble except upon system reset.

The system alarm LED and all other associated alarm displays shall remain illuminated until the alarm condition has been corrected and the panel has been reset.

A connected system printer (if supplied) shall record all the status changes that take place within the fire protection system, including alarm / trouble restoration. All status changes shall be logged.

The activation of an Automatic Fire Detector shall provide for all operations.

Alarm Verification per device in accordance with NFPA 72 - 1993 and UL 864.

Positive Alarm Sequence in accordance with NFPA 72 -1993 and UL 864.

Analog-Addressable smoke detectors shall be equipped with a Day/Night Sensitivity Mode which may be selected by either manual or automatic input.

Because certain smoke detector environments change from day (occupied) to night (unoccupied), a more sensitive or Night setting may be desirable. Adjustable sensitivity smoke detector values shall be distinctly identified in the system memory and by display.

Supervisory conditions shall cause a distinct annunciation at the panel. The system printer shall record supervisory events in a manner consistent for all status changes.

The fire alarm panel shall fully supervise its operation. The physical opening or cutting of the wiring to any initiation, alarm indicating, signaling line, or associated supervisory monitoring circuit shall cause distinct annunciation via the LCD display.

Analogue signals from detectors shall be processed in such a way as to discriminate, as far as possible, between sources of fire and false alarms, and shall identify detectors that are becoming dirty. As a minimum, multi-state indications, i.e. normal, fire, fault and pre-alarm warning, shall be provided for each detector.

It shall be possible to interrogate detectors to determine their analogue values and display these on the alphanumeric display of each control panel. There shall be the facility to display an individual detector's value separately as well as values of all detectors together. It shall also be possible to set a value and display the addresses of all those detectors with values above that value.

The controlling software of the system shall be configured to group detectors and manual call points into zones.

Output signals, for example, to sounder circuits and interfaces, corresponding to individual device inputs and/or their related zones, shall be configurable in the controlling software of the system. They shall be freely assignable; i.e. each input shall be capable of being programmed to operate any, some, or all outputs.

It shall be possible to modify the configuration of zones and reconfigure the relationship between inputs and outputs. This shall be site programmable.

The system shall be immune to EMC-related interference. In particular, the Contractor shall take into account the use of VHF/UHF radio communication systems, mobile telephones, pagers and computers, and other electrical equipment used in the building.

The system shall be installed in accordance with the manufacturer's instructions. In particular, the Contractor shall take due note of, and shall comply with, the manufacturer's instructions on circuit design, minimum signal strengths, loadings and end-of-line terminations, where appropriate.

### 4.3 Wiring Arrangements

It shall be the responsibility of the Contractor to determine the number of loops and other circuits required for the system.

Where the system is distributed, the network linking the control panels shall be capable of being extended in the future to link to further compatible control panels. The capacity of the network shall be expandable by 25%

### 4.4 Circuit Design

Each detection loop shall originate and terminate at the control and indicating equipment.

The number of loops required for the system shall be determined on the basis of device capacity, total loop length and the area of coverage of each loop. The maximum area coverage per loop shall not exceed 10,000m².

Each loop shall incorporate a minimum of 25% spare device capacity for possible future use. The spare capacity shall relate to manual call points, detectors, sounder and beacons (where relevant) and loop interfaces in any combination.

All wiring shall be monitored for faults.

Loop wiring shall tolerate a single open-circuit fault without affecting any device on the same loop. Loop wiring shall also tolerate multiple open-circuit or short-circuit faults in one area, without affecting the devices in any other area or on any other loop or circuit.

Removal of a device from a loop shall not cause any remaining devices in the system to become inoperative.

It shall be possible to disable detectors on the system. The controlling software shall permit individual detector disablement and detector group disablement. As a minimum, a group shall correspond with the detectors in a particular zone. Group detector disablement shall not render manual call points in the same area inoperative.

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Short-circuit isolators shall be provided at the beginning and end of each loop. Also, a single short circuit or open-circuit fault on an automatic fire detector circuit shall neither disable protection within an area of more than 2,000m², nor on more than one floor of the building plus a maximum of five devices (automatic detection, manual call points, sounders or a combination of these) on the floor immediately above and five devices on the floor immediately below that floor.

Where the system is distributed, the network between control panels shall be configured as a loop and shall be capable of tolerating a single open- or short-circuit without loss of communication between panels. It shall be a 'peer to peer' network that is not wholly dependent on a single,

centralized processor or panel. In the event of failure of the network, each control panel on the network shall be capable of operating in a 'stand-alone' mode and thus generating fire alarm warnings in response to activation of a device connected to it.

## 4.5 False Alarms

Great care shall be taken, at the design stage, to minimize the likelihood of false alarms occurring in the new or modified system.

Devices shall be of types appropriate to the local environment. For example, optical smoke detectors shall not be installed in areas where there is likely to be steam or dust present. Also, manual call points shall be fitted with transparent hinged covers where there is the possibility of accidental operation, e.g. in kitchens or service areas.

## 4.6 SYSTEM COMPONENTS

### 4.6.1 System Architecture

The system shall have a centralized structure. The locations of control and indicating equipment shall be as shown on the Contract Drawings.

A centralized system has one set of control and indicating equipment in a single location in the building. (The control panel may also be connected to repeater or mimic panel(s) elsewhere in the building.) This means that all detection loop wiring, and separate sounders wiring (if appropriate) will emanate from the centrally located control and indicating equipment. Centralized systems are suitable where the lengths of loop and sounder cables do not become excessive because of the size of the building.

### 4.6.2 Main Components

All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

All equipment and components shall be installed in strict compliance with each manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning system installation. Refer to the riser/connection diagram for all specific system installation/termination/wiring data.

All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

### 4.6.3 CABLING

All fire alarm system wiring must be as specified here in.

Wiring shall be in accordance with local, state and national codes (NBC of India, IS 2189, NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 1.5 Sq. mm for initiating device circuits and signaling line circuits, for notification appliance circuits.

The Cables used shall be annealed tinned copper conductor XLPE / Elastomeric Insulted insulated **Fire Survival multicore armoured cable (600/1000V) with Copper conductor having cross-linkable halogen free Ethylene Propylene Rubber (EPR) insulation and LSZH inner & outer sheath. Basic design as per BS 7846, IEC-502, IEC-61034. Fire performance tests as per BS 8491:2008 Cat.3 (120 mins) for above 20 mm overall dia & for below 20 mm overall dia as per BS 6387 C.W.Z. & BS EN 50200 PH-120 + Annex-E. BRE GLOBAL / LPCB certified.**

### 4.6.4 FIRE ALARM CONTROL PANEL OR NETWORK NODE

The main FACP Central Console shall be a suitable to accommodate required number of devises having 1 Loop as spare for detectors & devices as well. It shall contain a microprocessor based Central Processing Unit (CPU).

The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, panel modules including initiating circuits, control circuits, and notification appliance circuits, local and remote operator terminals, printers, annunciators, and other system controlled devices.

In conjunction with intelligent Loop Control Modules and Loop Expander Modules, the main FACP shall perform the following functions:

- Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.

- Supervise all initiating signaling and notification circuits throughout the facility by way of connection to addressable monitor and control modules.
- Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed. In the event of CPU failure, all SLC loop modules shall fallback to degrade mode. Such degrade mode shall

treat the corresponding SLC loop control modules and associated detection devices as conventional two-wire operation. Any activation of a detector in this mode shall automatically activate associated Notification Appliance Circuits.

- Visually and audibly annunciate any trouble, supervisory, security or alarm condition on operator's terminals, panel display, and annunciators.

When a fire alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

- The system alarm LED shall flash.
- A local piezo-electric audible device in the control panel shall sound a distinctive signal.
- The backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
- Printing and history storage equipment shall log and print the event information along with a time and date stamp.
- All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

When a trouble condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

The system trouble LED shall flash.

- A local piezo-electric audible device in the control panel shall sound a distinctive signal.
- The LCD display shall indicate all information associated with the trouble condition, including the type of trouble point and its location within the protected premises.
- Printing and history storage equipment shall log and print the event information along with a time and date stamp.
- All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (trouble notification appliances and/or relays) shall be activated.

When a supervisory condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

- The system trouble LED shall flash.
- A local piezo-electric audible device in the control panel shall sound a distinctive signal.

- The LCD display shall indicate all information associated with the supervisory condition, including the type of trouble point and its location within the protected premises.

- Printing and history storage equipment shall log and print the event information along with a time and date stamp.

- All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated system outputs (notification appliances and/or relays) shall be activated.

When a security alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

- The system security LED shall flash.

- A local piezo-electric audible device in the control panel shall sound a distinctive signal.

- The backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.

- Printing and history storage equipment shall log and print the event information along with a time and date stamp.

- All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

When a pre-alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

- The system pre-alarm LED shall flash.

- A local piezo-electric audible device in the control panel shall sound a distinctive signal.

- The backlit LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.

- Printing and history storage equipment shall log and print the event information along with a time and date stamp.

- All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

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### 4.6.5 Operator Control

**4.6.5.1 Acknowledge Switch:**

a) Activation of the control panel acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the LCD display to the next alarm or trouble condition. In addition, the FACP shall support Block Acknowledge to allow multiple trouble conditions to be acknowledged with a single depression of this switch.

b) Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.

c) Signal Silence Switch:

Depression of the Signal Silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition. The selection of notification circuits and relays that are silence able by this switch shall be fully fielded programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.

**4.6.5.2 Drill Switch**

Depression of the Drill switch shall activate all programmed notification appliance circuits. The drill function shall latch until the panel is silenced or reset.

**4.6.5.3 System Reset Switch**

Depression of the System Reset switch shall cause all electronically latched initiating devices to return to their normal condition. Initiating devices shall re-report if active. Active notification appliance circuits shall not silence upon Reset. Systems that de-activate and subsequently re-activate notification appliance circuits shall not be considered equal. All programmed Control-By-Event equations shall be re-evaluated after the reset sequence is complete if the initiating condition has cleared. Non-latching trouble conditions shall not clear and re-report upon reset.

**4.6.5.4 Lamp Test**

The Lamp Test switch shall activate all local system LEDs, light each segment of the liquid crystal display and display the panel software revision for service personal.

**4.6.5.5 Scroll Display Keys**

There shall be Scroll Display keys for FIRE ALARM, SECURITY, SUPERVISORY, TROUBLE, and OTHER EVENTS. Depression of the Scroll Display key shall display the next event in the selected queue allowing the operator to view events by type.

**4.5.5.6 Print Screen**

Depression of the PRINT SCREEN switch shall send the information currently displayed on the display to the printer.

1) The control panel shall be capable of expansion via up to 10 SLC modules. Each module shall support a maximum of 318 analog/addressable devices for a maximum system capacity of 3180 points. The system shall be capable of 3072 annunciation points per system regardless of the number of addressable devices and shall support up to 96 panel circuits which may consist of either inputs or outputs.

2) The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit liquid crystal display, individual, color coded system status LEDs, and a QWERTY style alphanumeric keypad for the field programming and control of the fire alarm system. Said LCD shall also support graphic bit maps capable of displaying the company name and logo of either the owner or installing company.

3) All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel.

4) The FACP shall be able to provide the following software and hardware features:

    a) Pre-signal and Positive Alarm Sequence: The system shall provide means to cause alarm signals to only sound in specific areas with a delay of the alarm from 60 to up to 180 seconds after start of alarm processing. In addition, a Positive Alarm Sequence selection shall be available that allows a 15-second time period for acknowledging an alarm signal from a fire detection/initiating device. If the alarm is not acknowledged within 15 seconds, all local and remote outputs shall automatically activate immediately.

    b) Smoke Detector Pre-alarm Indication at Control Panel: To obtain early warning of incipient or potential fire conditions, the system shall support a programmable option to determine system response to real-time detector sensing values above the programmed setting. Two levels of Pre-alarm indication shall be available at the control panel: alert and action.

    c) Alert: It shall be possible to set individual smoke detectors for pre-programmed pre-alarm thresholds. If the individual threshold is reached, the pre-alarm condition shall be activated.

    d) Action: If programmed for action, and the detector reaches a level exceeding the pre-programmed level, the control panel shall indicate an action condition. Sounder bases installed with either heat or smoke detectors shall automatically activate on action Pre-Alarm level, with general evacuation on alarm level.

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    e) The system shall support a detector response time to meet world annunciation requirements of less than 3 seconds.
    f) Device Blink Control: Means shall be provided to turn off detector/module LED strobes for special areas.

    g) NFPA 72 Smoke Detector Sensitivity Test: The system shall provide an automatic smoke detector test function that meets the requirements of NFPA 72.

h) Programmable Trouble Reminder: The system shall provide means to automatically initiate a reminder that troubles exist in the system. The reminder will appear on the system display and (if enabled) will sound a piezo alarm.

i) On-line or Off-line programming: The system shall provide means to allow panel programming either through an off-line software utility program away from the panel or while connected and on-line. The system shall also support upload and download of programmed database and panel executive system program to a Personal Computer/laptop.

j) History Events: The panel shall maintain a history file of the last 4000 events, each with a time and date stamp. History events shall include all alarms, troubles, operator actions, and programming entries. The control panels shall also maintain a 1000 event Alarm History buffer, which consists of the 1000 most recent alarm events from the 4000 event history file.

k) Smoke Control Modes: The system shall provide means to perform FSCS mode Smoke Control to meet NFPA-92A and 90B and HVAC mode to meet NFPA 90A.

l) The system shall provide means for all SLC devices on any SLC loop to be auto programmed into the system by specific address. The system shall recognize specific device type ID's and associate that ID with the corresponding address of the device.

m) Drill: The system shall support means to activate all silenceable fire output circuits in the event of a practice evacuation or "drill". If enabled for local control, the front panel switch shall be held for a minimum of 2 seconds prior to activating the drill function

n) Passwords and Users: The system shall support two password levels, master and user. Up to 9 user passwords shall be available, each of which may be assigned access to the programming change menus, the alter status menus, or both. Only the master password shall allow access to password change screens.

o) Two Wire Detection: The system shall support standard two wire detection devices specifically all models of System Sensor devices, Fenwal PDS-7125/7126 and CPD-7021, Hochiki model SLK-24F/24FH, Edwards 6250B/6270B and 6264B and Simplex models 2098-9201/9202 and 9576.

p) Block Acknowledge: The system shall support a block Acknowledge for Trouble Conditions

q) Sensitivity Adjust: The system shall provide Automatic Detector Sensitivity Adjust based on Occupancy schedules including a Holiday list of up to 15 days.

r) Environmental Drift Control: The system shall provide means for setting Environmental Drift Compensation by device. When a detector accumulates dust in the chamber and reaches an unacceptable level but yet still below the allowed limit, the control panel shall indicate a maintenance alert warning. When the detector accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.

s) Custom Action Messages: The system shall provide means to enter up to 100 custom action messages of up to 160 characters each. It shall be possible to assign any of the 100 messages to any point.

t) Print Functions: The system shall provide means to obtain a variety of reports listing all event, alarm, trouble, supervisory, or security history. Additional reports shall be available for point activation for the last Walk Test performed, detector maintenance report containing the detector maintenance status of each installed addressable detector, all network parameters, all panel settings including broad cast time, event ordering, and block acknowledge, panel timer values for Auto Silence, Silence Inhibit, AC Fail Delay time and if enabled, Proprietary Reminder, and Remote Reminder timers, supervision settings for power supply and printers, all programmed logic equations, all custom action messages, all non-fire and output activations (if pre-programmed for logging) all active points filtered by alarms only, troubles only, supervisory alarms, pre alarms, disabled points and activated points, all installed points filtered by SLC points, panel circuits, logic zones, annunciators, releasing zones, spal zones, and trouble zones.

u) Local Mode: If communication is lost to the central processor the system shall provide added survivability through the intelligent loop control modules. Inputs from devices connected to the SLC and loop control modules shall activate outputs on the same loop when the inputs and outputs have been set with point programming to participate in local mode or when the type codes are of the same type: that is, an input with a fir alarm type code shall activate an output with a fire alarm type code.

v) Resound based on type for security or supervisory: The system shall indicate a Security alarm when a monitor module point programmed with a security Type Code activates. If silenced alarms exist, a Security alarm will resound the panel sounder. The system shall indicate a Supervisory alarm when a monitor module point programmed with a supervisory Type Code activates. If there are silenced alarms, a Supervisory alarm will resound the panel sounder.

w) Read status preview - enabled and disabled points: Prior to re-enabling points, the system shall inform the user that a disabled device is in the alarm state. This shall provide notice that the device must be reset before the device is enabled thereby avoiding activation of the notification circuits.

x) Custom Graphics: When fitted with an LCD display, the panel shall permit uploading of a custom bit-mapped graphic to the display screen.

y) Multi-Detector and Cooperating Detectors: The system shall provide means to link one detector to up to two detectors at other addresses on the same loop in cooperative multi-detector sensing. There shall be no requirement for sequential addresses on the detectors and the alarm event shall be a result or product of all cooperating detectors chamber readings.

z) Tracking/Latching Duct (ion and photo): The system shall support both tracking and latching duct detectors either ion or photo types.

aa) ACTIVE EVENT: The system shall provide a Type ID called FIRE CONTROL for purposes of air-handling shutdown, which shall be intended to override normal operating automatic functions. Activation of a FIRE CONTROL point shall cause the control panel to (1) initiate the monitor module Control-by-Event, (2) send a message to the panel display, history buffer, installed printer and annunciators, (3) shall not light an indicator at the control panel, (4) Shall display ACTIVE on the LCD as well a display a FIRE CONTROL Type Code and other information specific to the device.

bb) NON-FIRE Alarm Module Reporting: A point with a type ID of NON-FIRE shall be available for use for energy management or other non-fire situations. NON-FIRE point operation shall not affect control panel operation nor shall it display a message at the panel LDC. Activation of a NON-FIRE point shall activate control by event logic but shall not cause any indication on the control panel.

cc) Security Monitor Points: The system shall provide means to monitor any point as a type security.

dd) One-Man Walk Test: The system shall provide both a basic and advanced walk test for testing the entire fire alarm system. The basic walk test shall allow a single operator to run audible tests on the panel. All logic equation automation shall be suspended during the test and while annunciators can be enabled for the test, all shall default to the disabled state. During an advanced walk test, field-supplied output point programming will react to input stimuli such as CBE and logic equations. When points are activated in advanced test mode, each initiating event shall latch the input. The advanced test shall be audible and shall be used for pull station verification, magnet activated tests on input devices, input and output device and wiring operation/verification.

ee) Control by Event Functions: CBE software functions shall provide means to program a variety of output responses based on various initiating events. The control panel shall operate CBE through lists of zones. A zone shall become listed when it is added to a point's zone map through point programming. Each input point such as detector, monitor module or panel circuit module shall support listing of up to 10 zones into its programmed zone map.

ff) Permitted zone types shall be general zone, releasing zone and special zone. Each output point (control module, panel circuit module) can support a list of up to 10 zones including general zone, logic zone, releasing zone and trouble zone. It shall be possible for output points to be assigned to list general alarm. Non-Alarm or Supervisory points shall not activate the general alarm zone.

gg) 1000 General Zones: The system shall support up to 1000 general purpose software zones for linking inputs to outputs. When an input device activates, any general zone programmed into that device's zone map will be active and any output device

that has an active general zone in its map will be active. It shall also be possible to use general zone as arguments in logic equations.

hh) 1000 Logic Equations: The system shall support up to 1000 logic equations for AND, OR, NOT, ONLY1, ANYX, XZONE or RANGE operators that allow conditional I/O linking. When any logic equation becomes true, all output points mapped to the logic zone shall activate.

ii) 10 trouble equations per device: The system shall provide support for up to 10 trouble equations for each device, which shall permit programming parameters to be altered, based on specific fault conditions. If the trouble equation becomes true, all output points mapped to the trouble zone shall activate.

jj) Control-By-Time: A time based logic function shall be available to delay an action for a specific period of time based upon a logic input with tracking feature. A latched version shall also be available. Another version of this shall permit activation on specific days of the week or year with ability to set and restore based on a 24 hour time schedule on any day of the week or year.

kk) Multiple agent releasing zones: The system shall support up to 10 releasing zones to protect against 10 independent hazards. Releasing zones shall provide up to three cross-zones with four abort options to satisfy any local jurisdiction requirements.

ll) Alarm Verification, by device, with timer and tally: The system shall provide a user-defined global software timer function that can be set for a specific detector or indicating panel module input. The timer function shall delay an alarm signal for a user-specified time period and the control panel shall ignore the alarm verification timer if another alarm is detected during the verification period. It shall also be possible to set a maximum verification count between 0 and 20 with the "0" setting producing no alarm verification. When the counter exceeds the threshold value entered, a trouble shall be generated to the panel.

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**Central Processing Unit**

1) The Central Processing Unit shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection or failure of any control panel module shall be detected and reported to the system display by the Central Processing Unit.

2) The Central Processing Unit shall contain and execute all control-by-event (including Boolean functions including but not limited to AND, OR, NOT, ANYx, and CROSSZONE) programs for specific action to be taken if an alarm condition is detected by the system. Such control-by-event programs shall be held in non-volatile programmable memory, and shall not be lost with system primary and secondary power failure.

3) The Central Processing Unit shall also provide a real-time clock for time annotation, to the second, of all system events. The time-of-day and date shall not be lost if system primary and secondary power supplies fail.

4) The CPU shall be capable of being programmed on site without requiring the use of any external programming equipment. Systems that require the use of external programmers or change of EPROMs are not acceptable.

5) Consistent with UL864 standards, the CPU and associated equipment are to be protected so that voltage surges or line transients will not affect them.

6) Each peripheral device connected to the CPU shall be continuously scanned for proper operation. Data transmissions between the CPU and peripheral devices shall be reliable and error free. The transmission scheme used shall employ dual transmission or other equivalent error checking techniques.

7) The CPU shall provide an EIA-232 interface between the fire alarm control panel and the UL Listed Electronic Data Processing (EDP) peripherals.

8) The CPU shall provide two EIA-485 ports for the serial connection to annunciation and control subsystem components.

9) The EIA-232 serial output circuit shall be optically isolated to assure protection from earth ground.

10) The CPU shall provide one high-speed serial connection for support of network communication modules.

11) The CPU shall provide double pole relays for FIRE ALARM, SYSTEM TROUBLE, SUPERVISORY, and SECURITY. The SUPERVISORY and SECURITY relays shall provide selection for additional FIRE ALARM contacts.

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**Display**

1) The system display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.

2) The display assembly shall contain, and display as required, custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.

3) The system display shall provide a backlit alphanumeric Liquid Crystal Display (LCD). It shall also provide ten Light-Emitting-Diodes (LEDs) that indicate the status of the following system parameters: AC POWER, FIRE ALARM, PREALARM, SECURITY, SUPERVISORY, SYSTEM TROUBLE, OTHER EVENT, SIGNALS SILENCED, POINT DISABLED, and CPU FAILURE.

4) The system display shall provide a QWERTY style keypad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels with up to ten (one Master and nine User) passwords shall be accessible through the display interface assembly to prevent unauthorized system control or programming.

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5) The system display shall include the following operator control switches: ACKNOWLEDGE, SIGNAL SILENCE, RESET, DRILL, and LAMP TEST. Additionally, the display interface shall

allow scrolling of events by event type including, FIRE ALARM, SECURITY, SUPERVISORY, TROUBLE, and OTHER EVENTS. A PRINT SCREEN button shall be provided for printing the event currently displayed on the 2 X 40-character LCD.

**Loop (Signaling Line Circuit) Control Module**

1) The Loop Control Module shall monitor and control a minimum of 318 intelligent addressable devices. This includes 159 intelligent detectors (Ionization, Photoelectric, or Thermal) and 159 monitor or control modules.

2) The Loop Control Module shall contain its own microprocessor and shall be capable of operating in a local/degrade mode (any addressable device input shall be capable of activating any or all addressable device outputs) in the unlikely event of a failure in the main CPU.

3) The Loop Control Module shall provide power and communicate with all intelligent addressable detectors and modules on a single pair of wires. This SLC Loop shall be capable of operating as a NFPA Style 6 (Class B) circuit.

4) The SLC interface board shall be able to drive an NFPA Style 6 twisted shielded circuit up to 12,500 feet in length. The SLC Interface shall also be capable of driving an NFPA Style 6, no twist, no shield circuit up to 3,000 feet in length. In addition, SLC wiring shall meet the listing requirements for it to exit the building or structure. "T"-tapping shall be allowed in either case.

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5) The SLC interface board shall receive analog or digital information from all intelligent detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular device. Each SLC Loop shall be isolated and equipped to annunciate an Earth Fault condition. The SLC interface board software shall include software to automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and the automatic determination of detector maintenance requirements.

**Enclosures**

1) The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.

2) The back box and door shall be constructed of 0.060 steel with provisions for electrical cables connections into the sides and top.

3) The door shall provide a key lock and include a transparent opening for viewing all indicators. For convenience, the door shall have the ability to be hinged on either the right or left-hand side.

4) The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.

**Digital Voice Command Center**

1. The Digital Voice Command Center located with the FACP, shall contain all equipment required for all audio control, emergency telephone system control, signaling and supervisory functions. This shall include speaker zone indication and control, telephone circuit indication and control, digital voice units, microphone and main telephone handset.

2. Function: The Voice Command Center equipment shall perform the following functions:

   a. Operate as a supervised multi-channel emergency voice communication system.
   b. Operate as a two-way emergency telephone system control center.
   c. Audibly and visually annunciate the active or trouble condition of every speaker circuit and emergency telephone circuit.
   d. Audibly and visually annunciate any trouble condition for digital tone and voice units required for normal operation of the system.
   e. Provide all-call Emergency Paging activities through activation of a single control switch.
   f. As required, provide vectored paging control to specific audio zones via dedicated control switches.
   g. Provide a factory recorded "library" of voice messages and tones in standard

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WAV. File format, which may be edited and saved on a PC running a current Windows® operating system.

   h. Provide a software utility capable of off-line programming for the VCC operation and the audio message files. This utility shall support the creation of new programs as well as editing and saving existing program files. Uploading or downloading the VCC shall not inhibit the emergency operation of other nodes on the fire alarm network.
   i. Support an optional mode of operation with four analog audio outputs capable of being used with UL 864 fire-listed analog audio amplifiers and SCL controlled switching.
   j. The Digital Voice Command shall be modular in construction, and shall be capable of being field programmable without requiring the return of any components to the manufacturer and without requiring use of any external computers or other programming equipment.
   k. The Digital Voice Command and associated equipment shall be protected against unusually high voltage surges or line transients.

**Power Supply:**

1. The Addressable Main Power Supply shall operate on 120/240 VAC, 50/60 Hz, and shall provide all necessary power for the FACP.
2. The Addressable Main Power Supply shall provide the required power to the CPU using a switching 24 VDC regulator and shall incorporate a battery charger for 24 hours of standby power using dual-rate charging techniques for fast battery recharge.

3. The Addressable Main Power Supply shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge. The supply shall be capable of charging batteries ranging in capacity from 25-200 amp-hours within a 48-hour period.
4. The Addressable Main Power Supply shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.
5. The Addressable Main Power Supply shall be power-limited per UL864 requirements.

**Auxiliary Field Power Supply - Addressable**

1. The auxiliary addressable power supply is a remote 24 VDC power supply used to power Notification Devices and field devices that require regulated 24VDC power. The power supply shall also include and charge backup batteries.
2. The addressable power supply for the fire alarm system shall provide up a minimum of 6.0 amps of 24 volt DC regulated power for Notification Appliance Circuit (NAC) power or 5 amps of 24 volt DC general power. The power supply shall have an additional .5 amp of 24 VDC auxiliary power for use within the same cabinet as the power supply. It shall include an integral charger designed to charge 7.0 - 25.0 amp hour batteries.
3. The addressable power supply shall provide four individually addressable Notification Appliance Circuits that may be configured as two Class "A" and two Class "B" or four Class "B" only circuits. All circuits shall be power-limited per UL 864 requirements.
4. The addressable power supply shall provide built-in synchronization for certain Notification Appliances on each circuit without the need for additional synchronization

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modules. The power supply's output circuits shall be individually selected for synchronization. A single addressable power supply shall be capable of supporting both synchronized and non-synchronized Notification Devices at the same time.
5. The addressable power supply shall operate on 120 or 240 VAC, 50/60 Hz.
6. The interface to the power supply from the Fire Alarm Control Panel (FACP) shall be via the Signaling Line Circuit (SLC) or other multiplexed means Power supplies that do not use an intelligent interface are not suitable substitutes. The required wiring from the FACP to the addressable power supply shall be a single unshielded twisted pair wire. Data on the SLC shall be transmitted between 24 VDC, 5 VDC and 0 VDC at approximately 3.33k baud.
7. The addressable power supply shall supervise for battery charging failure, AC power loss, power brownout, battery failure, NAC loss, and optional ground fault detection. In the event of a trouble condition, the addressable power supply shall report the incident and the applicable address to the FACP via the SLC.
8. The addressable power supply shall have an AC Power Loss Delay option. If this option is utilized and the addressable power supply experiences an AC power loss, reporting of the incident to the FACP will be delayed. A delay time of eight or sixteen hours shall be Dip-switch selected.
9. The addressable power supply shall have an option for Canadian Trouble Reporting and this option shall be Dip-switch selectable.
10. The addressable power supply mounts in either the FACP backbox or it's own dedicated surface mounted backbox with cover.
11. Each of the power supply's four output circuits shall be DIP-switch selected for Notification Appliance Circuit or General Purpose 24 VDC power. Any output circuit shall be able to provide up to 2.5 amps of 24 VDC power.

12. The addressable power supply's output circuits shall be individually supervised when they are selected to be either a Notification Appliance Circuit when wired Class "A" or by the use of and end-of-line resistor. When the power supply's output circuit is selected as General 24VDC power, the circuit shall be individually supervised when an end-of-line relay is used.
13. When selected for Notification Appliance Circuits, the output circuits shall be individually DIP-switch selectable for Steady, March Time, Dual Stage or Temporal.
14. When selected as a Notification Appliance Circuit, the output circuits of the addressable power supply shall have the option to be coded by the use of a universal zone coder.
15. The addressable power supply shall interface and synchronize with other power supplies of the same type. The required wiring to interface multiple addressable power supplies shall be a single unshielded, twisted pair wire.
16. An individual or multiple interfaced addressable power supplies shall have the option to use an external charger for battery charging. Interfaced power supplies shall have the option to share backup battery power.

**Field Charging Power Supply (FCPS)**

The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.

1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24 volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 60 hour standby.
2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two style Y) shall be available for connection to the Notification devices.
3. The FCPS shall include an attractive surface mount backbox.
4. The Field Charging Power Supply shall include the ability to delay the AC fail delay per NFPA requirements.
5. The FCPS include power limited circuitry, per 1995 UL standards.

**System Circuit Supervision**

1. The FACP shall supervise all circuits to intelligent devices, transponders, annunciators and peripheral equipment and annunciate loss of communication with these devices. The CPU shall continuously scan above devices for proper system operation and upon loss of response from a device shall sound an audible trouble, indicate which device or devices are not responding and print the information in the history buffer and on the printer.
2. Transponders that lose communication with the CPU shall sound an audible trouble and light an LED indicating loss of communications.
3. Sprinkler system valves, standpipe control valves, PIV, and main gate valves shall be supervised for off-normal position.
4. All speaker and emergency phone circuits shall be supervised for opens and shorts. Each transponder speaker and emergency phone circuit shall have an individual ON/OFF indication (green LED).

**Field Wiring Terminal Blocks**

1. All wiring terminal blocks shall be the plug-in/removable type and shall be capable of terminating up to 12 AWG wire. Terminal blocks that are permanently fixed to the PC board are not acceptable

**Audio Amplifiers**

1. The Audio Amplifiers will provide Audio Power (@25 Volts RMS) for distribution to speaker circuits.
2. Multiple audio amplifiers may be mounted in a single enclosure, either to supply incremental audio power, or to function as an automatically switched backup amplifier(s).
3. The audio amplifier shall include an integral power supply, and shall provide built-in LED indicators for the following conditions:

    - Earth Fault on DAP A (Digital Audio Port A)
    - Earth Fault on DAP B (Digital Audio Port B)
    - Audio Amplifier Failure Detected Trouble
    - Active Alarm Bus input
    - Audio Detected on Aux Input A
    - Audio Detected on Aux Input B
    - Audio Detected on Firefighter's Telephone Riser
    - Receiving Audio from digital audio riser
    - Short circuit on speaker circuit 1
    - Short circuit on speaker circuit 2
    - Short circuit on speaker circuit 3
    - Short circuit on speaker circuit 4
    - Data Transmitted on DAP A
    - Data Received on DAP A
    - Data Transmitted on DAP B
    - Data Received on DAP B
    - Board failure
    - Active fiber optic media connection on port A (fiber optic media applications)
    - Active fiber optic media connection on port B (fiber optic media applications)
    - Power supply Earth Fault
    - Power supply 5V present
    - Power supply conditions - Brownout, High Battery, Low Battery, Charger Trouble

    The audio amplifier shall provide the following built-in controls:

    - Amplifier Address Selection Switches
    - Signal Silence of communication loss annunciation Reset
    - Level adjustment for background music
    - Enable/Disable for Earth Fault detection on DAP A
    - Enable/Disable for Earth Fault detection on DAP A
    - Switch for 2-wire/4-wire FFT riser

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5. Adjustment of the correct audio level for the amplifier shall not require any special tools or test equipment.

6. Includes audio input and amplified output supervision, back up input, and automatic switch over function, (if primary amplifier should fail).
7. System shall be capable of backing up digital amplifiers.

**Controls with associated LED Indicators:**

1. Speaker Switches/Indicators

    a. The speaker circuit control switches/indicators shall include visual indication of active and trouble status for each speaker circuit in the system.
    b. The speaker circuit control panel shall include switches to manually activate or deactivate each speaker circuit in the system.

2. Emergency Two-Way Telephone Control Switches/Indicators

    a. The emergency telephone circuit control panel shall include visual indication of active and trouble status for each telephone circuit in the system.
    b. The telephone circuit control panel shall include switches to manually activate or deactivate each telephone circuit in the system.

**Remote Transmissions:**

1. Provide local energy or polarity reversal or trip circuits as required.
2. The system shall be capable of operating a polarity reversal or local energy or fire alarm transmitter for automatically transmitting fire information to the fire department.
3. Provide capability and equipment for transmission of zone alarm and trouble signals to remote operator's terminals, system printers and annunciators.
4. Transmitters shall be compatible with the systems and equipment they are connected to such as timing, operation and other required features.

**System Expansion**

Design the main FACP and transponders so that the system can be expanded in the future (to include the addition of twenty percent more circuits or zones) without disruption or replacement of the existing control panel. This shall include hardware capacity, software capacity and cabinet space.

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**Field Programming**

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1) The system shall be programmable, configurable and expandable in the field without the need for special tools, laptop computers, or other electronic interface equipment. There

shall be no firmware changes required to field modify the system time, point information, equations, or annunciator programming/information.

2) It shall be possible to program through the standard FACP keyboard all system functions.

3) All field defined programs shall be stored in non-volatile memory.

4) Two levels of password protection shall be provided in addition to a key-lock cabinet. One level shall be used for status level changes such as point/zone disable or manual on/off commands (Building Manager). A second (higher-level) shall be used for actual change of the life safety program (installer). These passwords shall be five (5) digits at a minimum. Upon entry of an invalid password for the third time within a one minute time period an encrypted number shall be displayed. This number can be used as a reference for determining a forgotten password.

5) The system programming shall be "backed" up on a 3.5" floppy diskette utilizing an upload/download program. This system back-up disk shall be completed and given in duplicate to the building owner and/or operator upon completion of the final inspection. The program that performs this function shall be "non-proprietary", in that, it shall be possible to forward it to the building owner/operator upon his or her request.

The installer's field programming and hardware shall be functionally tested on a computer against known parameters/norms which are established by the FACP manufacturer. A software program shall test Input-to-Output correlations, device Type ID associations, point associations, time equations, etc. This test shall be performed on an IBM-compatible PC with a verification software package. A report shall be generated of the test results and two copies turned in to the engineer(s) on record.

**Specific System Operations**

1) Smoke Detector Sensitivity Adjust: Means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the system keypad or from the keyboard of the video terminal. Sensitivity range shall be within the allowed UL window.

2) Alarm Verification: Each of the Intelligent Addressable Smoke Detectors in the system may be independently selected and enabled to be an alarm verified detector. The alarm verification function shall be programmable from 5 to 50 seconds and each detector shall be able to be selected for verification during the field programming of the system or anytime after system turn-on. Alarm verification shall not require any additional hardware to be added to the control panel. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.

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3) System Point Operations -
Any addressable device in the system shall have the capability to be enabled or disabled through the system keypad or video terminal.

4) System output points shall be capable of being turned on or off from the system keypad or the video terminal.

5) Point Read: The system shall be able to display the following point status diagnostic functions without the need for peripheral equipment. Each point shall be annunciated for the parameters listed:

. Device Status.
Device Type.
Custom Device Label.
Software Zone Label.
Device Zone Assignments.
Analog Detector Sensitivity.
. All Program Parameters.

System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system statuses:

System History Recording and Reporting: The fire alarm control panel shall contain a history buffer that will be capable of storing up to 4000 system events. Each of these events will be stored, with time and date stamp, until an operator requests that the contents be either displayed or printed. The contents of the history buffer may be manually reviewed; one event at a time, and the actual number of activations may also be displayed and or printed. History events shall include all alarms, troubles, operator actions, and programming entries.

The history buffer shall use non-volatile memory. Systems which use volatile memory for history storage are not acceptable.

Automatic Detector Maintenance Alert: The fire alarm control panel shall automatically interrogate each intelligent system detector and shall analyze the detector responses over a period of time.

If any intelligent detector in the system responds with a reading that is below or above normal limits, then the system will enter the trouble mode, and the particular Intelligent Detector will be annunciated on the system display, and printed on the optional system printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.

The system shall include the ability (programmable) to indicate a "pre-alarm" condition. This will be used to alert maintenance personal when a detector is at 80% of its alarm threshold in a 60 second period.

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**Addressable Devices**

1) Addressable devices shall provide an address-setting means using rotary decimal switches / Soft Programming.

2) Addressable devices shall use simple to install and maintain decade (numbered 0 to 9) type address switches.
3) Detectors shall be Analog and Addressable, and shall connect to the fire alarm control panel's Signaling Line Circuits.
4) Addressable smoke and thermal detectors shall provide dual (2)status LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs can be programmed off via the fire control panel program.
5) The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. Sensitivity can be automatically adjusted by the panel on a time-of-day basis.
6) Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
7) The detectors shall be ceiling-mount and shall include a separate twist-lock base which includes a tamper proof feature.

The following bases and auxiliary functions shall be available :

Sounder base rated at 85 DBA minimum.

FORM-C Relay base rated 30VDC, 2.0A

**Isolator base**

The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.

Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).

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**Addressable Pull Box (manual station)**

1) Addressable pull boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after

actual emergency operation, they cannot be restored to normal use except by the use of a key.

2) All operated stations shall have a positive, visual indication of operation and utilize a key type reset.

3) Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches (44 mm) or larger.

**Intelligent Photoelectric Smoke Detector**

The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.
The detector **SHALL NOT** respond to refrigerant gas.

**Intelligent Self Acclimatising Multi Sensor Detector**

The intelligent multi sensor detector shall be an addressable device that is designed to monitor a minimum of photoelectric and thermal technologies in a single sensing device. The design shall include the ability to adapt to its environment by utilizing a built-in microprocessor to determine it's environment and choose the appropriate sensing settings. The detector design shall allow a wide sensitivity window, no less than 1 to 4% per foot obscuration. This detector shall utilize advanced electronics that react to slow smoldering fires and thermal properties all within a single sensing device.

The microprocessor design shall be capable of selecting the appropriate sensitivity levels based on the environment type it is in (office, manufacturing, kitchen etc.) and then have the ability to automatically change the setting as the environment changes (as walls are moved or as the occupancy changes).

The intelligent multi criteria detection device shall include the ability to combine the signal of the thermal sensor with the signal of the photoelectric signal in an effort to react hastily in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a false alarm condition by examining the characteristics of the thermal and smoke sensing chambers and comparing them to a database of actual fire and deceptive phenomena.

The detector **SHALL NOT** respond to refrigerant gas.

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**Intelligent Thermal Detectors**

Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.

**Intelligent Duct Smoke Detector**

1. The smoke detector housing shall accommodate either an intelligent ionization detector or an intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.

**Addressable Dry Contact Monitor Module**

1) Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLCs.

2) The monitor module shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box.

3) The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

4) For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.

**Addressable Control Module**

1) Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contract relay.

2) The control module shall mount in a standard 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box, or to a surface mounted back box.

3) The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (Form-C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.

4) Audio/visual power shall be provided by a separate supervised power circuit from the main fire alarm control panel or from a supervised, UL listed remote power supply.

5) The control module shall be suitable for pilot duty applications and rated for a minimum of

0.6 amps at 30 VDC.

**Isolator Module**

Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or Class B branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building.

If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.

The isolator module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.

The isolator module shall mount in a standard 4-inch (101.6 mm) deep electrical box or in a surface mounted backbox. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

**LCD Alphanumeric Display Annunciator:**

The alphanumeric display annunciator shall be a supervised, back-lit LCD display containing a minimum of 160 characters for alarm annunciation in clear English text.

The LCD annunciator shall display all alarm and trouble conditions in the system.

Up to 32 LCD annunciators may be connected to an EIA 485 interface. LCD annunciators shall not reduce the annunciation or point capacity of the system. Each LCD shall include vital system wide functions such as, System Acknowledge, Silence and Reset.

LCD display annunciators shall mimic the main control panel displays and shall not require special programming.

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The LCD annunciator shall have switches which may be programmed for System control such as, Global Acknowledge, Global Signal Silence and Global System Reset. These switch inputs shall be capable of being disabled permanently or by a key lockout function on the front plate.

**Serially Connected Annunciator Requirements**

1. The annunciator shall communicate to the fire alarm control panel via an EIA 485 (multi-drop) two-wire communications loop. The system shall support two 6,000 ft. EIA-485 wire runs. Up to 32 annunciators, each configured up to 96 points, may be connected to the connection, for a system capacity of 3,072 points of annunciation.

2. An EIA-485 repeater shall be available to extend the EIA-485 wire distance in 3,000 ft. increments. An optional version shall allow the EIA-485 circuit to be transmitted over Fiber optics. The repeater shall be UL864 approved.
3. Each annunciator shall provide up to 96 alarm and 97 trouble indications using a long-life programmable color LED's. Up to 96 control switches shall also be available for the control of Fire Alarm Control Panel functions. The annunciator will also have an "ON-LINE" LED, local piezo sounder, local acknowledge and lamp test switch, and custom zone/function identification labels.
4. The annunciator may be field configured to operate as a "Fan Control Annunciator". When configured as "Fan Control," the annunciator may be used to manually control fan or damper operation and can be set to override automatic commands to all fans/dampers programmed to the annunciator.
5. Annunciator switches may be programmed for System control such as, Global Acknowledge, Global Signal Silence, Global System Reset, and on/off control of any control point in the system.
6. An optional module shall be available to utilize annunciator points to drive EIA-485 driven relays. This shall extend the system point capacity by 3,072 remote contacts.
7. The LED annunciator shall offer an interface to a graphic style annunciator and provide each of the features listed above

**Battery**

1) Shall be 12 volt, Lead Acid Maintenance free type.

2) Battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 30 minutes of alarm upon a normal AC power failure.

3) The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

**Battery Charger**

1) Shall be completely automatic, with constant potential charger maintaining the battery fully charged under all service conditions. Charger shall operate from a 240-volt 50/60 hertz source.

2) Shall be rated for fully charging a completely discharged battery within 48 hours while simultaneously supplying any loads connected to the battery.

3) Shall have protection to prevent discharge through the charger.

4) Shall have protection for overloads and short circuits on both AC and DC sides.

**Strobe lights** :-

shall meet the requirements of the ADA, UL Standard 1971, be fully synchronized, and shall meet the following criteria:

1. The maximum pulse duration shall be 2/10 of one second
2. Strobe intensity shall meet the requirements of UL 1971.
3. The flash rate shall meet the requirements of UL 1971.

**Alphanumeric LCD Type Annunciator:**

1. The alphanumeric display annunciator shall be a supervised, remotely located back-lit LCD display containing a minimum of eighty (80) characters for alarm annunciation in clear English text.
2. The LCD annunciator shall display all alarm and trouble conditions in the system.
3. An audible indication of alarm shall be integral to the alphanumeric display.
4. The display shall be UL listed for fire alarm application.
5. It shall be possible to connect up to 32 LCD displays and be capable of wiring distances up to 6,000 feet from the control panel.
6. The annunciator shall connect to a separate, dedicated "terminal mode" EIA-485 interface. This is a two-wire loop connection and shall be capable of distances to 6,000 feet. Each terminal mode LCD display shall mimic the main control panel.
7. The system shall allow a minimum of 32 terminal mode LCD annunciators. Up to 10 LCD annunciators shall be capable of the following system functions: Acknowledge, Signal Silence and Reset, which shall be protected from unauthorized use by a keyswitch or password.
8. The LED annunciator shall offer an interface to a graphic style annunciator and provide each of the features listed above.

**Fixed Emergency Telephone Handset**

1. The telephone cabinet shall be painted red and clearly labeled as "Emergency Telephone." The cabinets shall be located where shown on drawings.
2. The handset cradle shall have a switch connection so that lifting the handset off of the cradle shall send a signal to the fire command center, which shall audibly and visually indicate its on-line (off-hook) condition.
3. On activating the remote phone, the phone earpiece shall sound a telephone ring signal until the master handset is lifted.
4. The two-way emergency telephone system shall support a minimum of seven (7) handsets on line without degradation of the signal.

**Interactive Touch Screen Display :**

This specification includes the furnishing, installation, connection, and testing of an interactive firefighters' display; including Underwriters Laboratories (UL) listed application software and hardware complete and ready for operation.

The basic system shall be Underwriters Laboratories (UL) listed for :No. 864 Control Units or Fire Protective Signaling Systems (Ancillary listing)

An interactive firefighters' display shall be installed in accordance to the project specifications and drawings. The interactive firefighters' display system shall include, but not be limited to, a touch screen interface, network communications media, power supplies, and wire / fiber optic media as shown on the drawings and specified herein.

The interactive firefighters' display shall support fire alarm, supervisory, and security events from the fire alarm control panel(s). The interface shall display building floor plans with respective active fire alarm devices, water supplies, evacuation routes, access routes, gas, power and HVAC shutoffs, chemical hazards, and structural hazards in the building.

The system shall include an easy one-touch method of viewing building, emergency contacts, the facility site plan, and active event information.

A supervised interface to fire alarm control panels and network shall be made available. The system shall be electrically supervised and monitor the integrity of all conductors.

**Fire Fighter's Display : Performance requirements**

A. The network will interface and report the individually monitored system's alarm status via a user-friendly Graphical User Interface (GUI) based software.

B. The software shall operate under Microsoft® Windows® XP Embedded platform as manufactured by Microsoft Corporation.

C. The GUI based software must be capable of graphically representing the facility being monitored with floor plans and icons depicting the actual locations of the fire alarm device locations.

D. The software shall use a 1280 pixel x 1024 pixel GUI display capable of showing a large primary floor plan display, a site plan representative of an aerial view of the facility, the first active fire alarm on the system.

E. The software shall permit automatic navigation to the screen containing an icon that represents the first fire alarm device in alarm in the event of an off-normal condition.

F. The fire alarm device icon shall be visible only when it is in an alarm (or active) condition.

G. The software shall display the activated smoke detectors in a time sequence to track smoke progression.

H. The software shall allow the importation of externally developed floor plans in Windows Metafile (WMF), JPEG (JPG), Graphics Interchange Format (GIF) and Bitmap (BMP) format.

I. The software shall provide a intuitive and easy way to navigate to different screens representing floors and areas within a facility.

J. The system shall provide for continuous monitoring of all fire alarm conditions regardless of the current activity displayed on the screen.

K. The software shall display "YOU ARE HERE" along with icons representing standard building objects (stairs, elevators, etc) to be shown on the floor plan.

L. The software shall allow icons that represent hazardous materials stored in a facility.

M. The software shall provide a screen that displays preprogrammed building contact information.

N. The software shall provide a screen the displays building occupancy and other general building information.

O. The software shall allow a site plan to be imported that shows an aerial view of the facility.

P. The software shall display all active fire, supervisory, and security events within an event list.

Q. The system shall operate on an UL listed Embedded platform operating at no less than 700 MHz on the Microsoft® Windows® XP Embedded platform.

R. The Embedded platform shall have: no less than 256 megabytes of RAM, a flash drive with no less than 1 Gigabytes of storage space, 100 Base-T Ethernet NIC card, and USB ports.

S. The Embedded platform shall have a minimum 19" touchscreen display.

T. The Embedded platform shall come equipped with all necessary gateway modules to allow connection to the network it monitors as standard equipment.

U. A UL listed Ethernet Hub shall be provided for connection of multiple interactive displays and/or gateways.

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**MONITORING NETWORK**

A. The monitoring network shall consist of a network based on proven ARCNET® technology.

B. The network shall have the ability to use fiber optic cable (single-mode and multi-mode), wire (twisted pair copper media in a style 4 or style 7 configuration), or combination wire/fiber communications with support of up to 103 nodes.

1. Wire networks shall support 12 AWG, 1 Pair Shielded to 24 AWG, 4 Pair Unshielded following the manufacturer's guidelines.
2. Fiber optic networks shall support 62.5/125µm cable 8dB limit (50/125µm cable 4.2dB limit)
3. Wire to fiber conversions using repeaters

C. High-speed data communications (312,500 BPS).

D. True peer-to-peer communications between fire alarm control panels.

**PC Based Graphical Station for Central Monitoring :-**

This specification includes the furnishing, installation, connection, and testing of a PC based graphical facilities monitoring system; including Underwriters Laboratories (UL) listed application software and hardware complete and ready for operation.

The basic system shall be Underwriters Laboratories (UL) listed for Standard 864 Control Units for Fire Protective Signaling Systems (9th edition)

The system shall comply with requirements of NFPA Standard No. 72 for Proprietary signaling System Receiving Unit except as modified and supplemented by this specification.

The PC based graphical facilities monitoring system shall be installed in accordance to the project specifications and drawings.

The PC based graphical facilities monitoring system shall include, but not be limited to, one or more PC based graphical workstations, all input/output devices, network communications media, control equipment, auxiliary control devices, power supplies, and wire / fiber optic media as shown on the drawings and specified herein.

A supervised interface to fire alarm control panels and networks shall be made available.The system shall include an interface to digital alarm communicator receivers for wide area network monitoring.

The system shall allow a mixture of different technologies and manufacturers' equipment to operate on the same network and provide the operator with a consistent look and operation for all monitored equipment.

The system shall support a variety of topologies and media and shall provide an industry standard open architecture transport layer protocol.

Using standard RS 232 ports on existing and future monitoring and control systems used by the facility, the system shall connect to and interpret status change data transmitted from the ports and provide graphic annunciation, control, history logging and reporting as specified herein.

The system shall be electrically supervised and monitor the integrity of all conductors.

**Graphical Workstation Performance Requirements**

A. The network will interface and report the individually monitored system's status via a user-friendly Graphical User Interface (GUI) based software workstation.

B. The software shall operate under Microsoft® Windows® XP Professional as manufactured by Microsoft Corporation.

C. The GUI based software must be capable of graphically representing each facility being monitored with floor plans and icons depicting the actual locations of the various systems; and / or sensors' locations.

D. The software shall use a 1024 X 768 GUI display capable of showing a large primary floor plan display, a key map representative of a larger view of the primary display and its relationship to the facility being monitored, the current operator, number of fire, supervisory, pre-alarms, troubles, and security events within the network as well as outstanding events and acknowledged events.

E. The workstation shall have the ability to support graphic printing of all data including graphical floor plans, system activity, history, and guidance text. A Windows compatible printer shall be supported for the graphics and report printer options.

F. The workstation software shall permit automatic navigation to the screen containing an icon that represents the system or sensor in the event of an off-normal condition.

G. The system/sensor icon shall indicate the type of off-normal condition and shall flash and change to the color associated with the off-normal condition (e.g., RED for ALARM and YELLOW for TROUBLE).

H. The software shall allow the attachment of text (TXT) files, sound (WAV) files, image (BMP) files and video (AVI) files to each system or sensor icon allowing additional information to be provided to the system operator for responding to the off-normal condition.

I. The software shall allow the importation of externally developed floor plans in Windows Metafile (WMF), JPEG (JPG), Graphics Interchange Format (GIF) and Bitmap (BMP) format.

J. The software shall provide auto-navigation to the screen containing the icon of any system or sensor when an event is initially annunciated. In addition, operator navigation to screens containing outstanding events shall be accomplished by "clicking on" the event from either the acknowledged or unacknowledged event.

K. History Manager. The software shall contain a History Manager, which shall record all system events with a time and date stamp as well as the current system operator's name.

1. The system shall provide for the ability to store all off-normal events experienced by the various sub-systems that are monitored by the system.
2. All events shall be recorded with a time and date stamp and the system operator shall be provided with the ability to log a pre-defined response or a custom comment for each off-normal event and have that comment stored in the history file with the time, date and operator name.
3. Provide for the ability to conduct searches and generate subsequent reports, based on all events for a single system / device address, a specific node, a specific type of off-normal condition and date range (mm/dd/yy to mm/dd/yy) or combinations of these search parameters. The number of entries in the history file that match the determined search criteria will be displayed.
4. The History Manager shall signal a need to back-up the history file at 100,000 events and then remind the operator at intervals of 100 events thereafter.
5. It shall be possible to pre-select data fields for reporting and then saving the report as a template with a file name. It shall also be possible to schedule the pre-defined report to print at a designated time.

L. Alarm Monitoring. The system shall provide for continuous monitoring of all off-normal conditions regardless of the current activity displayed on the screen.

1. If an operator is viewing the history of a sub-system and an alarm condition should occur, the system shall automatically navigate to the graphic screen showing the area where the off-normal event is occurring.
2. The system shall prioritize all off-normal events as defined by Underwriter's Laboratories into the following categories: fire alarms, troubles, supervisory alarms, pre-alarms and security alarms.
3. The system shall display a running count of all events by type in an alarm event counter window. The event counter window shall include five counters, defaulted to Alarm, Trouble, Security, and Supervisory events.
4. The system shall show a running list of all unacknowledged events and acknowledged events and allow the system operator to acknowledge an event by "double-clicking" on that event in the Unacknowledged Events box. The Unacknowledged and Acknowledged Events boxes shall contain an abbreviated description of the off-normal condition.
5. The details of the condition may be viewed by selecting event in the unacknowledged events box.
6. The system shall allow the attachment of user-definable text files, image files and sound files, to each device / system monitored in order to facilitate the operators and response personnel's response to the off-normal condition.

7. The system shall record all events to the system's hard drive. A minimum of 100,000 events may be stored.

M. Reports & Logs:

1. The system shall provide for the ability to generate reports based on system history.
2. The system shall allow the system operator to enter custom comments up to 255 characters for each event and have those comments recorded in the system's history file.

N. Boolean Logic

1. An automated event response application shall be provided to automatically perform actions across the entire system based on network activity.
2. The event response application shall allow event responses (actions) based on predefined user conditions using simplified Boolean logic.
3. Actions shall be configured to be executed immediately or timed as required.

O. Control Aspects of System Software

1. The system shall provide for the direct control of all outputs associated with Input / Output dry contact relay points on Network Input/Output Nodes In addition, the system shall have the ability to control and program a sub-system through a terminal mode window (ASCII terminal type connection) interface to microprocessor-based sub-systems via an RS 232 serial Network Input/Output Nodes if available as an ancillary feature.
2. The system shall have the ability to monitor and control multiple control panels.
3. Discrete I/O Network Input/Output Nodes interfaces allow the system operator to initiate a change of state for the associated dry contacts.
4. A scheduling utility shall be included with the workstation to configure the I/O points on these Network Input/Output Nodes for automated activate/deactivate, and Arm/Disarm (depending on device type) status.
5. The workstation shall provide configuration utilities for monitoring and control profiles. These profiles shall be user definable for distribution of monitoring and control allowances for operators per workstation.
6. Terminal mode interfaces using serial Network Input/Output Nodes (if available for the specific system) shall be available to allow full programming and control of the system being monitored and shall provide the operator with the ability to take advantage of all features supported by a CRT attached to the associated individual sub-system.
7. Under no condition shall any sub-system be required to rely on the network for any data processing required to perform its particular function. Each individual sub-system shall be in effect "stand-alone" as to insure it's continued operation should a disruption in communication with the system be experienced.

P. The software shall be password protected and provide for the definition of security profiles for operator access control.

Q. The software shall contain provision for defining monitoring profiles of pre-selected Network Input/Output Nodes for monitoring. This shall include provision for status types within the selected NODES.

R. The software shall contain provision for defining control profiles of pre-selected Network Input/Output Nodes for control.

1. The system administrator shall be provided means to select which signals can be controlled by selected Workstation.

S. The software shall support live voice paging for mass notification to evacuation system over Internet Protocol (IP).

**Workstation for the PC Graphical Station :**

A. The system shall be a Facilities Monitoring System.

B. The system shall operate on an IBM compatible UL listed Intel Pentium III processor operating at no less than 800 MHz on the Microsoft® Windows® XP Professional platform.

C. The workstation shall have: no less than 256 megabytes of RAM, a hard drive with no less than 20 Gigabytes of storage space, a minimum of 8 megabytes of video RAM, a CD-R/W for system backup, internal supervisory CPU watchdog board with audible annunciator, 100 Base-T Ethernet NIC card, a 104 key keyboard, and a mouse type pointing device.

D. The workstation shall come equipped with all necessary gateway modules to allow connection to the network it monitors as standard equipment. All workstations shall support Ethernet communications when multiple workstations are required.

E. The workstation shall support an SVGA monitor and be supplied with a 17" flat screen LCD monitor.

F. The computer shall be capable of networking to additional computers and these computers shall be capable of operating as workstations and/or gateways for local area or wide area networks.

G. Alarm annunciation shall appear on all workstations and may be silenced at each local workstation.

1. Only one workstation and operator shall be in command of the system for global alarm acknowledgement at any time.

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**Printer Support:**

A. Support one or more Windows® compatible printers to be located and connected each workstation for graphics and report printing.

B. Support one model PRN-5 (or PRN-6), 80-column dot matrix tractor feed industrial grade printer for event and date-stamped printouts of off-normal events and status changes per workstation.

**MONITORING NETWORK**

A. The monitoring network shall consist of a network based on proven ARCNET® technology.

B. The network shall have the ability to use fiber optic cable (single-mode and multi-mode), wire (twisted pair copper media in a style 4 or style 7 configuration), or combination wire/fiber communications with support of up to 103 nodes.

1. Wire networks shall support 12 AWG, 1 Pair Shielded to 24 AWG, 4 Pair Unshielded following the manufacturer's guidelines.
2. Fiber optic networks shall support 62.5/125µm cable 8dB limit (50/125µm cable 4.2dB limit).
3. Wire to fiber conversions using repeaters.

C. High-speed data communications (312,500 BPS)

D. True peer-to-peer communications.

**INTEGRATION NETWORK**

A. The integration network shall be capable of monitoring a minimum of 100 nodes (Network Input/Output Nodes and routers) on an integration gateway consisting of, but not limited to:

1. Intelligent or conventional fire alarm control panels.
2. Competitor's intelligent or conventional fire alarm control panels.

B. Up to 99 gateways shall be connected via Ethernet for a total local area combination of up to 12672 (99x128) nodes.

C. Local area networks shall consist of a free topology network using twisted pair copper media in a bus, star, T-tap, or ring style 7 configurations at 78 Kilo baud.
Transmit/receive twin fiber (multi-mode 62.5/125 µm) strand FT-10 point-to-point topology and bi-directional FO-10 networks shall also be available. Wide area networks shall be supported by the use of network expansion routers.

1. Free topology (FT-10 style) wire network run allows multiple T-taps within a 1,500-foot (457.2 m) radius; 8,000 foot (2438.4 m) point-to-point using twisted pair; or 6,000-foot

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(1828.8 m) bus topology.
2. Free topology (FT-10 style) fiber network can also use fiber-optic cabling. Operates at 78.5 Kbaud.

3. Fiber optic (FO-10 style) network allows bus or ring topology using only fiber-optic cabling; node-to-node distance of over 10,000 feet (3048 m) with message regeneration. FO-10 style operates at 1250 Kbaud and utilizes multi-mode bi-directional fiber media (single fiber strand) in a bus or loop configuration.

D. Provide routers, repeaters or bridges where required to increase distance, alter network configuration or change media or to extend to remote facilities over alternate communications media including UL listed dial-up PSTN telephone, leased line, multimode fiber or Ethernet connectivity.

1. Dial-up units shall dial a local number and stay connected. Upon loss of carrier, a supervisory alarm shall be indicated at the workstation and the units shall automatically redial to connect.
2. Network expansion routers shall support public switched telephone circuits, two-wire or four-wire leased lines, and CAT5 Ethernet networks.

E. Network interface software shall be by the same manufacturer as the hardware portion of this specification.

F. The integration network shall utilize Network Input / Output Nodes to interface between the individual buildings' systems to be monitored by the integration network. The Network Input/Output Nodes shall act as a translator from the building system's specific panel communications protocol to the integration network protocol as well as serve as a transceiver from the building system panel to the integration network.

1. Network Input/Output Nodes shall be available in configurations that will allow transparent communications via RS 232 serial data ports with intelligent fire alarm control panels, security systems, and CCTV systems.
2. Network Input/Output Nodes shall be available in configurations that will allow monitoring of dry contacts, switched voltages, conventional security devices, access control panels and conventional fire alarm control panels using scheduled, automated and manual control.
3. Network Input/Output Nodes shall be UL listed to Standard 864 and 1076 and be provided with their own enclosure or be available in chassis mount configurations.
4. Network Input/Output Nodes shall operate at 24 VDC and obtain their power from the monitored control panel or a UL listed battery backed auxiliary power supply. All terminals shall be transient protected to 2400V and LEDs shall be provided for status, service and diagnostics.

G. Digital Alarm Communicator Receiver Network

1. The system shall provide a digital alarm communicator receiver (DACR) gateway with a RS 232 interface to the following digital alarm communicator receivers for wide area event reporting: Ademco 685, Silent Knight 9500 and 9800, Radionics 6600.
2. Each gateway shall support up to 10 digital alarm communicator receivers for alarm and trouble information from reporting devices.

H. Workstation Network:

1. Computers shall be networked using Ethernet supporting the use of TCP/IP protocol for local area systems.
2. The network shall be capable of supporting multiple clients (e.g., workstations, configuration applications, automated response applications) and up to ninety-nine (99) gateways.
3. A UL listed Ethernet Hub shall be provided for connection of multiple workstations, gateways, clients, and/or network printers.
4. System shall be UL listed to communicate between clients and gateways over a business computer network (shared IP).

**PC Graphical Station : System Setup & Conifuration :**

A. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes.

B. The factory trained technician shall install initial data and artwork at each workstation including:

C. Distribution of monitoring, control and security profiles as requested by owner.

D. Area diagrams, floor plans, key maps and screen titles.

E. Auto-navigation criteria.

F. Guidance text as provided by owner.

## 6.0 SUBMITTALS AND DOCUMENTATION

### Pre Commissioning

Prior to handover, the Contractor shall furnish with 'as fitted' drawings / wiring diagrams.

As fitted' drawings shall indicate the layout of all equipment, layout of aspirating smoke detector pipework, cable routes and cable sizes/types used. Wiring schematics, including cable termination details, shall also be provided by the Contractor.

'As fitted' CAD drawings shall be prepared using a software package capable of providing dwg format and two electronic copies shall be made available in that format. Also, four sets of A0 prints shall be provided to the Engineer.

Prior to handover, the Contractor shall also furnish GSI with O&M manuals. In addition to the manufacturer's technical data sheets on all components of the system and standard operating and maintenance instructions, the O&M manuals shall include specially written sections covering the specific operation of the system and any special maintenance requirements.

Three printed copies of the O&M manuals shall be supplied along with a copy in electronic form in a format that is computer readable, e.g. the Microsoft Office™ range of software i.e. Word™, Excel™, etc.

The following documentation shall also be provided at handover:

- The site-specific software as loaded into each control panel, to be supplied in both electronic format and printed listing for secure storage on site by GSI.
- Alarm audibility and/or intelligibility information. (This can be recorded on the 'as fitted' drawings.)
- Test results for all system wiring.
- Commissioning testing results/listings.
- Standby battery calculations.

### Contract Documentation

The Fire Alarm contractor shall provide a complete set of documents describing the system and its design concepts, installation, final testing, commissioning, and required operating and maintenance procedures.

As a minimum, the following documentation shall be provided for the system:

1. System description.
2. Checklist of equipment and components.
3. Installation instructions.
4. Equipment connection diagrams showing wiring detail of Addressable Device positions with addresses.

5. Standby battery calculations showing system power requirements and formulas used to calculate specified power.
6 Final testing instructions.
7. Commissioning instructions.
8. Certification documents.
9. Log book.
10. System operating instructions.
11. Routine maintenance instructions and schedules.
12. Remote monitoring link description and operating instructions (if this option is being provided).

As a minimum, the following drawings shall be provided for the system:

1. System schematic diagram.
2. Cabling and wiring diagram.
3. Detailed equipment connection diagrams.
4. Building plan showing zoning and location of fire controller, detectors, call points, sounders and ancillary devices.

The Fire Alarm contractor shall provide a complete set of system operating and service manuals for the following:

1. Fire controller
2. Detectors
3. Call points
4. Sounders
5. Ancillary devices
6. Remote monitoring link (if this option is being provided).

The date for submission of all documentation shall be in accordance with the schedule provided by the Fire Alarm contractor and as agreed with the customer.

**6.2 AS-BUILT DRAWINGS & OPERATING MANUALS**

6.2.1 The Contractor shall submit As-Built drawings that have been reviewed and deemed satisfactory by the Engineer. Final submission shall include four (4) sets of A1 size, one set of A3 size and two sets of electronic copy (AutoCAD files) on CD-ROM disc.

6.2.2 The Contractor shall submit three (3) copies of an operating manual that have been reviewed and deemed satisfactory by the Engineer

The manual should include:

- General description of equipment and system.
- Operating instruction for all equipment and system.
- Schedule of equipment clearly stating the type, make, model, serial number, quantity, capacity, location and date of installation.
- Manufacturer's literature including catalogues, wiring diagrams, technical description, etc.
- Recommended frequency and detailed task list for routine maintenance for each system and equipment
- Final factory and site testing results for each equipment and each system with signatures of witnesses.
- Emergency contact lists for 24-hour, 365-days including duty and backup personnel.

**6.5 CLOSE-OUT DOCUMENTS**

1. Submit final copies of the shop drawings outlined as above. These final submittals shall reflect all field modifications and change orders required to complete the installation. Submit the following quantities of record submittal drawings immediately following receipt of notification of substantial completion. Auto CAD drawing or VISIO files of all shop drawings on or CD ROM disks.
2. Three complete sets of documents located in a Spiral Bound notebook and organized by subject with divider tabs.

**6.6 CLOSEOUT MINIMUM REQUIREMENTS**

The Life Safety Contractor shall ensure the following are completed at hand-over:

6.6.1 Any snagging to be documented and agreed date determined for clearance.

6.6.2 All passwords/PIN numbers, levels and operators recorded.

6.6.3 Disk copies of all system and data files supplied.

6.6.4 Proprietary software manuals & disks.

6.6.5 Consumables, printer ribbons, printer paper at agreed levels.

6.6.6. All equipment access keys handed over.

6.6.7 Complete sets of O&M manuals left with system, any agreed amendments/additions required to be documented and a target date for completion agreed.

6.6.8 Training of engineers and operators to be checked complete or program for completion agreed.

**FINAL INSPECTION:**

At the final inspection a factory trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

**INSTRUCTION:**

Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.

The contractor and/or the systems manufacturer's representatives shall provide a typewritten "Sequence of Operation."

***QUALITY ASSURANCE***

7.1 **GENERAL**

7.1.1 The Life Safety System shall be furnished, engineered, and installed by Trained Engineers of the Contractor.

7.1.2 The contractor shall have extensive knowledge in the System Network Integration or shall be a factory trained and certified Integrator.

7.1.3 The contractor shall employ technicians who have completed the factory authorized training. The contractor shall employ technicians to provide instruction, routine maintenance, and emergency service within 24 hours upon receipt of request.

7.2 **SYSTEM INTEGRATOR QUALIFICATIONS**

7.2.1 The system integrator must be an authorized representative in good standing of the manufacturer of the proposed hardware and software components.

7.2.2 The system integrator shall have an office that is staffed with designers trained in integrating interoperable systems and technicians fully capable of providing LonWorks instruction and routine emergency maintenance service on all system components.

7.2.3 The system integrator shall have in house capabilities to provide control strategies for Life Safety Systems for the whole building control. This includes interfaces with HVAC, lighting, Access, Fire Detection,Fire Suppression and Protection, and security applications.

7.2.4 The system integrator shall have a service facility, staffed with qualified service personnel, capable of providing instructions and routine emergency maintenance service for networked control systems.

## 7.3 HARDWARE AND SOFTWARE COMPONENT MANUFACTURER QUALIFICATIONS

7.3.1 The manufacturer of the hardware and software components must be primarily engaged in the manufacture of Life Safety based systems as specified herein, and must have been so for a minimum of Ten(10) years.

7.3.2 The manufacturer of the hardware and software components shall have a technical support group accessible via a toll free number that is staffed with qualified personnel, capable of providing instruction and technical support service for networked control systems.

7.3.3 The manufacturer & Bidder ( if separate Entities) of the hardware and software components must have experience of no less than Six(6) similar projects, which have extensive hardwired and Software level integration with various building Utilities & building systems as 7.3.4 These projects must be on-line and functional such that the Client / Owners/Users representative should be able to visit such as installtion and observe the system in full operation, when demanded by the Client.

## 7.4 QUALITY ASSURANCE DURING EXECUTION

7.4.1 Physical Examination :-

A. Verify that systems are ready to receive work.

B. Beginning of installation means installer accepts existing conditions.

C. The project plans shall be thoroughly examined for control device and equipment locations, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

D. The contractor shall inspect the site to verify that equipment is installable as show, and any discrepancies, conflicts, or omissions shall be reported to the Architect/Engineer for resolution before rough-in work is started.

E. The Control System Contractor shall examine the drawings and specifications for other parts of the work, and if head room or space conditions appear inadequate or if any discrepancies occur between the plans and his work and the plans for the work of others,

he shall report such discrepancies to the Architect/Engineer and shall obtain written instructions for any changes necessary to accommodate his work with the work of others.

**7.5 FIELD QUALITY CONTROL**

7.5.1 All work, materials and equipment shall comply with the rules and regulations of applicable local, state, and National codes and ordinances as identified in Part 1 of this Section.

7.5.2 Contractor shall continually monitor the field installation for code compliance and quality of workmanship. All visible piping and/or wiring runs shall be installed parallel to building lines and properly supported.

7.5.3 Contractor shall arrange for field inspections by local and/or state authorities having jurisdiction over the work.

**7.6 IDENTIFICATION OF HARDWARE AND WIRING**

7.6.1 All wiring and cabling, including that within factory-fabricated panels shall be labeled at each end within 2" of termination with a cable identifier and other descriptive information.

7.6.2 Permanently label or code each point of field terminal strips to show the instrument or item served.

7.6.3 Identify control panels with minimum 1 inch letters on nameplates.Identify all other control components with permanent labels.

7.6.4 Identifiers shall match record documents.

7.6.5 Identify room sensors relating to terminal box or valves with nameplates.

**8.0 GENERAL DESIGN FEATURES / PERFORMANCE CRITERIA**

Refer Chapter 4 “Product Specifications”

**9.0 DELIVERY, STORAGE AND HANDLING :-**

**9.1 CONTRACTOR’S RESPONBILITY**

- It shall be the responsbility of the Contractor to ensure delivery of the equipment to the site free of any damages to the latter.
- Any Loading / Unloading Charges or incindental expenses thereof shall be borned by the

Contractor for safe transit and storage of the equipment, and no further claim shall be made to the clien on this account.

- It shall be the responsibility of the Contractor to inward all material with proper emphasis on documentation and clearance from the Consultant / Client and project managers.
- Any Damaged Equipment supplied to the site shall be immediately replaced under notice to the client's project Supervisor / Manager at site.
- The Contractor shall provide for a safe and secure storage of the Equipment supplied under Lock and Key and shall indemnify the client against any on-site damage or theft of the Equipment, for which the contractr has relaised the monies form the Client.

**9.2 PROTECTION**

9.2.1 The Contractor shall protect all work and material from damage by his/her work or workers, and shall be liable for all damage thus caused.
9.2.2 The Contractor shall be responsible for his/her work and equipment until finally inspected, tested, and accepted.
9.2.3 The Contractor shall protect his/her work against theft or damage, and shall carefully store material and equipment received on-site that is not immediately installed.
9.2.4 The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

**9.3 CLEANING**

9.3.1 This contractor shall clean up all debris resulting from his or her activities daily.
9.3.2 The contractor shall remove all cartons, containers, crates, etc. under his control as soon as their contents have been removed.
9.3.3 Waste shall be collected and placed in a location designated by the Construction Manager or General Contractor.
9.3.4 At the completion of work in any area, the Contractor shall clean all of his/her work, equipment, etc., making it free from dirt and debris, etc.
9.3.5 At the completion of work, all equipment furnished under this Section shall be checked for paint damage, and any factory-finished paint that has been damaged shall be repaired to match the adjacent areas.
9.3.6 Any metal cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.

All cables, junction boxes, cables supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.

All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

Manual Pull Stations shall be suitable for surface mounting or semi flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.

**Typical Operational Requirement:**

Actuation of any manual station, smoke detector heat detector or water flow switch shall cause the following operations to occur unless otherwise specified:

Activate all programmed speaker circuits.

Actuate all strobe units until the panel is reset.

Light the associated indicators corresponding to active speaker circuits.

Release all magnetic door holders to doors to adjacent zones on the floor from that the alarm was initiated.

Return all elevators to the primary or alternate floor of egress.

A smoke detector in any elevator lobby shall, in addition to the above functions, return all elevators to the primary or alternate floor of egress.
Smoke detectors in the elevator machine room or top of hoist way shall return all elevators in to the primary or alternate floor. Smoke detectors or heat detectors installed to shut down elevator power shall do so in accordance with ANSI A17.1 requirements and be coordinated with the electrical contractor.

Correct installation, combined with the use of high quality equipment, components and cabling, ensures that the fire detection and alarm system shall operate as designed and provide many years of trouble-free service.

The Fire Alarm contractor shall install the alarm system in accordance with the documented installation instructions.

The Fire Alarm contractor shall provide all relevant installation documentation required for each component of the system.

Installation of the system shall be in accordance with the recommendations set out in NFPA-72

The Fire Alarm contractor shall be responsible for the correct setting of all equipment and components of the system in accordance with previously agreed plans and drawings.

All cabling and wiring shall be tested before they are connected to the fire controller and its associated devices.

WARNING If the tests are carried out after the cables and wires have been connected to the controller and its devices, components within the controller and the devices will be damaged by high voltages used during testing.

**Materials**

All cabling and wiring to be used in the system shall be copper Armoured with conductor not less than area 1.5mm² in cross section.

Wiring used for driving devices requiring high currents (e.g. bells, etc.) shall limit the voltage drop to less than 10% of the nominal operating voltage.

Cables used for the transmission of system data and alarm signals shall be in accordance with the types recommended by the manufacturer of the fire alarm system.

The ends of all cables shall be sealed by means of proprietary seals and associated glands. No heat shall be applied to any seal or termination. Cable tails shall be insulated by means of blank PVC sleeving anchored and sealed into the seal.

Where protection of the cable glands is required or terminations are on display, the glands shall be enclosed in red coloured shrouds of the appropriate British Standard colour.

All cables to brick/concrete shall be securely fixed by means of copper saddles sheathed with red PVC. These saddles shall be provided near bends and on straight runs at intervals no greater than recommended in the British Standards or by the manufacturer.

Where multiple cables are to be attached to a wall or soffit, copper saddles shall enclose all cables and shall be secured by means of suitable masonry plugs and two round head plated woodscrews

Where multiple cables are to be attached to the top of horizontal trays they shall be neatly run and securely fixed at suitable intervals. Copper or plastic cable fixings shall be used.

At detector and sounder locations, cables shall be terminated in approved galvanized junction boxes. All other devices forming part of the system shall utilize dedicated /custom back boxes.

**Installation of Detectors**

All detectors (and bases) shall be installed in accordance with guidelines set out in NFPA -72 and the installation instructions provided by the manufacturer.

All detectors shall be installed in the exact locations specified in the design drawings; thus providing the best possible protection.

The type of detector installed in each particular location shall be the type specified in the design drawings.

All detector bases shall be securely fixed to approved boxes and allow for easy fitting and removal of detectors.

Cable and wire entries to detector bases shall be fitted with grommets to prevent possible damage to the insulation.

Cable and wire strain relief clamps shall be provided at all entries to detector bases.

Cable entries of detector bases used in environments with abnormal atmospheric or operating conditions shall be appropriately sealed to prevent ingress of dust, water, moisture or other such contaminants.

**Installation of Control Devices**

All control devices (e.g. call points, sounders, interface modules, etc.) shall be installed in accordance with the guidelines set out in NFPA-72 and the installation instructions provided by the manufacturer.

All control devices and associated modules shall be installed in the exact locations specified in the design drawings.

The type of control device installed in each particular location shall be the type specified in the design drawings.

All control devices and associated modules shall be securely fixed, and if required, marked with appropriate notices, warnings, signs as applicable.

Cable and wire entries to all control devices and associated modules shall be fitted with grommets or glands so as to prevent possible damage to the insulation.

Cable and wire strain relief clamps shall be provided at entries to control devices and associated modules as required.

Cable entries of control devices and associated modules used in environments with abnormal atmospheric or operating conditions shall be appropriately sealed to prevent ingress of dust, water, moisture or other such contaminants.

**Installation of Fire Controller Equipment**

The fire controller equipment shall be installed in accordance with the guidelines set out in NFPA-72 and the installation instructions provided by the manufacturer.

The fire controller and its associated component parts shall be installed in the location specified in the design drawings.

The type of fire controller and its associated component parts installed shall be the type specified in the design drawings.

The fire controller equipment shall be securely fixed, and if required, marked with appropriate notices, warnings, signs as applicable.

Cable and wire entries to the fire controller and associated devices shall be fitted with grommets or glands to prevent possible damage to the insulation.

Cable and wire strain relief clamps shall be provided at entries to fire controller and associated devices as required.

The fire alarm system mains power connections to the fire controller equipment shall be accordance with the guidelines set out in the relevant British Standards and the installation instructions provided by the manufacturer.

The fire alarm system mains power isolating switch shall be coloured red and clearly labelled 'FIRE ALARM: DO NOT SWITCH OFF'.

Each circuit of the system shall be connected to the fire controller via associated fuse or circuit breaker devices located within the fire controller unit.

All cables from the fire controller equipment to the detection and alarm devices shall be clearly labelled as part of the fire detection and alarm system.

## *11.0 TESTING AND COMMISSIONING, TRAINING*

Initial testing can be carried out as per following but not limiting to :-

| Sr No | Description | Visual | Test Readings | Documentation |
|---|---|---|---|---|
| 1 | All cables are tested for continuty,insulation,resistance etc. | | | √ |
| 2 | Carry out visual checks on all panels,cables,interphase modules etc.to ensure they are clean and free from any mechanical damage | √ | | |
| 3 | Check for proper termination & feruling | √ | | |
| 4 | Check input A/C supply voltage | | √ | |
| 5 | Check location/spacing of Detectors as per standards | √ | | |
| 6 | All device are addressed as per drawing | | √ | |
| 7 | Check Distribution of Detector / Loops / Zones as per Drawing. | | √ | |
| 8 | Check all Modules / Detectors, for healthy blinking status. | √ | | |
| 9 | Apply Smoke / Aerosol to random detectors & check output of the same in panel, shall display proper address/Loop/zone.Check for activation of approriate speaker circuits with message. | | √ | |
| 10 | Check distribution of Amplification Zones as per approved shop drawings | | √ | |
| 11 | Check tripping of AHU / Fan / Access doors etc. on activation of detectors. | | √ | |
| 12 | Activation of Hooter circuits as programme ,PA evacuation message/alert message/emergency message | | √ | |
| 13 | All the manual call point are working properly | | √ | |
| 14 | Hooter / Strobe are working as programmed | | √ | |
| 15 | If power fails, whether panel working on battery supply | | √ | |
| 16 | Panel display and all key working properly | | √ | |
| 17 | Check for seamless integration with BMS | | √ | |

1. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.

2. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

3. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.

4. Verify activation of all flow switches.

5. Open initiating device circuits and verify that the trouble signal actuates.

6. Open signaling line circuits and verify that the trouble signal actuates.

7. Open and short notification appliance circuits and verify that trouble signal actuates.

8. Ground initiating device circuits and verify response of trouble signals.

9. Ground signaling line circuits and verify response of trouble signals.

10. Ground notification appliance circuits and verify response of trouble signals.

11. Check presence and audibility of tone at all alarm notification devices.

12. Check installation, supervision, and operation of all intelligent smoke detectors during a walk test.

13. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

14. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

## COMMISSIONING

### Pre Commissioning

At final commissioning of each system, the Contractor shall confirm that:

All detection devices, including point detectors, beam smoke detectors, flame detectors, and aspirating smoke detectors and inputs are tested and operate correctly.

All manual controls, whether manual call points or centrally located controls, operate correctly.

The correct indications are given at the control and indicating equipment, including the repeater panels, mimic panels and graphics PC central control and display terminal.

All outputs operate, in the required manner, including alarm sounders or voice alarm system loudspeakers, visual indicators and connections to ancillary services and other systems. In particular, the Contractor shall check that audibility levels of sounders and/or audibility and intelligibility of voice alarm broadcasts are correct.

The fire detection and fire alarm system complies with the operational sequence detailed in Section 5 of this Specification.

The standby batteries are adequately sized. (Measurements of the quiescent and alarm loads shall be taken and compared to calculated values used at the design stage.) Calculations and measurements shall be submitted to the Engineer.

Commissioning shall be fully documented and the documentation submitted to the Engineer.

The Contractor shall demonstrate each fire detection and fire alarm system to the satisfaction of the Engineer by conducting a series of witnessed acceptance tests as directed by the Engineer. This shall take place after the above final commissioning and following receipt of the commissioning documentation by the Engineer. Acceptance testing shall include the actuation of all devices in the system, simulation of various faults and operation of all manual controls.

Following commissioning, a system soak period of not less than one week shall follow, unless the system incorporates fewer than 50 automatic fire detectors, in which case no soak test is necessary.

Both the installation and the commissioning activities shall be undertaken as a single continuous operation.

Upon completion of the installation activity, the Fire Alarm contractor shall Test, Start-up, Commission and Handover the system to the customer.

The Fire Alarm contractor shall make use of the following documents to record test results and details of commissioning tests:

Cable Test Sheets Installation
Check Report System Layout
Drawing(s) System Schematic
Diagram(s)

The Fire Alarm contractor shall be responsible for inspecting and testing the complete system, including:

1. Detectors
2. Call Points
3. Sounders
4. Ancillary Devices
5. Fire Controller Equipment and Associated Devices
6. Auxiliary Equipment (e.g. Plant Interface Module, etc.)
7. Operating and Control Software.

The fire controller and associated devices and modules shall be tested in accordance with the guidelines set out in NFPA-72 and the testing instructions provider by the manufacturer.

The Fire Alarm contractor shall start up and operate the system for a trial period to ensure that it operates correctly.

The Fire Alarm contractor shall test all functions of the system, including the software, to ensure that it operates in accordance with the requirements of the design specification and relevant standards.

The Fire Alarm contractor shall undertake audibility tests during which the sounders may be operated continuously over a period of two hours. (Should the customer require these tests to be carried out at a separate visit, or out of normal working hours, this can be arranged at additional cost.)

Commissioning of the system shall constitute practical completion

Following the satisfactory completion of installation, testing and start up, the Fire Alarm contractor shall demonstrate to the customer that the system successfully performs all of the functions set out in the design specification.

The Fire Alarm contractor shall provide the customer with an agreed quantity of spare parts testing equipment and consumables which are to be used during routine maintenance and testing of the system.

The Fire Alarm contractor shall provide a customer appointed fire system supervisor with on-site training in the use, operation and maintenance of the system and explain the procedures to be followed in the event of fire and false alarms. The system supervisor shall also be shown how to carry out routine maintenance and testing procedures, and how to keep the Log Book. (also see Section 9).

The Fire Alarm contractor shall prepare a report detailing all tests performed during installation and commissioning of the system. The report shall include the results of the tests and details of any specific settings or adjustments made. Any outstanding tasks or activities which are to be completed at another time shall also be included in the report.

The Fire Alarm contractor shall present an Acceptance Certificate for signature by the customer.

**TRAINING OF OPERATING PERSONNEL:**

- All training shall be by the Building Controls Contractor and shall utilize specified manuals, as-built documentation, and the on-line help utility.
- Operator training shall include four initial eight-hour sessions.
- The initial operator training program shall be to establish a basic understanding of Windows based software, functions, commands ETC.
- Special Emphasis shall be laid by the Trainer on imparting knowledge to the participants on extracting the maximum mileage out of the Head-end application to achieve energy monitoring and efficiency.
- Participants should be trained in the concept of maximum demand load management and the process logic applied by the IBMS system to achieve the same.
- The training shall encompass as a minimum:

    1. Troubleshooting of input devices, i.e., bad sensors.
    2. Sequence of operation review.
    3. Sign on - sign off.
    4. Selection of all displays and reports.
    5. Use of all dialogue boxes and menus.
    6. System initialization.
    7. GUI Software.
    8. Network Management Software.

## 12.0 INTERFACING WITH OTHER SERVICES.

- Interfacing with Third Party Service providers and Equipment Providers is a integral and most important part of the scope of works of the IBMS vendor.
- It shall be the Contractor's responsibility to study and inclulate the Design Logics of various Utilities being provided by third parties
- It is expected and assumed for granted that the Contractor shall study of third party drawings to locate equipment / locate Marshalling boxes to pick up signals relevant to Control and Monitoring of Life Safety
- The Contractor shall also prepare and share data related to software level integrations to the IBMS contractor on .net / xml / or conventional integration on MODBUS / LONWORKS / BACNET / DALI / M-BUS / JBUS / OPC Platforms, made availabe either on Serial interface or on a IP Platform.
- The Contractor shall be responsible to ensure that all information relevant to Interfacing with Other Services and Other Systems is collated an put to use to ensure a fully operational Life Safety System as per technical requirements put forth in the Tender, and to the descrition of the Architect / Client / Consultant as Directed from Time to Time.
- During Execution, it shall be Contractor's responsibility to follow Co-ordinated drawings and interface with other Services and contractors for proper laying and installtion of equipment such that there is no fouling of services in any manner.

## 13.0 MODE OF MEASUREMENTS

13.1 At various Logical Stages of the project, the Contractor shall ensure that joint measurements are taken, recorded and filed after the approval from the project managers / Consultants.

13.2 The contractor shall provide their own blank measurement sheets for the approval of the project managers /consultants to ensure confirmance to minimum information requirement on the subject document.

13.3 All Cabling Nodes for the Life Safety Systems – i.e., from the Notification Equipment to the Floor Fire Panels, and from Fire Panels to the Signalling Appliances shall be measured for SLC and NAC cabling. Communication cable between various network Nodes shall be measured separately at per meter basis.

13.4 Ethernet LAN Cabling from Equipment to Switches and Between Floor Switches to Main Network switch shall be measured as Networking Cabling at per meter basis.

13.5 Against the scheme and the Drawing plans, Equipment utilised and Spares shall be cross checked by the Consulting Engineer, the Contractor and the project manager as installed on site.

13.6 Equipment actually installed at site, against the individual line items shall be checked for confirmance, and joint measurement taken for Quantities, and then Certified.

## 14.0 OPERATION AND MAINTENANCE

14.1 The Contractor shall offer prices against the Operations and Maintenance contracts as asked for in the Tender.

14.2 Operations would mean manning the Life Safety System stations 24 x 7. This would entail the contractor providing for atleast 5 nos. or more of trained technical manpower of Diploma Engineer level on their payroll, present on the site at any given time. This team shall be responsible for smooth operation of the IBMS System, Reports generation, trend viewing, analysis and reports to the Facility Management team / Client.

14.3 It shall be the Contractors responsibility to provide their appointed Operations team to provide all tools, instrumentation and other accessories to enable them to fulfill the desired function.

14.4 The Client shall enter in to a Service level Agreement with the Contractor for the purpose of the Operations contract. Such a Agreement will list the response time to a client requirement and related parameters. The Agreement may also list a of events / alarms to
the escalation matrix based on the response required for the event.

14.5 The Contractor shall provide the Replacement warranty for the components installed, while under the defects liablity period.

14.6 Under the DLP, the Contractos shall undertake all necessary maintenanace and repair / replacement actitivities to ensure 99.9% uptime of all the installed Equipment and
the Life Safety system as a whole.

14.7 On the Completion of the DLP, the client may chose to enter in to a Comprehensive or non Comprehensive maintenance contract with the Life Safety Contractor for the
purpose of regular planned and Emergency Maintenance of the system.

14.8 A Separate Maintenance Agreement and linked service parameters shall be defined in the SLA.

14.9 As a Minimum, whether under DLP or under Maintenance Contract post DLP, the expected reolution time shall be as follows :

- for minor complaints / maintenance issues : Max 4 Hours
- for Major Maintenance issues: Max 24 hours

- for Replacement of Level1 Importance components: Max 12 hours
- for Replacement of Level 2 Importance compoenents: Max 48 hours.

According to the recommendations in Codes, fire systems should be regularly maintained under a maintenance agreement.

Fire and planning authorities, and in certain cases insurers, have powers to check that fire systems are maintained. Failure to maintain the fire detection and alarm system could contribute to death or injury in the event of fire.

# PUBLIC ADDRESS SYSTEM

## 2.1 Amplifiers 240 Watts

This product shall be manufactured by a firm whose quality system is in compliance with the ISO 9001, QUALITY SYSTEM.

## 2.2 General Requirements

a. 480 Watts Power Amplifier with at least 4 mic level inputs.

b. All input channels have a power supply to provide power to condenser microphones, 2 input channels should also be switched to line sensitivity. Separate music inputs are available with their own input selector and volume control.

c. The power is directly available on 70V and 100V constant voltage connections and on allows impedance connection for an 8ohm load. Moreover the amplifiers have separate 70V/100V call-only output channel for addressing areas where only priority announcement are required, and 70V/100V mix only output channels for areas where no priority announcement should be heard.

d. for more output power than the built-in power stage can deliver additional Plena power amplifiers can be connected to the balanced line output in a loop-through arrangement.

e. It should have two front panel switches to direct the amplifier output to two seprate zones, so that certain announcement or background music should not be heard in part of building. Priority calls are always routed to both zones.

f. Provision shall be made to connect the PA system to Lift Car Speaker.

## 2.3 Technical Specifications

- Electrical
  - Mains Power Supply Voltage - 230/115VAC+/- 10%

- Performance
  - Frequency response - 50Hz to 20 kHz
  - Distortion - <1% at rated output power,1 kHz
  - Bass Control - -8/+8dB at 100Hz
  - Treble Control - -8/+8dB at 10 kHz
  - Dynamic range - 100dB

- Mic input - 4x
- Sensitivity - 1mV
- Impedence: >1kohm
- S/N (flat at max volume) - 63dB
- Headroom: >25dB
- Speech filter: -3dB at 315 Hz, high –pass,6dB/oct
- Phantom power supply - 16V via 1.2kohm
- VOX input

- Loudspeaker Output (70/100V)
- Connector - Screw, Floating
- Power - 360/240W (Max/rated)

## 2.4 ENVIRONMENTAL SPECIFICATIONS:

A. Temperature:

1) Operating: 0°C to +40°C.
2) Storage: 0°C to +70°C.

B Humidity: <95% relative condensing.

2.4.1 REGULATIONS

CE, EN / Any international standard

## 2.5 CEILING SPEAKERS

This product shall be manufactured by a firm whose quality system is in compliance with the ISO 9001, QUALITY SYSTEM. This will mainly be installed at Floors lobby of both Tower A and Tower B

2.5.1 **General Requirements**

6 Watts false ceiling speaker
15Watts Horn type wall mounted speaker

A. Easy to install with spring-loaded mounting clamps
B. Power handling capacity-6 watts/4 watts

### 2.5.2 Technical Specifications

- Power Handling Capacity - 6 watts
- Sound pressure level - 93dB
- Effective Frequency Range - 300-15kHz
- Rated Input Voltage - 100 Volts
- Color - IFB White
- Weight - 600Grams
- Mounting - Clamps

### 2.5.4 REGULATIONS

CE, EN, EVAC

## 3.0 HORN TYPE SPEAKERS.

This product shall be manufactured by a firm whose quality system is in compliance with the ISO 9001, QUALITY SYSTEM.

This will mainly be installed at Basement parking Area.

### 3.1 General Requirements

High efficiency horn loudspeaker with excellent speech reproduction and sound distribution for a wide range of outdoor application

a) It should be circular or rectangular horn loudspeaker with 100V line input, made up of ABS.

b) It should include 100V transformer with taps on the primary winding to allow different power settings. Nominal full-power, half power or quarter power radiation) i.e. in 3dB steps) can easily be selected by connection the amplifier output to the appropriate tap.

c) The horn loudspeaker should have sturdy adjustable mounting brackets, allowing the sound beam to be accurately directed.

d) It should be designed to withstand operating at their power for 100hrs in accordance with IEC 268-5 Power handling capacity standards.

### 3.2 Technical Specifications

a) Max Power - 22.5 W
b) Rated power - 15 W

c) Sound pressure level at rated power (1W/1m) - 103 dB
d) Effective frequency range (-10dB) - 500Hz to 5kHz
e) Opening angle (at 1kHz/4kHz,-6dB)
Horizontal - 130deg/50deg
Vertical - 130deg/50deg f)
Rated Voltage - 100V
g) Rated Impedance - 667 ohm
h) Connection - 4 wire cable

### 3.3 ENVIRONMENTAL SPECIFICATIONS:

a) Temperature:

1) Operating: 0°C +55°C.
2) Storage: 0°C +70°C.

b) Design rating: IP65

### 3.4 REGULATIONS

CE, EN OR ANY OTHER INTERNATIONAL STANDARD

## 4.0 TABLETOP CALL STATION

This product shall be manufactured by a firm whose quality system is in compliance with the ISO 9001, QUALITY SYSTEM.

This will mainly be installed at Control room of whole establishment

### 4.1 General Requirements

The tabletop microphone should be a stylish, high-quality tabletop unidirectional condenser microphone, intended for making calls in a public address system. It should have heavy metal base and rubber feet ensure stability on any flat surface.

This PTT should not only switch on the microphone, but also provides priority contacts, that are compatible with the amplifiers. The switching characteristic of the PTT-key should be configured internally for PTT-mode (on as long as pressed) or toggle mode (press to switch on, press again to switch off). If the priority contact is not required, the microphone can be connected to amplifiers with 3- pin Euro style connector. A green LED indicates when the microphone is active.

Technical Specifications

- Phantom Power Supply
- Voltage range 12 to 48Vvvv
- Current Consumption <8mA

Performance

- Sensitivity 0.7mV@85dB SPL
- Max input Sound level 110dB SPL
- Distortion <0.6%
- Input Noise level 28dB
- Frequency response 100Hz to 16 kHz
- Outdoor impedance 200 ohms

## 4.2 ENVIRONMENTAL SPECIFICATIONS:

A. Temperature:

1) Operating: 0°C to +45°C.
2) Storage: 0°C to +70°C.

Humidity: <95%

## 4.3 REGULATIONS

A. CE, EN

## UPS SYSTEM

**Datasheet of 2 X 40 KVA Online UPS Systems with 60 min battery back up time (PRS Mode)**

| Sr No. | Description | Technical Specification | Vendor Compliance (Yes / No) | Details if any deviations |
|---|---|---|---|---|
| **1** | **Rating (in KVA)** | **40 KVA / 36 kW** | | |
| **2** | **Make** | APC/ Eaton / Vertiv | | |
| **3** | **Model** | Vendor to Specify | | |
| ***[ A ]*** | ***Input*** | | | |
| 1 | Rectifier Design | IGBT Based | | |
| 2 | Nominal Voltage | 415 VAC | | |
| 3 | Nominal Frequency | 50 Hz | | |
| 4 | Input Power Factor | 0.99 | | |
| 5 | Input Voltage Range | -15%, + 20% | | |
| 6 | Frequency Range | 40 to 72 Hz | | |
| 7 | THDi | < 5% | | |
| 8 | Inrush Current | ≤120% of rated current for ≤2 cycles | | |
| ***[ B ]*** | ***Output*** | | | |
| 1 | Invertor Design | IGBT Based Technology | | |
| 2 | Voltage | 415 V AC | | |
| 3 | Waveform | Pure Sine wave | | |
| 4 | Total Harmonic Distortion | < 3% for linear load & ≤5 % for non linear load | | |
| 5 | Crest Factor | 3 :1 | | |
| 6 | Overload capacity | 110% for 60 min, 125% for 10 min, 150% for 1 Min | | |
| 7 | Short Circuit Capability | 160A < 400ms | | |
| ***[ C ]*** | ***Environmental*** | | | |
| 1 | Operational Temperature | 0 to 40 Deg. | | |
| 2 | Altitude | 1000m above sea level | | |
| 3 | Relative Humidity | 5 to 95%, no condensation allowed | | |
| ***[ D ]*** | ***Physical*** | | | |
| 1 | Enclosure Protection | IP 20 with dust filter | | |
| 2 | Cooling | Forced Air Cooling | | |
| 3 | Colour | Vendor Specify | | |
| 4 | Cable Entry | Vendor Specify | | |
| ***[ E ]*** | ***Bypass*** | | | |

| | | | | |
|---|---|---|---|---|
| 1 | Phase | 3 Phase | | |
| 2 | Static Bypass | Auto & Manual | | |
| 4 | Type of Bypass | Automatic Static Bypass with integral Manual Maintenance Bypass | | |
| 5 | Voltage | 415 V AC | | |
| 6 | Frequency | 50Hz | | |
| 7 | Transfer | No Break | | |
| ***[ F ]*** | ***Battery*** | | | |
| 1 | Type | SMF VRLA | | |
| 2 | DC Voltage | Vendor Specify | | |
| 3 | Recharge Time upto 90% | 8-10 hrs | | |
| 4 | VAH Required Each UPS | 57600 VAH | | |
| 5 | Battery Backup Each UPS | 60 min | | |
| 6 | Minimum Charger Capacity | Min 10 Amp Charger | | |
| 7 | Battery make | Exide / Quanta / Panasonic | | |
| 8 | Battery testing | Automatic and Manual | | |
| 9 | Battery Breaker | Required | | |
| ***[ G ]*** | ***General*** | | | |
| 1 | Overall Efficiency on Full load | 94% | | |
| 2 | High Efficiency mode | 98% | | |
| 3 | Acoustic Noise (in dbA) | < 70 dBA @ 1 Meter | | |
| 4 | Alarms | Audible Alarm required for Mains Failure, Low Battery, Inverter Trip, Over Temperature, Over Load | | |
| 5 | Electrical Protection | Required | | |
| 6 | Parallel Redudancy | Parallel Compitible upto 3 units | | |
| 7 | Display Panel | Graphical LCD with backlight, Mimic Diagram with LED status, Alarm LED | | |
| 8 | Battery rack thickness CRCA sheet | M.S. Angle stand | | |
| 9 | Painting Details for Battery Rack | Powder coated MS stand | | |
| ***[ H]*** | ***Approx. Dimensions(mm)*** | | | |
| ***A.*** | ***UPS (mm)*** | | | |
| 1 | Width | Vendor Specify | | |
| 2 | Depth | Vendor Specify | | |
| 3 | Height | Vendor Specify | | |
| 4 | Approx. Weight (Kg) | Vendor Specify | | |
| ***B.*** | ***Battery Stand (mm)*** | | | |
| 1 | Width | Vendor Specify | | |
| 2 | Depth | Vendor Specify | | |

| | | | | |
|---|---|---|---|---|
| 3 | Height | Vendor Specify | | |
| 4 | Approx. Weight (Kg) | Vendor Specify | | |
| ***[ I ]*** | ***Standard*** | | | |
| 1 | Classification | IEC62040-3:1999, EN62040-3:2001 | | |
| 2 | Electromagnetic Compatibility | IEC62040-2, EN50091-2 | | |
| 3 | Marking | CE | | |
| ***[ J ]*** | ***Protection*** | | | |
| 1 | Battery Over voltage | Required | | |
| 2 | Battery Under Voltage | Required | | |
| 3 | DC High | Required | | |
| 4 | Output Over/Under Voltage | Required | | |
| 5 | O/P short Circuit | Required | | |
| 6 | Inv Over Temp | Required | | |
| 7 | Surge | Required | | |
| ***[ L ]*** | ***Warranty*** | | | |
| | UPS | 2 Years | | |
| | Battery | 2 Years | | |

**Note: Required Manufacturers Authorization Letter ( MAF )**

**MANUFACTURER'S AUTHORIZATION LETTER (MAF)**

**To,**
**Bank of Baroda,**
**GIFT City, Gujarat**

**Subject: Authorization letter.**

**Inquiry / Tender No.**

Dear Sir,

We M/s. _____ who are established and reputable manufacturers of UPS hereby authorize

**M/s**_____ to quote for and fulfil your requirement as per the mentioned tender.

We hereby extend our back to back service and support as per tender requirement. With respect to the Goods offered by the above firm in reply to this Invitation for Bids.

Yours faithfully,

For and on behalf of M/s

(Authorized Signatory)

## SECTION: L

### MODEL PRE-CONTRACT INTEGRITY PACT

**General**

This pre-bid pre-contract Agreement (hereinafter called the Integrity Pact) is made on _____ day of _____ Month, 20____, between, on one hand, Bank of Baroda, a body corporate constituted under the Banking Companies (Acquisitions and Transfer of Undertakings) Act, 1970 having its head office at Mandvi Baroda, and its corporate office at Baroda Corporate Centre, C-26, G-Block, Bandra Kurla Complex, Bandra East, Mumbai-400051 (hereinafter called the "BUYER", which expression shall mean and include, unless the context otherwise requires, his successors in office and assigns) of the First Part and M/s _____ represented by Shri _____, Chief Executive Officer (hereinafter called the "BIDDER/Seller" which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second Part.

WHEREAS the BUYER proposes to procure (Name of the Stores/Equipment/Item/Services) and the BIDDER/Seller is willing to offer/has offered the said stores/equipment/item/services and

WHEREAS the BIDDER is a private company/public company/Government undertaking/partnership/registered export agency, constituted in accordance with the relevant law in the matter and the BUYER is a Public Sector Undertaking performing its functions on behalf of the President of India.

NOW, THEREFORE, To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to :-

Enabling the BUYER to obtain the desired said stores/equipment at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDERs to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the BUYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:

1. **Independent Monitors**

1.1 Shri Harishwar Dayal has been appointed Independent External Monitors (hereinafter referred to as Monitors) for this Pact in consultation with the Central Vigilance Commission. The name and e-mail address of the IEM is as follows:

Name: Shri Harishwar Dayal

E-mail: dayalagra@gmail.com

1.2 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.

1.3 The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.

1.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.

1.5 As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the BUYER.

1.6 The BIDDER(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the BUYER including that provided by the BIDDER. The BIDDER will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/Subcontractor(s) with confidentiality.

1.7 The BUYER will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such meetings.

1.8 The Monitor will submit a written report to the designated Authority of BUYER/Secretary in the Department/ within 8 to 10 weeks from the date of reference or intimation to him by the BUYER I BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

## 2. Facilitation of Investigation

In case of any allegation of violation of any provisions of this Pact or payment of commission, the BUYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER and the BIDDER shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

## 3. Law and Place of Jurisdiction

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the BUYER.

## 4. Other Legal Actions

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

## 5. Validity

The validity of this Integrity Pact shall be from date of its signing and extend upto 5 years or the complete execution of the contract to the satisfaction of both the BUYER and the BIDDER/Seller, including warranty period, whichever is later. In case BIDDER is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

5.1 Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

**6. The parties hereby sign this Integrity Pact at _____ on _____**

| | |
|---|---|
| BUYER | BIDDER |
| Name of the Officer: | Chief Executive Officer |
| Designation: | Department: |
| Witness | Witness |
| 1. _____ | 1. _____ |
| 2. _____ | 2. _____ |