BANK OF BARODA
Baroda Pride, New No:41,
Luz Church Road,
Mylapore
Chennai 600 004

Notice Inviting Tender (NIT) for Civil, Interior furnishing, Electrical and Air-conditioning works for the proposed Canteen facility at 4th floor at Baroda Pride,New No:41 Luz Church Road, Zonal Office Building, Mylapore, Chennai- 600 004

TECHNICAL SPECIFICATIONS

VOLUME - II

CONTENTS

Sr. No	Title
01	Preamble
02	List of Vendors/Manufactures
03	Technical Specifications for Interior Works
04	Technical Specifications for Electrical Works

PREAMBLE

1. All items of work under this Contract shall be executed strictly to fulfill the requirements laid down under "Basis of Design" in the specifications. Type of equipment, material specification, methods of installation and testing and type of control shall be in accordance with the specifications, approved shop drawings and the relevant Indian Standards, however capacity of each component and their quantities shall be such as to fulfill the above mentioned requirement.

2. The unit rate for all equipment or materials shall include cost in INDIAN RUPEES (INR) for equipment and materials including all taxes and duties and also including forwarding, freight, insurance and transport into Contractor's store at site, storage, installation, testing, balancing, commissioning and other works required.

3. The rate for each item of work included in the Schedule of Quantities shall, unless expressly stated otherwise, include cost of:

a) All materials, fixing materials, accessories, appliances tools, plants, equipment, transport, labour and incidentals required in preparation for and in the full and entire execution, testing, balancing, commissioning and completion of work called for in the item and as per Specifications and Drawings.

b) Wastage on materials and labour.

c) Loading, transporting, unloading, handling/double handling, hoisting to all levels, setting, fitting and fixing in position, protecting, disposal of debris and all other labour necessary in and for the full and entire execution and for the job in accordance with the contract documents, good practice and recognized principles.

d) Liabilities, obligations and risks arising out of Conditions of Contract.

e) All requirements of Specifications, whether such requirements are mentioned in the item or not. The Specifications and Drawings where available, are to be read as complimentary to and part of the Bill of Quantities and any work called for in one shall be taken as required for all.

f) **In the event of conflict between Bill of Quantities and other documents including theSpecifications, the most stringent shall apply. The interpretation of the Architect / Consultant /Project Manager shall be final and binding**

4. The Contractor shall procure and bring Materials/Equipment to the site only on the basis of drawings approved for construction and shop drawings and not on the basis of Bill of Quantities which are approximate only. This also applies to the Contractor's requisition for Owner supplied materials.

5. The contractor shall include for making all the opening in slabs, beams, walls etc. as required for his work. However, the contractor can coordinate with civil work to provide necessary sleeves. All openings shall be closed using water proofing compound or as specified by Project

Manager.

6. The work shall be carried out in conformity with the plumbing drawings and within the requirements of architectural, HVAC, electrical structural and other specialized services drawings.

7. The contractor shall cooperate with all trades and agencies working on the site. He shall make provision for hangers, sleeves, structural openings and other requirements well in advance to prevent hold up of progress of the construction schedule.All supports to the civil structure shall be provided with anchor fasteners.

8. Shop drawings are detailed working drawings coordinated with other trading work, which incorporate the contractor's details for execution of the work and incorporate equipment manufacturer's details and dimensions to ensure that the same can be installed in the space provided.

9. All shop drawings should detail pipe routing and levels, showing location of other services, before execution of the works. All shop drawings will be made on Autocad and Coloured prints have to be produced for site work.

15. All rates quoted are inclusive of cutting holes and chases in walls and floors andmaking good the same with cement mortar / concrete / water proofing of appropriate mix and strength as directed by the Project Manager. Contractor shall provide holes, sleeves, recesses in the concrete and masonry work as the work proceeds. All hot and cold water supply pipes crossing masonry walls of typical guest room toilets shall be provided with GI pipe sleeves.

16. The annular space between the pipe and sleeve shall be filled up with glass wool in between and fire proof sealant on either end after testing. Any pipe crossing fire rated wall as per fire compartmentation will be provide with higher size of GI sleeve. All floor crossing pipes will be provided with higher size GI sleeve.

17. The contractor shall, from time to time, clear away all debris and excess materials accumulated at the site failing which the same shall be done by Project Manager at contractor's risk and cost and cost of cleanup shall be deducted from the contractors pro-rata bill.

18. After the fixtures, equipment and appliances have been installed and commissioned; contractor shall cleanup the same and remove a plaster, paints, stains, stickers and other foreign matter or discoloration leaving the same in a ready to use condition.

19. On completion of all works, contractor shall demolish all stores, remove all surplus materials and leave the site in a broom clean condition, failing which the same shall be done by the Project Manager at the Contractor's risk and cost. Cost of the cleanup shall be deducted from the contractor's bills on pro-rata basis in proportion to his contact value.

NAME OF WORK : CIVIL,INTERIOR FURNISHIGN, ELECTRICAL AND AC WORKS AT BARODA PRIDE, NEW NO.41, LUZ CHURCH ROAD, CHENNAI-600 004

Sr. No.	LIST OF NOMINATED MATERIALS & SUPPLIERS	SUGGESTED MAKE LIST
1	**INTERIOR WORK**	
	MDF / Plywood	NUWUD / Century / Asain / Archid /GREENPLY
	Laminated sheet	Archidlam National/ Formica/ Greenlam/MERINO/
	Veneer	Green / Duro / Century / Timex / Anchor
	Particle board (only for modular w/s & storage Unit)	Archidply /Greenlam/Century
	Acrylic sheet	ICI/ GE/ Merino / Samsung / Dupont
	Marine grade plywood	Century, Kitply, Greenply, Anchor, Orchid, Prince
	Adhesive	Fevicol / Araldite/Anchor
	Solid Surfaces (Curion)	DUPOINT/HI-MAC/ STARON
	Marine grade Block Board	Century, Kitply, Greenply, Anchor, Orchid
	Flush Door	Century, Kitply, Greenply, Anchor, Orchid
	Polish	Asain / Dulex or equivalent
	Latex	MM Foam or equivalent ISI make
	High density foam	U Foam or equivalent ISI make
	Locks	Godrej / Hafle / Hettich / Ebco / Doorset / Ozone / Efficient gadget
	Storage Hardware	Godrej / Hafle / Hettich / Ebco
	Screws / Nails & other accessories	GKW / Nettleford
	False Flooring	Kebao , Armstrong , AMF
	Vinyl Flooring	Armstrong ,gerflor, Eurotex ,
	Carpet	Unitex, Armstrong,
	Wooden laminated flooring	Pergo / Armstrong / Euro / Squarefeet
	Plain/Toughened glass	Saint- Gobain, Indo Asahi , Modi
	Hardware for general staff areas	Dorma / Euro/ Ozone / Enox / Ebco /Hamco
	Hardware for main Glass doors (patch fittings)	Dorma / Euro/ Ozone / Enox / Ebco /Hamco
	Door Closers (general use)	Dorma / Euro/ Ozone / Enox / Ebco /Hamco
	Floor springs (general use)	Dorma / Euro/ Ozone / Enox / Ebco /Hamco

	Floor springs for main glass doors	Dorma / Euro/ Ozone / Enox / Ebco /Hamco
	Aluminium Sections for Paritions	Jindal /Hindalco/indal/ Tata steel
	False Ceilings: Gypsum	India Gypsum / Saint Gobin / Asia/ Armstrong
	False Ceilings: Grid (As Approved)	Armstrong / AMF
	False Ceilings: Grid (Metal Ceiling)	Unimech / AMF / Armstrong /
	GI Sections	India Gypsum / Saint Gobin / Jindal
	Acoustical False Ceilings: Mineral fiber board	Armstrong, Hunter Douglas / Peritex
	POP Punning	Gyprock / India Gypsum / Birla
	Paint	Asian / Nerolac / Dulex / Berger / Nippon
	Exterior Paint	Asian / Nerolac / Dulex / Berger
	ACP (Exterior / Interior)	Alstone / Eurobond /Alucobond
	Cylicon	G E / Dow corning / Wacer
	Rolling / Vertical Blind	Vista / Peritex / Winfab / MAC
	Frosted Film	Garware or equivalent
	Aluminum Skirting - 50mm	Jindal or equivalent
	Water Proofing	Pidilite or equivalent
	HardWood	Salwood / Teakwood/kapoor
	Automated Rolling Shutter	Gandhi Automation/Toshi Automatic Systems/Akash Rolling Shutter
2	**Plumbing**	
	CP Fitting	Jaquar /Hindware/Pince /Astral
	Liquid Soap Dispenser	Jaquar / Parryware /Essco
	SS tissue paper dispenser	Orchids/ Kimberly
	SS Hand Drier	Orchids/ Kimberly
	SHOWER	JAQUAR / PARRYWARE / ESSCO
	CP GRATING WITH RIM	JAQUAR / PARRYWARE / ESSCO
	TOWEL RAIL	JAQUAR / PARRYWARE / ESSCO
	Sanitary Ware	Hindware / Cera / Parryware / **Jaquar**
	Sanitary Fittings	Jaquar /Hindware/ **Parryware**
	Geyser	Bajaj / Sphere Hot / Crompton /Racold / V Guard / Havells / **Venus**
	Stainless Steel sink	Nirali / Diamond/Franke- Single Bowl
	C.I. Pipe	Bengal Iron Corporation or equivalent ISI make
	Urinal Partition Glass	Merino / Saint Gobain/ Modi / Asai
	GI Pipe	Tata/ Jindal / Zenith /APPOLLO/SURYA PRAKASH
	CP Fitting	Pince /Astral
	PVC & CPVC Pipe	Pince /Astral / **Supreme**
	CPVC FITTINGS	ASTRAL/ ASHIRWAD / SUPREME
	GI FITTINGS	NVR BRAND / UNIK/HB
	BUTTERFLY VALVE (50mm to 100mm)	INTERVALVE / AUDCO/ZOLOTO

	BALL VALVE (15mm to 40mm)	RB / TBS / CIMBRIO
	AIR RELEASE VALVE	RB / TBS / CIMBRIO
	NON RETURN VALVES	AUDCO/ZOLOTO/LEHERY
	PRESSURE REDUCING VALVES	AUDCO/ZOLOTO/LEHERY
	SOLENOID VALVES	AUDCO/ZOLOTO/LEHERY
	ANCHOR FASTNER / 'U' CLAMPS	HITECH SUPPORTS
	STONE WARE PIPES AND GULLY TRAPS (ISI)	MYSORE STONE WARE / TSL
	PVC PIPES (SWR Quality)	PRINCE / SUPREME/ASTRAL/ASHIRVAD
	PVC PIPES (Agricultural series)	PRINCE / SUPREME/ASTRAL/ASHIRVAD
	PVC FITTINGS (Fabricated)	CLARION
	PVC FITTINGS (Moulded)	PRINCE / SUPREME/ASTRAL/ASHIRVAD
	PVC FLOOR TRAPS (Moulded)	PRINCE / SUPREME/ASTRAL/ASHIRVAD
	MANHOLE COVER - Cast iron	BIC / NECO
3	MANHOLE COVER - (RCC Precast)	RAJVAIBHAV / SFRC
	LEVEL CONTROLLERS	AQUA INTECL TECH / VINAYAKA
	INSULATION FOR GI BURIED PIPES	PYPE KOTE / TAPEX
	ENAMEL PAINT	ASIAN PAINTS / APCOLITE
	EWC CONNECTORS	MULTICWIK
4	HOT WATER INSULATION	ARMAFLEX / VIDOFLEX
	Civil Work	
	Ceramic Tiles/vitrified homogeneous glazed tiles.	HR Johnson, Kajaria, Nitco, ASL, Somany
	Cement	Ultratech , ACC , JK Cement , Ambuja
	Chemical Pasting (Tiles)	Pidilite , Fosroc , Eurokart
	Steel	Sail ,Tisscon , Ispat , Tata
	Electrical	
	Light Fittings	Philips / Wipro / Osram / Havells / Cromption G.
	MCCB, MCB , RCCB, DB, ICTPN TP, HRC Fuse, cahnge over switch, switch fuse Unit	L&T, ABB, Legrand, Siemens, Schneider
	FRLS insulated Elec. Wire/ cable armourd, unarmourd, Sheathed,unSheathed, flexible LT cable, Multi core, single core cable, flat cable	Finolex/Ploycab/Havells/RR kabel/KEI
	PVC conduit(HEAVY DUTY ONLY)	CAP/Finolex/Polycab
	PVC insulated copper conductor Wires	Finolex/ Polycab/RR Cable
	Distribution Box	Legrand/ Schneider/ ABB/Siemens
	MCB & MCCB	Legrand/ Schneider/ ABB/Siemens/L&T
	Light Fixture & Lamps	Philips/ Wipro Osram / Havells / Cromption G./ Halonix
	HT cable	Polycab/Havells
	Modular Switches	ABB/ Legrand/ MK/ANCHOR/ELLEYS/ROMA
	DLP Trunking	Legrand/Schneider or equivalent
	Power cable	CCI/ Skytone/ Universal/ LAPP/ Torrent
	End Termination	Raychem/ Mahindra/ELMEX
	PANEL	Crompton/L&T/C&S
	Fan	Crompton/Havells/Bajaj/Usha

	Raceway & Alu. Trunking	Tata/Jindal/Zenith
5	Casing Caping	Finolex/Cap or equivalent
	Weather proof socket outlet with MCB	ABB/MDS/LEXIC/Neptune/Elcon- Clipsil, Siemens, Schneider (Merlin Gerin)
	Miniature Circuit Breaker	ABB/MDS/LEXIC/ Clipsil/Siemens/HPL
	Earth Leakage Circuit Breaker	MDS/LEXIS/Siemens/HPL
	MCB Distribution Boards in sheet steel housing (double door)	ABB/MDS/LEXIC/Siemens/HPL
	Distribution	
	MV Contractor/Timer/Relays/Starters	Legrand/ Schneider(MG)/ ABB/Siemens/L&T
	Moulded case circuit breakers	Legrand/ Schneider(MG)/ ABB/Siemens/L&T
6	SFU/Fuses	HPL/ L&T. Siemens, GE Power, Schneider (MG)
	ACB	Schneider(MG)/ ABB/Siemens/L&T
	Single Phase Preventer (Current base)	L&T, Minilec
	Raising Mains & Tap Off (Power coated)	Zeta, C&S, Siemens
	MV Switcheboards (Powder Coated)	Tricolite Electrical Industries, conlec Enginners Pvt. Ltd, Vidyut Control Pvt Ltd., Trinitron Milestone Switchgear, Unilec Ltd, Madhu Electrical Advance Electro Control Pvt Ltd.
7	**Low Tension System**	
	Light & Fan Wire	Polycab, Finolex, Havells
	Telephone Wires	Delton, Skyline, Finolex, Rallison, Batra Henley
	Telephone Tag Blcoks	Krone / Pouyet/ TVS
8	**Cables and Accessories**	
	1100Volts grade Cables	CCI, Universal, Fort Gloster, Polycab, RPG (Asian), Nicco
	Cable Lugs	Dowells
	Cable compression Glands	Peeco/ Comet
	Cable Trays / Cable ladders	Slotco, Bharti, RICCO, Pilco, MM Enterprises
	Metering & Protection	
9	Cast Resin current transformers	Gilbert Maxwell, Kappa AE,Precise
	Meters (Digital)	L&T Roshab, Automatic Electric, Siemens, Socomex
	Selector switches	HPL/L&T Salzer, Kaycee
	Indication lamp	L&T Vaisno Teknic
	KWH Electronics Digital Meter	Secure, L&T, Enercon, Socomec- HPL
	EPABX	
10	Exchange/ Console Panel	Copper connection, Flash Hymax, Accord CG, Tata Telecom, Panasonic
	CVT	Logicstat, Blue Bird, Selvon, Max Power
	UPS	HPL- Socomec, Tata Liebert, APC, Invensys, Copper Connection
	Hand Set	Beetel, Tataphone, Crompton

	Tape off	Cat Vision, Shyam
	Electrical Items	
	Panel Switch Gear & related Item	
	LT Panel/Bus Duct	By any Panel manufacturer who process C.P.R.I. certificate for specified fault level & IP level protection
	Fuse Disconnector switch/switch fuse unit	L&T, Siemens/ Schneider/ABB/Legrand
	Ammeter Voltmeter	AE/L&T/MECO/Rishab
	Digital Meters/ Intelligent Maultifuntional Digital mater	AE/HPL/CONZERV
	Selector Switch, Push button switch / emergency switch	KAY CEE/ L&T/ Siemens/ Schneider
	Indication Lamp	AE/L&T/Siemens/ Schneider
11	CT's	L&T / AE/ Kappa
	AT's	L&T/Siemens/ Schneider/ legrand
	Voltage stabilizer for air conditioner (4/5KVA)(170-270V)	V Guard/Microtek
	Air Conditioner - Split Inverter AC(5 star) - (.75 ton - 1ton,1.5 ton,1.8ton-2ton)	Daikin/Blue Star/ Carrier
	Air Conditioner - Cassette Inveter AC(5/4/3 star) - (2.9 ton	Daikin/Blue Star/ Carrier
	- 3.5 Ton)	
	Transformer	
	Distribution Transformer	Jindal /Areva/ Muskan/Alstrom
	11 or 33 KV VCB	Crompton/ Alstom/ ABB
	HT Termination & Jointing kit	Ray Chaem / Mahindra/ ELMEX
	Cable Glands	Dowells / Siemens/Braco
	Lugs & Thimbles	Dowells / Johnson
12	Upto & including 11KV cables (ISI markes)	CCI/ Skytone/ Gloster/ Havells
	Insulating Mats	ISI Marked
	Capacitor Bank (ISI marked)	GE Power/ BHEL/EPCOS/ L&T
	Lightning Arrestor	Altas/ Alstom/ GE power
	Protection & Other Relay	ABB/ Siemens/ Schneider/ L&T/ Allen Bradley
	Internal Wiring Related Works	
13	MCB/RCCS/Isolators (ISI) marked MCB DB	L&T Siemens/ Schneider/ Legrand/ MDS / Hager
	PVC Conduit	CAP / BEC/ Seiko/ AKG / Sudhakar / Precision / Avonplast
	PVC insulated copper wire (ISI marked)	Skyline/ Finolex/ Havells/ Ploycab
	Telephone Cable	Skytone/ Delton/ NICCO/Polycab/ Finolex/National
	Switch, TV & Telephone socket & boxes (Modular Type)	CPL/ Legrand/ABB/Anchor
	Miscellaneous Items	
	Lightning Protection Unit	Erico/ Pheonix/ INDELEC

	Relays	L&T/ABB/Siemens/BCH
	Contractors	L&T/ GE Power/BCH/ Siemens/ABB
	Changeover switch	C&S/Havells/ L&T/HPL
	KWH, PF, Frequency meter	BHEL/ AE/Havells/ L&T/ALSTOM
	Push Buttons	L&T/ Siemens
	Timers	L&T/ Legrand/ Schneider/Siemens/GE
14	Exhaust Fan	Crompton / GEC
	Casing & Capping	Modi / equivalent as per approval
	Kitkats	Havells / Anchor / equivalent as per approval
	Meters	AE / Rishaba / IMP
	Music System	Philips / Bose / equivalent as per approval
	Networking	
	Switches	Brocade/Cisco/Digi-Link/3Com/Nortel/Foundry/D-Link
	Patch Panel,Patch cord and I/o	Digi-Link / Tyco(AMP) /Schneider/D-Link
	Cable	Digilink/Clipser/National/Polycab/Lapp/Finolex
	Racks	ComRack / HCL / ValRack / APW President
	Cat6 E UTP cable	D-Link / Legrand
	PVC casing/pipe/flexible pipe	Modi
15	Cat6 24-Port jack Panel	D-Link / Legrand/Digi
	Cat6 Information out Let, Faceplate with SMD	D-Link / Legrand
	Cat6 Mounting Cord 3ft (1Mtr) Factory made	D-Link / Legrand
	Cat6 Mounting Cord 7ft (1Mtr) Factory made	D-Link / Legrand
	12U Communication 9U Rack with Cable Manager, Cantilever shelf, Power manager, mounting fasteners pack of 20, Front Glass Door and Lock	Wall rack
	Modular	
	Extruded aluminum sections	Hindalco, Sant aluminum, Midi extrusions, Jindal
	Pre laminted particle board	Action Tesa, Associate Décor, Asis, Century (interior grade - 2)
	PVC lipping	Rehau, Dolkin
	Hinges/storage and pedestal locks/minifix fittings/sliding channels etc.	Ebco, hafele, Hettich, **Dorma** or equivalent
	8 mm Glass	Modi, Saint gobain, Asahi
	Door locks for cashier cabin	Godrej, Enox, Doorset, Ultra, Ebco
	Hydraulic door closer	Yele, Enox, Everite, Ebco
	Powder coating	Paramount, Narolac
	Fabric for panel	Response
	MDF	8mm / 10mm / 12mm / 18mm MDF
	MS STRUCTURE ,COLUMNS AND PURLINS	Tata/SAIL/ JSW/VIZAG
	Roofing/wall sheets with insulation	Lloyds insulations/Meta/ Tatabluscope Interarch

	Autoclaved Aerocon Blocks 600x150x200mm	Hyderabad Industries, Birla Aerocon,Renacon AAC Blocks
	Fiber Glass wool insulation	UP Twiga, OCF,K-flex
	Welding electrodes	Esab, Advani, Oerlikon
	Block Board	Century / Greenply / Samrat / Blue Apple ply
	Textured Laminate (Basic rate of 1.0 mm thk Laminate shall be Rs 1200.00 per Sheet)	Century / Merino / Greenlam/vir/Archid lam/aica
	Soft Boards	Jolly Boards/ Sitatex / Anchor
	Sound Insulation	UP Twiga / Rockwool
	Pest Control	Pest Control India / PECOPP
	Modular False Ceiling	Daiken/AMF / ARMSTRONG / USG/SAINT GOBIN
	Modular Axiom Profile	Daiken/AMF / ARMSTRONG / USG/ SAINT GOBIN
	Metal Baffle and Open cell ceiling	Daiken / ARMSTRONG/ANUTONE
	Gypsum Board	Saint Gobain – Gyproc,USG
	Fire Line Gypsum Board	Saint Gobain – Gyproc,
	Floor-springs Heavy Duty	GEZE/ Dorma / Hafele/GODREJ
	Door Closure Heavy Duty	GEZE/ Dorma / Haffele / Everite / Hardwyn/GODREJ
	Wood preservative	Pest Control – India
	Mirror	Saint Gobain / Modiguard
	Polishes	Asian / Nerolac / Berger
	Telescopic sliding drawer channels	Hafle Germany / Earl-Bihari (EBCO) / Hettich/epco
	Door Locks	GEZE/ Dorma / Haffele/epco
	Door Handles	Dorma / Geze/godrej
	Glass marker White Boards	Saint Gobain / Form 5
	Adhesives	Fevicol / Araldite
	Gyp Plaster	Saint Gobian - Gyproc
	Aluminum Skirting	DEKO/ Alloy / Dorma
	Modular Aluminixpndtw0 um Glass Partition & Door Frame	DEKO/ Alloy / Dorma
	Graphic Film	3M / Avery / LG
	Frosted Film with minimal colour bands	3M / Avery / LG
	Colour Film	3M / Avery / LG
	Sliding Folding Partiton - Solid Acoustic	Dorma / Hufcor / Malrox
	Fire Rated Glass Partition & Glass Door	Saint Gobain Vetrotech + MPP
	Decorative Wall Panels	Abstracta - MTM
	Wall Paper	Marshalls/Greenteriors/Muraspec/ Ego
	Aluminum T Groove / Hat channel	Alloy / Zeb
	Dinoc film (Basic Rate 300/-)	3M / LG
	Acoustical Panels & Sheets	Albans / Lila Décor
	Fabric	Response / Décor / Harmony/Bombay Dyeing
	White Cement	Birla White / JK
	Granite (Baw 1 sic Cost - Rs 150/- Sqft)	as per designer selection

	Italian Marbles Tiles (Basic Cost - Rs 160/- sft)	as per designer selection
	MS Powder Coated Lockers	Midas / Godrej
	Kitchen Equipment	Jai Engineering/Agro
16	Plastic Dustbins	Prince, Supreme, Nilkamal
	Roller Blinds (Normal / Blackout Motorised) (Basic Cost of Fabric Rs 90/- per	Marvel/Johnson/Hunter duglous/ Vista / Phifer / Marshal
	Zebra Blinds	Marvel/Johnson/Hunter duglous/VISTA
	Signage / Logo	3M / Avery
	Entrance mat	3M Nomad
	Carpet Tiles	Shaw / Alfa/ Mohawk / DESSO
	Modular Furniture	Danco/Space wood/Featherlite
	Chairs	Amardeep/Herman Miller/Featherlite
	Soft Boards	Firdoz/Leela decor/Albans
	Melamine	Asian / ICI Dulex
	Hardware	Efficient gadget / Barl Behari0
	Distemper paint	Asian / Berger / Jenson & Nicholson
	False Ceiling -Gypsum	Indian Gypsum / Saint Gobain/ Gyproc
	Beeding	Beach wood/TEAKWOOD
	Acrylic surface	DuPont/Samsung/LG
	Channeled Plank Panelling	Anutone/Armstrong/or equivalent
	Acoustic Fabric	Anutone/Armstrong/or equivalent
	Water-proofing	Dr.Fixit/Fosroc or equivalent
	UPVC	Fenesta/ equivalent
	GI Sheets	TATA / HSL / SAIL / NIPPON DENRO,JINDAL or approved equivalent.
	Fire Damper	Carraire / Air Breeze/SRIFABS or approved equivalent.
	Vibration Isolators/Flexible Connectors	Resistoflex / Dunlop or approved equivalent.
	Insulation Fibre glass	UP Twiga / Kimmco / Owens corning or approved equivalent.
	Power Cables	CCI / ICC / Gloster / UCL/FINOLEX or approved equivalent.
17	Control Cables	Finolex / Delton or approved equivalent.
	Aluminum Grilles Diffusers/ Linear Grilles	Caryaire / Air Breeze/SRIFABS or approved equivalent.
	Filters	Klenzaids / Airtech / Aerosol / Anfilco or approved equivalent.
	Cooling Coils / Heating Coils	Blue star / Rohini / Ethos / Carrier / Jaypee / Coil Company / ZECO or approved equivalent.
	Nitrile rubber	Armaflex / vedoflex /AERO FLEX/ARMACELL or approved equivalent.
	Low Voltage Systems	
	Fire Alarm Panel.	Honeywell / Ravel / Blue Star

	Smoke Detectors	Ravel / Honeywell / System sensor
	Armoured cable	Polycab / Surabhi / equivalent as per approval
	Access control system	Solus / Honeywell / Siemens / HID / Syris
	CCTV Surveillance system	Bosch / Samsung / Secura / Honeywell
	2 Core Flexible copper cable	Polycab / Finolex / equivalent as per approval
	Public Address Ampilifier	Onkyo / Philips / Ahuja
	Celling Ring Speaker (8w)	Philips / Ahuja / equivalent as per approval
	Fire panel	Morley / Honeywell / seimens / Appolo
	Fire Extinguishers	Ronak / Safex / equivalent as per approval
	SPRINKLER BULBS	HD / SPRAY SAFE / equivalent as per approval
	Rodent	Maser / Star/ Branded
	WLD	Csystem / equivalent as per approval
	VESDA	Securitron / equivalent as per approval

Note: Contractor shall obtain prior approval before procurement of the Materials listed above and should obtain Banks'approval before execution strictly as per Bank's approved makes. Laminate and approved shades as listed under:

Frosty White laminate – "Sunmica" make Frosty
white G499/1499 or equivalent as per approved brand list.
Alpine White PVC laminate – "Zurich" make
Silky Matte 9003 Alpine White or equivalent as
per approved brand list.
Silver laminate – "Sunmica" make Brushed
Aluminium Steel tone MBA475 or equivalent as per approved brand list.
Orange band– "Sunmica" make – G599 / 159 or equivalent as per approved brand list.

. If the above Brands of Materials are not available, Engineer-in-charge shall allow use of other brand material duly approved by Appropriate Technical Authority (ATA), provided they confirm to thxpndtw0 e requirement of IS as per Technical Specification/Quality Plan as enclosed with the Tender Document. All the equipment's Test Certificates, Warranty / guarantee Certificates and Technical Specifications should be produced by Contractor. No deviation in this regard shall be permitted.

TECHNICAL SPECIFICATION: INTERIOR WORK

1. GENERAL

This specification is for work to be done, item to be supplied and materials to be used in the works as shown and defined on the drawings and described herein, all under the supervision and to the satisfaction of the Architect.

1.1 The workmanship is to be the best available and of a high standard, use must be made of a special trades men in all aspects of the work and allowance must be made in the rates for so doing.

1.2. The materials and items to be provided by the Contractor shall be approved with any samples which will be submitted for approval by Contractor and generally in accordance with the specifications. Also if products are specified in the specification and/or bill of brand, trade name or catalogue reference, the Contractor will be required to obtain the approval of the Architect before using the materials. The Contractor shall produce all invoices, vouchers or receipts for any material if called upon to do so by the Client/ Architect.

1.3 Samples of all materials are to be submitted to the Architect for approval before the Contractor orders or deliver the materials at site. Sample together with their packing are to be provided free of charge by the Contractor and should any materials be rejected, they will be removed from the site at the Contractor's expense; all samples will be retained by the Client/ Architect for comparison with materials which will be delivered at the site. Also, the Contractor will be required to submit specimen finishes of colors, fabrics etc. for the approval of the Architect before proceeding with the work.

1.4 The Contractor shall be responsible for providing and maintaining and boxing or other temporary coverage required for the protection of dresses or finished work if left unprotected. He is also to clean out all shavings, out ends and other waste from all pairs of the works before coverings or in-fillings are constructed.

1.5 Boxes and moulds shall be accurately set out and rigidly constructed so as to remain accurate during the time they are in use.

1.6 All unexposed surface of timber e.g. false ceiling, backing fillets,

backs of doorframes, cupboard framing, ground, etc. are to be treated with two coats of approved timber preservative before fixing or converging.

1.7 Only first class workmanship will be accepted. Contractor shall maintain uniform quality and consistency in workmanship throughout.

2. JOINERY:

2.1 Joinery is to be prepared immediately after the placing of the Contract, framed up, bonded and waged up. Any portions that are wrapped or found with other defects are to be replaced before wedging up. The whole of the work is to be framed and finished in a workmen-like manner in accordance

with the detailed drawings wrought and wherever required, fitted with all necessary metal ties, straps, belts, screws, glue etc. Running beaded joints are to be cross-tongued with teak tongues wherever required with1.5" thick expandable-cross tongues. Joiners work generally to be finished with fine sand/ glass paper.

2.2 Joints: All joints shall be standard mortise and tennon, dowel, dovetail, and cross-halved. Nailed or glued but joints will not be permitted, screws, nails etc. will be standard iron or wire of oxidized nettle fold tenons should fit the mortises exactly.

2.3 Nailed or glued butt joints will not be permitted, exceptional cases with approval of Architect.

2.4. Where screws shown on aw 15 finished surface, those will be sunk and the whole plugged with a wood plug of the same wood and grain of the finished surfaces will be neatly punched and the hole filled with wood filler to match the colour.

2.5 Should joints in joiner's work open, or other defects arise within the period stated for defect liability in the contract and the clause thereof be deemed by the Architect to be due to such defective joinery shall be taken down, and refilled, redecorated and/ or replaced if necessary and any work distributed nd0shall be made good at the Contractor's expense.

2.6 Nails, spikes and bolts shall be of lengths and weights approved by the Architect. Nails shall comply with is 1959-1960 or equivalent approved quality sample. Brass headed nails are to comply with B.S.1210. Wire staples shall comply with B.S.1494 or equivalent.

2.7. The contact surface of dowels, tenons, wedges etc. shall be glued with an approved adhesive.

2.8 Where glued joinery and carpentry work is likely to come into contact with moisture, the glue used shall be waterproof.

3. HARDWARE & METALS

The hardware throughout shall be of approved manufacture or supplier, well made and equal to in every respect to the samples to be deposited with the Architect. The Contractor may be required to produce and provide samples from many different source before the Architect take decision and he should allow his rates for doing so.

3.1 Fittings generally shall be brass oxidized, unless otherwise specified and shall be suitable for their intended purpose. In any case, it will have to be approved by Architect before the Contractor procures it at site of work.

3.2 Screws are to match the finish of the article to be fixed and to be round or flat headed or counter sunk as required.

3.3. The Contractor should cover up and protect the brass and bronze surfaces with thick grease or any other suitable productive material, renew as necessary and subsequently clean off away on connection.

3.4 Aluminum and stainless steel shall be of approved manufacture and suitable for its particular application. Generally, the surface of Aluminum shall have an anodized finish and both shall comply with the samples approved by the Architect/ PMC. All stainless steel sheets shall be 304 SS Japan or equivalent with gauge as specified but not thinner than 16 G.

3.5 All steel, brass, bronze, Aluminum and stainless steel articles shall be subjected to a reasonable test for strength, if so, required by the Architect at the Contractor's expense.

3.6 All brazing and welds are to be executed in a clean and smooth manner rubbed down and left in the flattest and tidiest way, particularly where exposed.

3.7. Chromium plating shall be in accordance with XX I.S. Standard or as per approved specification for normal outdoor conditions and shall be on a base material of copper or brass.

4. GLAZIER

4.1 All glass to be of approved manufacturer complying with IS 3548-1966 as per approved quality and sample to be of the selective qualities specified and free from bubbles, smoke, air holes and other defects.

4.2 Polished plate glass shall be 'glazing glass' (G.G.) quality and that for

mirrors shall be 'silvering quality' (C.G.) conforming to IS 3438-1965 or as per approved sample and quality.

4.3 The compound for glazing to metal is to be a special non-hardening compound manufactured for the purpose and of a brand and quality approved by the Architect / PMC.

4.4 While cutting glass, proper allowance should be made for expansion. Each square of glazing to be in one whole sheet. On completion of work, clean all glass inside and cut, replace all cracked, scratched and broken panes and leave in good condition.

5. PAINT AND POLISHES:

5.1 All material required for the works shall be of specified and approved manufacturer, delivered to the site in the manufacturer's containers with the seals etc., unbroken and clearly marked with the Manufacturer's name or trade mark with a description of the contents and colour. All materials are to be stored at the site of the work

5.2 Spray painting with approved machines will be permitted only if written approval has been obtained from the Architect prior to painting. No spraying will be permitted in the case of priming coats or where the soiling of adjacent surfaces is likely to occur. The nozzle and pressure to be so operated as to give an even coating throughout to the satisfaction of the Architect. The paint used for spraying is to comply generally with the specification concerned and is to be specially prepared by the manufacturer for spraying. Thinning of paint made for brushing will not be allowed.

5.3 Wood preservative shall be so lignum or other equal and approved impregnating wood preservative and all concealed wood work shall be treated with wood preservative.

5.4 All brushes, tools, pots, kettles etc. used in carrying out the work shallbe clean and free from foreign matter and are to be thoroughly cleaned out before being used with a different type of class of materials.

5.5. All iron or steel surfaces shall be thoroughly scraped and rubbed with wire brushes and shall be entirely free from rust, mill scale etc. before applying the priming coat.

5.6 Surfaces of now wood work which to be painted are to be rubbed down, cleaned, down to the approval of the Architect.

5.7 Surfaces of previously painted woodwork which are to be painted are to be cleaned down with soap and water, detergent solution or approved solvent to remove dirt, grease etc. The surfaces shall be flatted down with a suitable abrasive and then rinsed down

and allowed to dry. Minor areas of defective paint shall be removed by scraping back to a firm edge and the exposed surface touched in with primer as described and stopped with putty. Where wood work has been previously painted or polished and is to be newly polished, scrapping, burning off or rubbing down.

5.8 Surfaces of previously painted metal which shall be painted are to be cleaned down and flattened down as described in a surfaces of any rust and loose scale shall be removed completely by chipping, scrapping and wire brushing back to the bare metal and touched in with primer as described.

6. UPHOLESTRY

6.1 This will be of first class standard workmanship with webbing, no-sag springs, coiled springs, padding and filling as specified on drawing. Covering fabrics will be seen, tufted, and corded as shown on the drawing and as approved by the Architect

6.2 Cushion Vents :-
Brass 'Cushion Vents' should be installed at the back or under side of seat cushions (especially those covered in leather vinyl plastic or very tightly woven fabric) to allow air to escape easily and to prevent torn seems.

6.3 Materials :-
Finished timber shall be of the type specified. Furnishing fabrics, colour, pattern, substance to be as specified and manufactured, or supplied by the Company specified, no variations of this will be permitted unless with prior approval of the Architect.

7. POLISH

7.1 French Polish :-
The basic material shall be shellac dissolved in methylated spirit.

Preparation:-

The timber must be well sanded and cleaned and the grain filledwith grain filler. Any staining must be done before applying the polish.

Equipment:-

The polishing rubber the most important implement in French polish shall consist of a pad of cotton wool, which acts as a reservoir for the polish, and a cover of soft white linen or cotton fabric, similar to a well-worn handkerchief which acts as a fitter. The rubber must never be dipped into the polish; they should be changed by pouring the polish on to the pad with the cover removed.

Application:-

Work evenly over the surface with a slow figure-of-eight motion until the timber is coated with a thin layer of polish. The object is to apply a series of thin coats, allowing only a few minutes for drying between the coats. When a level and even-bodied surface is obtained the work is ready for the second stage i.e. spiriting off.

Allow the work to stand for at least eight hours, then take a fresh rubber with a double thickness of cover material and charge it with methylated spirit. The object of spiriting off into and remove the rubber marks and to give the brilliance of finish.

Finally, work in the direction of the grain and continue until the surface is free from smears and rubber marks then leave to harden off.

7.2 Wax Polish :-

Wax polish shall contain silicon and driers. A good silicon wax is to be used not a cream or s.d0pray. The timber shall be sealed first with another finish such as Ronseal, before applying the wax.

Application:-

Apply a light coat of the sealer by brush or cloth direct to the unfilled timber, working it well in and finishing evenly with the grain. Allow to dry thoroughly, then sand lightly with fine abrasive paper. Apply a heavy coat of wax by cloth or on flat surfaces, with a stiff brush. Workit well into the timber and finish off by stroking with the grain before leaving to harden. Leav.d0e for several hours before rubbing up with soft brush. Finally, buff the grain with a soft cloth.

7.3 Transparent Coloured Polyurethane (Melamine)

This shall be applied where natural grain of the wood is required to show. Polyurethane gives tough surface which resist chipping, scratching and boiling water.

Application:-

Clean off all grease and wax with an abrasive and white spirit, this should not be applied in humid conditions. Apply the first coat, preferably of clear hard glaze with a cloth pad. Leave this to dry for at least six hours,

and then apply further coats with a paint brush. If you wait for longer than 24 hours between coats, rub down the previous coat with fine glass paper or a medium grade of steel wool. Obtain a matt finish, if required, by giving a final coat of clear Ronseal Matt coat.

8. TIMBER

8.1 Only seasoned New Burma Teak Wood to be used unless otherwise specified.

8.2 Use of Rose Wood whenever specified only.

8.3 All the wood shall be properly sew, natural growth and shall be free from worm holes, loose or dead knots or other defects, saw die square and shall not suffer warping, splitting or other defects.

8.4 The moisture content shall not exceed 12%.

8.5 All internal frameworks shall be treated with approved wood preservative.

8.6 All wood brought to site should be clean shall not have any preservative or other coating/ covering.

8.7 All rejected decayed, bad quality wood shall be immediately removed from site.

8.8 All wood brought to site must be stacked-stored properly as per instructions.

9. PLYWOOD

9.1 Plywood/ veneered board etc. as specified in the approved list of manufacturers shall only be used. (Block board commercially not to be used).

9.2 Only Marine grade plywood conforming to I.S.I. 710 of approved make only to be used.

9.3 Marine plywood shall generally conform to I.S. 710-1976 and also to Defense / Navy specification bonded, with phenol formaldehyde, treated with wood preservative.

9.4 Only teak wood particle board shall be used. Particle board shall be phenol formaldehyde bonded and generally conform to I.S. 3087-
1965.

9.5 Only 3 mm to 4 mm thick straight-grained group matching approved veneers shall be used. Only veneers laminated from species like teak, rose wood, walnut, laurel, white cedar and mahogany, shall be considered for approval and use.

10. DRY WALL

10.1 94mm thick Tufbloc magnesia drywall partition system (having high water & fire resistance) which includes two layers of Anutone Tufbloc Square edge of size 1200x2400x10mm and 1200x2400x12mm having density 1000kgs/m3, weight 10 & 12kg/m2 fixed on the either side of GI strut channel framework.

10.2 Framework includes Floor/Head (FC50) channels having thickness 0.55mm, length 3600mm, equal flanges of 32mmand web of 50mm fixed to floor and ceiling with suitable fasteners at 300mm centers staggered. Noise and fire rated silicon sealant to caulked along the perimeter of the partition frame before fixing channels. Then Stud channel (SC48) having thickness 0.75mm, length 3600mm, unequal flanges of 34/36mm and web of 48mm should be placed into the floor/head channel positioned vertically at 600mm centers. Extra reinforcement to be provided at openings (doors, windows, etc)

10.3 Synth PF having thickness 50mm, width 600mm, density 1000gsm filled between the Studs and held in position byusing chicken wire mesh/cross bracings/pasting on one side of the boards.

10.4 The first layer of sheet 12mm thick should be fixed on one side of the Stud framework in a staggered (ashlar or brick) pattern by using suitable metal fasteners at 300mm centers. Another layer of sheet 10mm thk should be fixed over it in staggered pattern with suitable metal fasteners. Edges of the two layers of boards must not coincide. Same procedure tobe followed on other side of the framework to give 2 layers oneither side of framework. 4mm gap should be maintainedbetween boards on all sides.

10.5 Installed partition system is then sanded, smoothed, primered and roller finished by using water based emulsion paint of approved colour

11. BLINDS

11.1 Blackout Fabric made up of 100% Polyester with Acrylic coating - Phifer make. Lead free fabric with thickness of 0.356mm having Solar Reflectance of 68% and Solar absorption of 32% and Solar transmittance 0% having Greenguard Gold certification for low chemical emissions also Bacterial and Fungal Resistance as per ASTM E 2180, ASTM G21. Flame retardant as per California US Title 19 (Small Scale), NFPA 701-2004 TM#1(small scale), CAN/ULC-S-109-03(large and small scale) with 5 years of interior warranty.Roller blind tube should be made of Aluminum with a diameter of 38mm, bottom rod should be powder coated and should come with the end cap to support the fabric, Aluminum brackets and a ball chain or any other

sturdy fixing arrangement as per manufacturer specification all complete as per direction of Engineer in charge.

11.2 Blackout fabric made up of durable laminated back out fabric that combines the woven texture of Fiberglass as the face fabric with durable Vinyl backing to achieve total light blockage - Phifer make. Lead free fabric with thickness of 0.58mm having Solar Reflectance of 71% and Solar absorption of 29% and Solar transmittance 0% having Greenguard Gold certification for low chemical emissions also Bacterial and Fungal Resistance as per ASTM E 2180, ASTM G21 with antimicrobial properties preferably with Microban. Flame retardant as per California US Title 19 (Small Scale), NFPA 701-2004 TM#1(small scale), NFPA 101 (Class A Rating) IBC Section 903.1 (Class A Rating), BS 5867 2008 Part 2 Type B Performance NFPA 701 TM#2 (large scale) ASTM E 84 (Class 1) with 10 years of interior warranty.

Roller blind tube should be made of Aluminum with a diameter of 38mm, bottom rod should be powder coated and should come with the end cap to support the fabric, Aluminum brackets and a ball chain or any other sturdy fixing arrangement as per manufacturer specification all complete as per direction of Engineer in charge.

12. GRID CEILING

12.1 Mineral Fibre Acoustical Suspended Ceiling System with FINE FISSUREDHi NRC(Board) EDGE TILES WITH 24mm Exposed GRID.

The tiles should have Humidity Resistance (RH) of 99%, NRC 0.7, Light Reflectance ≥85%, Thermal Conductivity k = 0.052 - 0.057 w/m K, Colour White, Fire Performance UK Class 0 / Class 1 (BS 476 pt - 6 &7) in module size of 600 x 600 x 20mm , suitable for Green Building application, with Recycled content of 54%.

The tile shall be laid on Prelude32 with 24 mm wide T - section flanges colour white having rotary stitching on all T sections i.e. the Main Runner, 1200 mm & 600 mm Cross Tees with a web height of 32mm and a load carrying capacity of 8Kgs/M2 & minimum pull out strength of 100 Kgs.. The T Sections have a Galvanizing of 90 grams per M2 and need to be installed with Suspension system of Armstrong make.

The Tile & Grid system used together should carry a 30 year warranty.

12.2 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.

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. 600 x 600mm module to be formed by fitting 600mm long flush fitting cross tees centrally betweenthe 1200 mm cross tees.

Perimeter trim to be wall angles of size 3000x19x19mm, secured to walls at
450 mm maximum centres. Installation to be carried out by Trained Installation team & Installation should be carried out as per recommended procedure.

13. GYPSUM CEILING

13.1 False Ceiling (Gypsum Board) Providing and fixing ½" thk. Gypsum board false ceiling at levels as shown in the drg. From FFL. Rate shall be inclusive of all Gypsum components contained G.I. perimeter channels of size 0.55 thick having one flange of 20mm and another flange of 30mm and a web of 27mm along with perimeter of ceiling, screw fixed to brickwall/partition with the help of nylon sleeves and screws, at 610mm centres. The suspending G.I.intermediate channels of size 45mm, 0.9mm thick with two flanges of 15mm each from the soffite at 1220mm centres with ceiling angleof width 25mm x 10mm x 0.55 thick fixed to soffite with G.I. cleat and steel expansion fastners at every 610mm c/c.

Ceiling sections of 0.55mm thickness having knurled web of 51.5mm and two flanges of 26mm each with lips of 10.5mm are then fixed to intermediate channel with the help of connecting clip and in direction perpendicular to the intermediate channel at 457mm centres. 12.5mm tapered edge Gypboard is then screw fixed to ceiling section with 25mm drywall screws driver or drilling machine with suitable attachment. The boards are to be jointed and finished so as to have a flush look which includes filling and finishing the tapered and square edge of the boards with jointing compound & joint paper tape. Rate shall be inclusive of Cut outs for A/c machiness, spot lights, light fixtures, A/C. Grills, fire and security systems cut outs, All Sections should adhere to the manufacturers guidelines.
Vertical sides visible will be measured. The ceiling work shall include the process of creating openings as per the size specification of selected light fixtures / AC units and make any necessary finishing works.
The overall make shall include the finishing of 2 coat putty and White Plastic Emulsion Paint duly coated on all plain and vertical faces completein all respects

14. METAL CEILING (OPEN GRID)

14.1 Horizontal level Open cell Aluminum lay-in ceiling tiles with border panels forming flush-tegular edge of size 600mmx600mmx38mm having Fire Performance CLASS 0/Class 1 (BS 476). The tile of 'Global white' color withcell size 100mm X 100mm shall be laid on white painted Suprafine XL15mm profile grid system comprising Main runners (3000mm), 1200mm and 600mm cross tees with 15mm white flanges and 32mm web height.

The grid should be of 15mm wide T - section flanges color white having rotary stitching on all T sections i.e. the Main Runner with C3 coupling, 1200 mm & 600 mm Cross Tees with Hardened XL2 Clip having a web height of 32 mm and a load carrying capacity of 8s Kgs/M. The T Sections have a Galvanizing of 90 grams per M2 with pull out strength of 100 Kgs.

INSTALLATION: To comprise main runner spaced at 1200mm centers securely fixed to the structural soffit by approved hangers at 1200mm maximum centre & not more than 150mm from spliced joints. The last hanger at the end of each main runner should not be greater than 600mm from the adjacent wall. 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. 600 x 600mm module to be formed by fitting 600mm long cross tees centrally between the 1200 mm cross tees. Installation to be carried out by Trained Installation team & Installation should be carried out as per recommended procedure.

Perimeter trim to be wall angles, secured to walls at 450 mm maximum centers.
Remarks: The price includes the powder coating charges for black panels (155 regular +20 powder coating charges)

15. BAFFLE CEILING

15.1 Vertical Linear Baffle Ceiling made out of Aluminum Extrusion in Aluminum alloy grade 6063. The baffle blade shall be in size of 100x 25 x 3600mm in Wood grain finish – Pradoo & Cabrueava. The baffle blade shall be suspended using Slotted U-profile at on-center spacing in multiples of 25mm. longer lengths of Baffle to be connected by Baffle Joiner and the ends to be fixed with End caps. Spacing between baffle is 150mm

Installation of U-Grid:
The U profile to be suspended at every 1200mm on-centre using 6mm threaded rod from the structural soffit using U-profile hanger. U-profile splice to be used to join more than one U profiles of length 3.75M. 1st U- Grid Channel must be no more than 400mm from the perimeter.

15.2 Installation of Baffles:
Locate the slot for Baffle Hangers in slot of Baffle section at 1200mm centres. Hangers are inserted into the slot, then rotated 90° and fixed into position by tightening the grub screw. Baffle to be lifted into position and hangers engage over lip of U-Grid Channel. Each Hanger to be secured into position by inserting the Locking Clip.
Baffles blades to be connected at ends with Baffle Joiner, which are inserted into the top and bottom slots of the Baffle closed profile for alignment only. The bottom Joiner to be located first and fastened on one side only. The top Joiner to be fitted then and secured with grub screws onone side. Then the two Baffle sections shall be joined and the top Joiner is screw fastened on the 2nd Baffle profile.

End Caps to be located by pushing the End Cap tongues into Baffle slots. Installation to be carried out by Armstrong Trained Installation team &Installation should be carried out as per Armstrong recommendedprocedure.

16. ACOUSTICAL WOODEN PANEL

16.1 Channeled Woodworks perforated panels of width 128mm, thickness of 15mm and length 2440 mm or as required by the Architect/ approving engineer, made of a high density fibre board with minimum 830 Kg/M3 density substrate with a laminated facing / wood veneer as per the approved shade/ species & finish and a melamine balancing layer on the reverse side. The boards shall have a special perforation pattern where the visible surface has" fluted perforation of 2mm width and 14mm of visible panel each. The panels shall provide a fire reaction of Class of 1 as per Part 7 of BS 476. The

edges of the panels shall be "tongue-and-grooved" to receive special clips for installation. The back of the perforated panel shall have sound absorbing non-woven acoustical fleece having NRC of 0.55. The panels shall be mounted on special Aluminum splines using clips and approved by the Architect/ Engineer-in-Charge.

16.2 INSTALLATION:

Install wooden battens (provided by others) of section 50mmx50mm or as approved by the Architect on the solid wall horizontally using screws and plugs at spacing of 600mm centre-to-centre. Screw the aluminum extruded keel for channeled woodworks (GTPT001) over the lowest and second wooden batten at an on-centre distance of 600mm. Install the first set of wooden panels by inserting the clips for border channeled woodworks (GTPT002) and insert the groove of the panel into the projecting flange of the aluminum clip. Continue installing rows of panels by inserting the tongue into the groove of the earlier inserted panel and progressively installing clips for inside channeled woodworks (GTPT003) into the next keel till the actual height is achieved. Use clips for border channeled woodworks (GTPT002) to finish off the installation. Finish off the edges using wooden moulding of matching colour (provided by others). Installation to be carried out by Trained Installation team & Installation should be carried out as per recommended procedure.

17. ACOUSTICAL FABRIC PANEL

17.1 Acoustical Wall Paneling' with square edges made of fibre glass substrate 25mm thick and wrapped on the front side with an acoustically transparent and classified for Fire reaction Class B-s1, d1 as per EN13501, fabric with an option of colors –as per the choice of the Architect of size 600X1200 mm providing a minimum sound absorption level of 0.90 NRC tobe affixed to wall using Wall panel impalers construction adhesives as per the instructions laid down by the manufacturer.

17.2 **INSTALLATION:**

4nos. wall panel Impalers of shall be fixed to the wall surface using self- tapping screws. Silica based construction adhesive to be dabbed on to the projecting elements (spikes) of the impalers. Armstrong Optra wall panels shall be pierced through the spikes of the impalers ensuring the line and level of the panels are maintained.

Installation to be carried out by Armstrong Trained Installation team & Installation should be carried out as per Armstrong recommended procedure.

18. EXQUISITE SPARKLE TEXTURE PAINT

Providing & applying Heritage Exquisite Sparkle is a decorative homogenous surface

texture for interior application, consisting of a two component system of dry Granules (25kgs/pack) made of 92% silica particles coated with fade resistant pigments and a 100% Acrylic Polymer Bonding Agent

(5kgs/pack) with the applied thickness of coating between 0.8 – 1.0 mm to be applied in single coat, on a cured, smooth level plaster without keying, as per the shades/combinations approved, as per manufacturer's directions for usage, to be applied by approved applicatorof manufacturer, as per the directions/supervision of the engineers in charge. For better result one coat of primer suggested.

Packing System:

Dry Material	:	25 kg
Bonding Agent	:	5 kg
Coverage the wall)	:	150-160 sqft/bulk (depending on undulations on
Thickness	:	0.8 mm to 1.0 mm

19 FULLY GLAZED PARTITIONS

Providing and fixing in position fully glazed partition made in 12mm thicktoughened glass panels held in position. The glass shall be held at top and bottom throughout the length with Plywood sections of 4"x3" at the bottom and 2" x 3" on all other sides with teak beedings as per the detail drawing.Further glass is sealed with approved silicone sealant as per the detailed drawing. The borders of the all sides finished with 1mm thick approved shade laminate and the beeding shall be machine polished with a matt finished duco polish in smooth matt finish. The glass joints shall be havingbutt/ Chamfered type fixed with and finished with non-staining silicone sealant as approved by the Architect. The top portion of the partition whichis hung from ceiling through plywood structure to support the glass partitions is also inclusive of the measurement. The overall finish includescleaning the stains of paints and / or any silicon or any other marks over the executed work. All toughened glass edges should be crystal edge

SPECIFICATIONS MS Structures & Roofing.

1 Primary members fabricated from plates shall have flanges and webs joined on one side of the web by a continuous welding process and shall conform to the physical specifications of ASTM A570 (Grade 50) / ASTM A572 or equivalent IS standard having a minimum yield strength of 345 MPa. Minimum thickness of primary member shall be as IS:800-2007 (Table number -2)

1.1 Secondary members for Purlins and Girts shall conform to the physical specification of ASTM A570 (Grade 50) or equivalent IS Standards having a minimum yield strength of 345 MPa. The minimum thickness of secondary members shall be 2.5mm.

1.2 Rod bracing shall conform to the physical specification of ASTM A36 or IS equivalent and having minimum yield strength of 250 MPa.

1.3 All hot rolled sections shall conform to the physical specifications of ASTM A36 or equivalent IS, having a minimum yield strength of 250 MPa. All other miscellaneous secondary members shall have minimum yield strength of 250 MPa.

2. DESCRIPTION

1. **PRIMARY MEMBERS :**

Primary structural framing shall include the transverse rigid frames, end wall wind columns and column brackets.

ROOF SHEETING:

SINGLE SKIN WITHINSULATION - TOP SHEET WITH BAREGALVALUME ROOF SHEET WITH SCREW DOWN SYSTEM

Supplying and fixing of bare galvalume screw down profiled metal sheet of 0.475mm thick as per manufacturer's specification, with insulation as Roof sheeting, made out of Cold Rolled Steel coil of 550 Mpa yield strength. ,

The sheet should satisfy the SRI value of greater than 78 and necessary test certificate to be submitted to meet the above mentioned value

50 mm thick glass wool insulation material with density shall be of 24 kg per Cu.m, weight. The Insulation shall be covered with aluminum foils on one side, supported over 50 x 50 mm x 1.6 mm galvanized welded wire meshes. Insulation shall be supported by using 10 G, GI wires tied diagonally with the purlin to avoid sag

Performance stimulated test like water leakage test to be done by the PEB contractor at site after laying the roofing sheet. Water to be poured on top of sheet through hose pipe to prove that there is no water leakage.

'Building Virtual Completion Certificate' will be issued to CONTRACTOR only after hydro testing of the roof for any leakages in the roofing laps, gutters and down takes is completed and CONTRACTOR submitting the 'No Claim No Due Certificate'.

During the Defect Liability Period CONTRACTOR shall inspect the building once in 3 months' time for recertification. For inspection an Engineer shall be deputed and a detailed report shall be submitted to Owner.

During the defect liability period if any emergency arises due to water leakage, CONTRACTOR must mobilize their team for rectification within 48 hours after intimation by Britannia

DOUBLE SKIN WITHINSULATION - TOP SHEET WITH BAREGALVALUME ROOF SHEET WITH SCREW DOWN SYSTEM, BOTTOM LINER SHEET WITH COLOUR COATED SHEET WITH INSULATION.

Supplying and fixing of bare galvalume screw down profiled metal sheet of 0.47mm thick as per manufacturer's specification, with insulation as Roof top sheeting, made out of Cold Rolled Steel coil of 550 Mpa yield strength.

Bottom liner sheet shall 0.5mm thick color coated at bottom side made out of 550 Mpa steel and fixed above the purlin and secondary purlin will then fixed above the liner sheet to place the insulation and roof top sheet

50 mm thick glass wool insulation material with density shall be of 24 kg per Cu.m, weight.

Performance stimulated test like water leakage test to be done by the PEB contractor at site after laying the roofing sheet. Water to be poured on top of sheet through hose pipe to prove that there is no water leakage.

'Building Virtual Completion Certificate' will be issued to CONTRACTOR only after hydro testing of the roof for any leakages in the roofing laps, gutters and down takes is completed and CONTRACTOR submitting the 'No Claim No Due Certificate'.

During the Defect Liability Period CONTRACTOR shall inspect the building once in 3 months' time for recertification. For inspection an Engineer shall be deputed and a detailed report shall be submitted to Owner.

During the defect liability period if any emergency arises due to water leakage, CONTRACTOR must mobilize their team for rectification within 48 hours after intimation by Britannia.

Note:

Contractor should ensure that the top sheet of both single and double skin roof will be in same level.

Single Skin Wall Panels

I) Single Skin without insulation:

Wall panel material specifications shall be 0.5mm TCT high tensile steel profiled sheet having min. yield strength of 550 Mpa conforming to ASTM-A446 with galvalume coating to AZ-150 bare galvalume. The profile shall have a maximum pitch of 200mm and minimum depth of 26 mm. Alternatively maximum pitch of 333mm with two intermediate stiffening ribs will be acceptable.

SHEETING FASTENERS:

Standard fasteners shall be self-tapping zinc plated metal screws with EPDM bonded zinc plated washers. All screws shall be color coated to match roof and wall sheeting.

SEALER:

This is to be applied at all side laps and end laps of roof panels and around self-flashing windows. Sealer shall be pressure sensitive elastomeric Butyl tapes. The sealer shall be non-asphaltic, non-shrinking and painted surfaces at temperatures from 51°C to +104°C.

CLOSURES:

Solid or closed cell closures matching the profiles of the panel shall be installed along the eaves, rake and other locations specified on drawings.

FLASHING AND TRIM:

Flashing and / or trim shall be furnished at the rake, corners, eaves, and framed openings and wherever necessary to provide weather tightness and finished appearance. It shall be matching with the color of wall & roof. Material shall be 0.47mm TCT conforming to the physical specifications of sheeting.

SKY LIGHTS:

Providing and fixing of translucent polycarbonate sheets of 2 mm thick, "compact type", colour of opal white of TUFLITE /GE /Polygal/danpalan or equivalent - make to the profile of roof as shown in drawing. Sheet profile to match the Roof sheeting. Skylight to be provided only in roof area.Length of Polycarbonate sheet to be restricted to 15m and it should be of Class B.

GUTTERS AND DOWNSPOUTS & HEADER PIPE SYSTEM

Gutters and downspouts shall be adequately designed to ensure proper roof drainage system. The contractor shall design & install a proper roof rain water disposal system (gutters, down spouts , header pipes etc.) for the entire shed. The size of the gutters and no. of down spouts shall be designed by the contractor for an effective & efficient rain water disposal considering the size of the building. Design the roof water drainage for rain fall 150 mm per hr. to be considered with a 2 times factor of safety.

Material shall be MS C class pipe with with two coats of primer and two coats of finish paints for the header pipe and down take pipe to header pipe.

Eaves and Valley gutter shall be made out 3mm thick MS with 2mm thick FRP lining.

Down take pipes at eaves side shall be PVC pipes.

TECHNICAL SPECIFICATIONS

ELECTRICAL

INDEX

SL.NO.	DESCRIPTION	REMARKS
1.	GENERAL SCOPE OF ELECTRICAL WORKS	
2.	INTERNAL ELECTRIFICATION	

GENERAL SCOPE OF ELECTRICAL WORKS

1.0 SCOPE

This specification details the broad guidelines for supply, transportation, receive, store, loading and unloading, erect, testing and commissioning and handover of all the equipments required for the Electrical Installation. The contractor shall furnish all the materials, labor, tools and equipments to complete all the electrical works, as per the bill of quantities and technical specifications and drawings attached. The contractorhas to execute the works as directed by the Consultant / Client's Engineer-in charge to their complete satisfaction.

2.0 CONTRACTOR

The Contractor shall be a licensed 'A' grade Contractor up to 11KV, possessing a valid Electrical Contractor's license in the State, employing one qualified and competent experienced engineer licensed supervisors and skilled workers having valid permits as per the Regulation of Indian Electricity Rules and Local Electrical Inspectors requirements. He should have similar type of experience in executing electrical works of the same magnitude earlier and should have qualified engineers to execute the work as per drawings and to supervise the works at site.

3.0 MINIMUM REQUIREMENT OF TECHNICAL STAFF: - (AT SITE)

One qualified, and competent experienced Engineer – having license issued by Telangana License Board and with site experience in executing similar installations acceptable to the Client/Consultant to supervise works.

Experienced Wireman - Detail manpower loading chart to be furnished.

4.0 SCOPE OF WORK

Supply of various equipment to site, unloading, QC inspection at receiving point, storing, transportation to work site, handling, assembling, cleaning, mechanical erection, chipping of foundations, installation, alignment, testing and commissioning and handing over in working condition of all items covered below

but not limited to it.

a) Power sockets for electrical equipment, ACs, Geysers etc.

b) Wiring, sub main wiring, circuit wiring for power and light.

c) Distribution boards for Lighting, Power, AC etc.

4.1 DETAILED SCOPE OF WORK

1. Internal electrification which includes, Conduting, Wiring, MCB DBs, Lighting Fixtures, Ceiling fans, Exhaust fans etc.

4.2 2 FOLLOWING WORKS ARE DEEMED TO BE INCLUDED IN THE SCOPE OF WORK.

1. Minor civil works like drilling and punching holes and openings in concrete floors, slabs, chasing of brick walls, fabrication of supporting structures, drainage of water from cable trenches, cleaning and clearing of all debris due to electrical installation.
2. Excavation, scaffolding and back filling for direct buried cables and earthing conductors as applicable.
3. Preparation of execution drawings and as built-in- drawings.
4. Coordination with other contractors with regard to installation of items in Electrical Contractors scope.
5. The extent of work services under the contract include all items shown on the drawings, indicated in companion with specifications, notwithstanding the fact that such items have been omitted from the price schedule. All equipments and services, which are required to complete the intent of the contract, shall also be deemed to be within the scope of the contract.

4.3 3 GENERAL NOTES FOR THE TENDERERS

1. Fabrication work includes Angular Supports for Panels etc.
2. All necessary tools, tackles, welding equipments, brazing equipments shall be broughtby contractor.
3. The Tenderer shall submit Designs, Drawings to Consultant / employer for approval,and after obtaining approval the execution of work shall be started.
4. The above Electrical & Electronic equipment of latest design/version which are Superiorin facilities shall be acceptable.

4.4 4 INSPECTION

The Transformer, LT panel, DG sets, and other critical items shall be inspected atsupplier firms premises as per IS relevant Specifications. All testing Facility shall be made available at Works Premises.

4.5 5 PERFORMANCE TEST

The Tenderer shall establish to the satisfaction of the employer for the operational capability of the equipments at manufacturer facility to meet the standard output

stipulated here under in the Tender Part of Technical Specification. After satisfying himself by confirming the equipment has been installed properly and necessary operational capabilities shall be carried out to the satisfaction of employer and consultant.

4.6 6 DOCUMENTATION

The Tenderer shall supply 6 sets of relevant as-built drawings consisting of General Arrangement showing Location of Electrical Items in Drawing, Layout of Panels, Circuit Diagram, Wiring Diagram. The same shall be given in CD form also to the employer after execution of work.

The relevant Test certificates of OEMs, Calibration Certificates traceable to National Standards shall be part of documents

Catalogues, Technical Literatures, of Electrical Items shall be part of document Instruction and Maintenances Manual of Electrical diagrams shall be part of Documents. Details of IC, Memory Chips of Proprietary in nature shall be furnished inManuals.

4.7 TRAINING:

Training shall be imparted to Supervisors, Technicians, of employer staff regarding Instruments as deems necessary.

5.0 MATERIALS

The materials listed under "APPROVED MAKE" only shall be used. Materials, equipments, fittings, etc. used in the installation shall conform to the latest relevantIS. In case of materials for which standard specifications do not exist, the consultant / Employer's Engineer-in-charge shall approve the material before the start of work.

6.0 CODE, REGULATIONS AND STANDARDS:

The installation shall conform in all respects to Indian Standard Code of Practice for Electrical Wiring Installation I.S.732-1982. It shall also be in conformity with the current Indian Electricity Rules Safety Codes and the Regulations and requirements of the Local Electrical Supply Authority. Wherever this specification calls for a higher standard of materials and/or workmanship then those required by any of the above regulations, this specification shall take precedence over the said regulations and standards.

INTERNAL ELECTRIFICATION

I. GENERAL REQUIREMENTS

1. Materials

All materials, fittings, appliances etc. used in electrical installations shall comply with the requirements of relevant Indian Standard specifications, National Electricity code and Indian Standards and shall be well finished. Materials for which Indian Standard specifications have not been indicated, shall conform in quality to the samples maintained by the Engineer-in-chief or as approved by him.

2. Conformity with Indian Electricity Act, Rules etc

All electrical work shall be carried out in conformity with the requirements of the Indian Electricity Act 2003 & Indian Electricity rules 1956 framed there under and Fire insurance act as applicable and also the relevant regulations of Electric Supply authorities concerned as amended from time to time.

3. Execution of work

Unless otherwise exempted under the rule of the Indian Electricity rules the work of electrical installation shall be carried out under the supervision of a person holding a certificate of competency issued by the recognized authority.

The workmen shall also hold certificate of competency. Good workmanship is an essential requirement for compliance with these specifications.

4. Testing

All electrical work shall be systematically tested by the contractor in the presence of Engineer-in-chief to ensure compliance with the specifications laid down. Test results shall be recorded and signed by the Contractor and EIC, if the test results are not acceptable, all repairs and replacements and extra work of removal and relaying or re fixing shall be carried out by the Contractor at his expense and

installation retested, until test results indicate compliance with the prescribedrequirements.

The Contractor shall supply the necessary apparatus, labour and instrumentsor equipment required for testing.

5. Record of Installations

On completion of the work the Contractor shall submit to the Engineer-in- Charge complete wiring diagram for each of the installations in the case of internal electrical works, schematic diagram of equipment and connections for sub-stationsand switch gear works and the route layout plans in case of external overhead line or underground cable work. Five sets of plans shall be submitted and it shall be ensured that the plans indicate complete site data of the installations.

All circuits shall be clearly indicated and numbered in the wiring diagram and all points shall be given the same number as the circuit to which they are electrically connected.

6. Safety Procedures and Practices

In all major electrical installations, such as substations, industrial establishments, transmission and distribution lines and cable networks, safety procedures instructions for working on low, medium and high voltage mains and apparatus and safety practices listed in IS 5216-1982 (first revision) Guide for safety procedures and practices in electrical works shall be followed to the extent applicable. The Contractor shall provide workmen with safety devices and appliances.

7. Fire Safety

All electrical equipment shall satisfy the requirements laid down in IS 1646- 1997 Code of Practice for fire safety of buildings (general) electrical installations and IS 3034 -1993 Code of practice for fire safety of industrial buildings, electrical generating and distributing stations, to the extent applicable.

II TECHNICAL SPECIFICATIONS

1. LT Cable

1.1 All LT cables shall be of 2/3/3 ½ or 4 core aluminium conductors, XLPE insulated heavy duty and suitable for 1100 volts grade and conforming to IS-7098 (Part -1 – 1988).

1.2 The aluminium conductors used shall be stranded, compacted and circular /shaped and the main insulation shall be of cross linked polyethylene (XLPE) with inner sheathing PVC extruded and each core of the cable shall have colour identification all as specified in IS.

1.3 Armour over the inner sheath shall be either of strip or wire type and outer sheathshall be of Extruded PVC conforming to ISS.

The cables shall be suitable to withstand maximum conductor temperature of 90°Cand 250°C during operation and short circuit respectively.

1.4 **Cable Termination Accessories:** All the cable termination accessories such as cable sockets, compression joint sleeves, conducting jellys, cable glands reducing bushes and check nuts etc. Shall be best quality available

2. INTERNAL ELECTRICAL WORK

2.1 The minimum sizes of Multistranded conductor cables shall be as under :-

(a) Lighting and fan circuit cables 2.5 sq.mm nominal area.
(b) Power circuit cables 4 sq.mm nominal area.
(c) Sub main cables 6 sq.mm area.
(d) Earthing lead 1.5,2.5, 4sq.mm areas.
(e) DB wiring 4Cx10Sqmm, 4Cx16Sqmm

2.2 The capacity of the current shall be as under:

1. The light and fans may be wired on a common circuit. Such circuit shall not have more than 10 total point of light, fan and light socket outlet or a load of 800 watts, whichever is less.
2. The power circuit shall be designed with a maximum two outlets per circuit.
3. Wherever the load to be fed is more than 1 KW, it shall be controlled by an isolator switch or miniature circuit breaker.

Cable for internal wiring for light, power and sub mains.

3. WIRING IN CONDUIT, SURFACE OR CONCEALED

3.1 Single core PVC insulated unsheathed cable upto 1100V grade conforming to IS: 694 – 1990.

3.2 For the purpose of colour coding in conduit wiring in particular the samples for make and colour of insulation of wires shall be got approved before the wires / cables are procured and drawn into conduit. Red / yellow / blue wires for phases, black for neutral and green wire for earth shall be used wiring in conduit without coding will notbe acceptable. Wire/ cable shall be 1100 volts grade single core conforming to IS: 1596-1997 or IS: 694-1990.

4. ROUND BLOCKS

4.1 Round blocks shall be of teak wood, unless otherwise indicated, double of single as indicated, and varnished. Minimum size of blocks shall be 40 to 50 mm thick and 80to 100mm in diameter, or of any size, as indicated.

4.2 **Conduit and Conduit Fittings** : All conduit and conduit fittings and accessories shall be of rigid non metallic PVC conduit shall be solid drawn. IS: 3419 – 1998 Specification for fittings for rigid non metallic conduits. Conduit fittings shall be of un-plasticized PVC.

5. WOODEN PLUGS (GUT TIES) AND RAW PLUGS

All wooden plugs shall be seasoned hardwood not less than 5 cms long 2.5 cm square on inner face and 2 cms square on the outer exposed face. These shall be fixed securely as the work proceeds in the structure subsequently as indicated, cemented and finished flush with the surface. Rawl plugs or epoxy resin Phill plugs or metallic split hammered type plugs manufactured by number of proprietary firms may be used as alternative when so indicated and fixed as per manufacturer's instructions.

6. SCREWS AND FASTENINGS.

All screws shall be of alloy aluminium or cadmium plated iron unless otherwise indicated.

7. CEILING ROSE

Ceiling rose shall be surface type and shall comply with IS : 371 – 1979, Specification for ceiling roses having two or three terminals plates and of outside diameter not less than 63.5mm Ceiling roses shall be provided, with means for gripping flexible cord which shall not damage the insulation and / or sheath of the cord and shall be such that the load on the cord is not transmitted to the terminals.

8. FITTINGS & ACCESSORIES

8.1 Lighting Fixtures & Lamps

The lighting fixtures shall be of the type specified in the drawing. The mounting height and location shall be as specified in the drawing. Unless otherwise specified, the mounting height shall not be less than 2.5 m.

The lighting fixtures shall be controlled either individual or in groups as specified in the drawing. The lighting fixtures shall be either supported vertically or mounted on bracket or suspended by down rods as required and approved by Engineer-in-Charge.

8.2 Lighting fixtures for general purpose

(a) All the luminaries shall be commercial/industrial type as per specific requirement. Specification for the various types of incandescent, mercury vapour, sodium vapour and fluorescent fittings mentioned in the schedule of quantities shall be followed. All the lighting fixtures shall be complete with all parts,

Accessories for efficient performance whether specifically asked in the specification orin the schedule of items or not.

(b) Individual light fittings shall be provided with suitable arrangements for G.I. threaded conduit entry of 19 mm dia unless otherwise specified. Terminals of all fittings shall be suitable for taking 2.5 sq.mm. flexible, copper conductor PVC insulated, PVC sheathed cable.

(c) Fittings shall be supplied with all interconnections made and fully wired upto the terminal block.

(d) All live parts shall be provided with suitable sleeves to prevent accidental contacts. The earthing terminal in the fitting shall effectively earth the body of the entire luminaries.

(e) The clearance between the live parts and the enclosures, earthing and other safety factors shall be governed by the latest revision of the relevant IS specification and IE rules.

(f) Dust and vapour tight fittings shall have the enclosures suitably designed to withstand the heating effect.

(g) The fixing arrangement of various components and lamps shall be in such a way that the maintenance and replacement jobs can be easily carried out.

(h) The luminaries shall be suitably designed to provide economically the required level of illumination on the working plane when mounted at normal standard height in accordance with the type of fixtures.

(i) The luminaries shall be suitable for operating at normal supply voltage of 240V single phase, 50 HZ with voltage variation of +/-5%.

8.3 Flood light fixtures

Post top lanterns

The canopy made of cast aluminium opal acrylic diffuser rain proof and integral typepost top lanterns having control gear housing ballast p. f . improvement capacitor etc.

8.4 Fluorescent fittings (With Electronic Ballast)

a) Anti-corrosive fluorescent light fitting

This anticorrosive and dust proof fluorescent tube light fitting shall have cast aluminum housing for control gear, p.f. correction condenser to improve p.f to 0.95 and connector block.

Seamless aluminum pipe carrying the connecting lead shall be screwed into the control gear box on one end and fixed to the end box made of cast aluminum on the other end. The end box should have drip water proof and dust proof lamp holders with neoprene gasket. All the hard-wares should be painted with epoxy primer and finished stove enameled grey.

Suitable acrylic or silica glass tubular cover shall be provided for the tube light.

b) Decorative fluorescent light fittings

Decorative type fluorescent tube light fitting complete with stove enameled mountingrail, Electronic ballasts, spring loaded rotor lamp holders, starter holder and starter,

p.f. correction condenser to improve the p.f. to 0.95 and acrylic diffuser. Provision shall be made for mounting the fittings end to end in continuous row and/or for mounting individually using high impact black polystyrene end plate. However, depending on the location instead of acrylic diffuser, metallic/plastic louvers as specified shall be supplied. In area having false ceiling fitting shall be suitable for recess mounting.

c) Fluorescent strip light fitting

Fluorescent strip light fitting shall be with white stove enamelled mounting rail incorporating all electrical accessories such as Electronic ballasts, spring loaded rotor lamp holders, starter, starter holder and p.f. improvement capacitor upto 0.95 etc.

8.5 Bulkhead fittings

The body of the fitting shall be made of cast aluminum alloy with inside white and outside grey finish and having frosted glass cover wire guard made of galvanized wire of suitable dia to ensure protection to glass guard against mechanical injury and painted with stove enameled silver gray finish. The fitting shall be provided with ceramic lamp holder mounted on mild steel bracket suitable to take bayonet cap lamp. The housing shall be made of suitable conduit threaded entry, fixing lugs shall be provided for mounting on wall. Proper sealing of inside against outside influences is to be achieved with the help of a neoprene gasket glued to 'the housing and positioned between ring and housing. All MS hardware parts shall be cadmium plated and passivated to withstand corrosion.

8.7 Fluorescent Tube Lamps, Fittings and Accessories

Shall comply with the following Indian Standards;

IS-1569-1976 Capacitors for use in tubular fluorescent, high pressure mercury andlow pressure sodium vapour discharge lamp circuits.

IS- 2215-1983 Starter for fluorescent lamps.

IS- 2418 (Part 1 to 4)-1977 Tubular fluorescent lamps for general lighting service.IS-3323-1980 Bi-pin lamp holders for tubular fluorescent lamps.

IS-3324-1982 Holders for starters for tubular fluorescent lamps.

8.8. Compact Fluorescent lamp, fitting and Accessories

These fittings shall be of standard make and shall be complete with lamp, lamp holder, fittings with reflector, choke, capacitor or appropriate size and quantity complete with electrical connections.

8.9. Lamp Holders

Lamp holder shall be metal cased type or insulated type as indicated and shall comply with IS 1258-2005 Specification for bayonet lamp holders. Lamp holders shall be suitable for fixing in pendant or to bracket or angular as ordered.

9. MCB DISTRIBUTION BOARDS

9.1 Distribution boards shall be factory made and conforming to IS : 8623 suitable for universal mounting copper bus bar, Neutral bar, Earth bar, Standard DIN bar Rail and cable ties for cable management. Top and bottom shall have removable gland plates with knock outs.

9.2 SPN Distributions boards shall be suitable for provision for DP/SPN MCBs/ isolator as incomer and SP outgoings all as specified and shall be flush mounting type. The degree of protection shall be IP-42 protection with acrylic door.

9.3 TPN Distribution boards shall be suitable for FP/ TPN MCBs/ Isolator as incomer with timer contactor for lighting and ACDB and TPN / SP outgoings all as specified and shall comply with IP-42 protection with metal door.

9.4 MCBs – All MCB s shall be conforming to IS-8828 of 1996 and shall be ISI marked. These shall be suitable for “C” curve and 10KA Breaking capacity and shall be provided with box terminal on top and bottom both suitable for adopting cable size upto 35 Sq mm. The enclosure of MCBs shall be “ Moulded Self Extinguishing thermoset plastic and these shall be suitable for snap fixing on standard Din Rail.

9.5 MCBs Isolators: All MCB type isolators shall conform to IS: 13947-Part3, 1993 andshall be suitable for impulse voltage of 6 KV and short time with stand capacity of 1000 amps for 0.3 seconds.

9.6 Plug and Socket DBs - Plug and socket Distribution Boards including SP/DP MCBs for protection of appliances like window type / Split type Air conditioners and Geysers shall be provided. All these plug and socket DBs shall be of Universal mounting type.

9.7 Lighting of public thorough fares shall be carried out as described in IS 1944 (Part I & II) - 1970 Code of practice for lighting of public thorough fares. Electrical wiring.

installations where system voltage exceeds 650 volts shall be carried out as described in IS 732 (Part I & 3) – 1989. Code of practice for electrical wiring installations (system voltage exceeding 650 volts).

10. EARTHING

All connections to earth and earthing of neutral shall be carried out in accordance with IS 3043-1966,

11. LT SWITCH GEAR PANEL

11.1 LT Switch gear panel shall be Indoor type totally enclosed dust and vermin proof, free standing, fully compartmentalized in design suitable for 415 volts, 3 phase, 50 Hz, 4 wire AC system conforming to IS:375 all as specified herein after. Degree of protection shall not be less than IP-51 as per IS:2147 and it shall be suitable to withstand a Fault level of 50 KA (rms) for one second.

11.2 Bus bars shall be either of copper or aluminium of rated capacity. Cross section of Bus bars for each phase and neutral shall be same. All the Bus bars shall be air insulated and will be codified in Red, Yellow, Blue and Black colours as per the standard practices using heat shrinkable sleeves. Copper bus bars shall be made of high conductivity 99.9% pure copper of ETP grade. Aluminium bus bars shall be made of 63401 WP grade aluminium alloy. All the bus bars shall have full round edges and shall be suitably braced with non – hygroscopic SMC supports of 660 volts grade.

11.3 LT Switch gear shall be made up of requisite vertical section, which when coupled

together shall form continuous dead front switchboard. It shall be constructed only of materials capable of with standing with mechanical, electrical and thermal stresses as well as the effect of humidity, which are likely to be encountered in the normal service of the panel.

11.4 Each vertical section shall consists of

1. A front framed structure of rolled folded steel channel section of minimum 3mm thickness rigidly bolted /welded together. The structure shall comprise of the components contributing to the major weight of the equipments such as air circuit breakers, main bus bars, vertical risers and other front mounted accessories.
2. The structure shall be mounted on rigid Base Frame of MS channel of minimum thickness 5mm and height 75mm. The design shall ensure that the weight of the mounted components is adequately supported without loss or deformation in transit.
3. A rear cable chamber housing the cable and connections and power / control cable terminations shall be provided. The design shall ensure generous availability of space

   for ease of installation & maintenance of cabling & adequate safety in working in any vertical section with out coming in accidental contact with the live parts in the other.
4. The top most doors in each vertical section shall house ventilating louvers where necessary. All louvers shall be covered with perforated sheet having holes of diameter less than 1mm to prevent the entry of vermin.
5. Front and rear door shall be fitted with Neoprene gaskets with fasteners designed to ensure proper compression of the gasket. Where covers are provided in place of doors, generous overlap shall be provided between sheet surfaces with closely spaced fasteners to preclude the entry of dust.

11.5 The height of the panel shall always be less than 2000mm.

11.6 Doors and covers shall be of minimum 2mm thick sheet steel. Sheet shrouds & partitions shall be minimum 1.6mm thickness. All sheet steel work forming the exterior as well as interior of the switchboard shall be smoothly finished, leveled and free from flaws. The corners shall be properly rounded without any Burrs.

The switch gears in the panel shall be such arranged so as to facilitate their maintenance and ease of inspection.

11.7 The switch gears in the panel shall be such arranged so as to facilitate their maintenance and ease of inspection at the same time a adequate degree of safety. Minimum clearance of 25mm and 19mm respectively shall be maintained between phases/phase to neutral/phase to earth and between neutral to earth. When for some reason, these clearances are not available, suitable insulation shall be provided.

All insulating materials used in the construction shall be non-hygroscopic type duly treated to withstand the effects of high humidity, high temperature tropical ambient service conditions.

11.8 Functional units such as circuit breakers, switch fuse unit, MCCBs etc shall be arranged in multitiers.

11.9 All doors bearing instruments shall be earthed with the body of the panel. Provision shall be made for permanently earthing the frames and other parts of the switchgearby two independent connections. Earthing bus bars (2 Nos) shall be of aluminium of minimum size 50x6mm.

11.10 Large clearances & creep age distances shall be provided on the bus bar system to prevent the possibility of fault. High tensile bolts and spring washers shall be provided at all bus bar joints. The cross section of bus bars and risers for various sections shallbe adequate from temperature rise tests point of view also.

All sheet metal work incl. Frames etc shall be with anti corrosive coating and finally epoxy polyester power coating of flint grey shade (RAL-7032) all as specified in relevant ISS.

11.11 The switchgear panel shall be tested for the following and test results for the same front manufacturer shall be submitted to GE-

(a) Electrical and Mechanical operation test.
(b) Insulation test at 2.5 KV for one minute.
(c) Heat run test at rated current.
(d) Megger test by 1000V megger.

12. MOULDED CASE CIRCUIT BREAKERS (MCCBS)

12.1 Moulded case circuit breakers (MCCBs) shall be suitable for operational voltage

of 415V AC, 50 Hz, 3 Phase, 4 wire system for a rated current and ultimate breaking capacity and it shall conform to IS: 13947 (Part 3, 1993) and IEC-60947 (Part-2).

12.2 MCCBs shall be of compact and elegant design suitable for reversible load and line terminations without affecting its performance. MCCBs shall be suitable for fixing flush on the panels and shall be provided with handle operating mechanism including Rotary Handle vari-depth type.

12.3 The insulating case and cover of MCCBs shall be made of high resistant and flame retardant thermosetting insulating materials. The switching mechanism shall be quick make, quick break and trip free. The position of the operation knob/handle shall clearly indicate ON, OFF and TRIP position.

12.4 Each pole shall be provided with a pair of contacts, which shall open at a high speed over a large distance under short circuit faults. The special designed arc chutes of insulating materials shall be provided to contain the arc by providing effective arc quenching device.

12.5 The tripping mechanism shall be hydraulic type or Electronic release or thermal magnetic release for protection for over load and short circuit as per the details given below :-

Capacity Of MCCBs	Ultimate breaking Capacity	Overload Release	Short Circuit Release
Up to 125 Amps	16 KA	Adjustable Thermal release (0.7 to 1.0 In)	Fixed magnetic type suitable for 10.0 In.
160 or 250 Amps	25/36 KA	-do-but range from 0.64 to 1.0	Adjustable magnetic release (3.5 to 10.0 In.)
400 and 630 Amps	36 KA/ 50	Electronic release with over load Zone of adjustment 0.4 to 1.0 In	Electronic release with short circuit Zone of adjustment 1.5 to 10.0 Ir. (Adjusted Current) with time.

Under voltage trip, mechanical interlocks etc shall be provided as per standard practice and ISS. Under voltage trip shall be designed to operate when the control voltage drops below a tripping threshold i.e., 20% to 70% of rated voltage and shall be suitable for operation on 230V/ 415V AC.

The terminals shall be suitable for both copper and aluminium terminations.

III. INTERNAL ELECTRICAL WORK

1. SITTING OF ELECTRICAL EQUIPMENT

The siting of cable and conduit runs, controls, distribution boards fittings and accessories, etc., shall be as laid down in IS 4648-1968. Guide for electrical layout in residential buildings or as directed by the EIC. The location of fittings etc., shall be marked in advance on walls, etc, and approved by the EIC.

2. SYSTEM OF WIRING

CONDUIT WIRING

2.1 Type and size of conduits

All rigid PVC conduits used shall conform to IS:9537. The conduit may be threaded type and shall be used with the corresponding accessories. The conduits shall be designated by their nominal outside diameters.

2.2 Bunching of Cables

Conductors of different circuits / different phases / different voltages shall be bunched in separate conduits. The number of insulated cables that may be drawn into single conduit is given in the following table with maximum space factor of 40%.

Nominal Cross Section area mm²	Number and Diameter in mm of wires	Size of Conduit(mm) outside diameter			
		19/20	25	32	40
		S/B	S/B	S/B	S/B
1.5	1/1.4	7/5	12/10	20/14	---
2.5	1/1.8	6/5	10/8	18/12	---
4.0	1/2.24	4/3	7/6	12/10	---
6	1/2.8	3/2	6/5		---
10	1/3.55	2/0	5/4		---

16	7/1.7	-	2	7
		-	/	/

		-	0		6
25	7/2.24	- -	- -		5/4
35	7/2.5	- -	- -		4/3
50	7/3	- - -	-		2/0

The above table shows maximum capacity of conduits for the simultaneous drawing of cables. Supply to runs of conduit which has distance not exceeding 4.25M between drawn in boxes and which do not deflect from the straight run by an angle more than 15º. The B applies to runs of conduit, which deflect from the straight run by an angle more than 15º.

2.3 Bunching of Cables

Conduits shall be joined by means of screwed couplers and screwed accessories only. Where there are long runs of straight conduit, inspections type couplers shall be provided at intervals. Threads on conduits in all cases shall be 13 mm to 19 mm long, sufficient to accommodate full threaded portion of couplers or accessories. For conduit fittings and accessories reference may be made to IS:2667. Cut ends of conduits shall have neither sharp edges nor any burrs as otherwise these may damage the insulation of conductors while drawing them through such pipes.

2.4 Fixing of Conduits

2.4.1 Conduit pipes shall be fixed by heavy gauge saddles and spacing plates secured to suitable wood plugs or other approved plugs with screws in an approved manner, at a distance of 300mm from the centre of such fittings. The saddle shall comply with the requirements of IS: 3887.

2.4.2 Where conduit pipes are laid along the trusses, steel joists etc. The same shall be secured by means of ordinary clips or girder clips as required. Where it is not permitted to drill holes in the truss members, suitable clamps with bolts and nuts shall be used. The width and thickness of the ordinary clips or girder clips shall not be less than as given in following table:

For concealed conduit, above requirements shall be applicable and in addition, following clauses shall also be complied with.

2.5 Making of chases

Chases in the wall shall be made neatly and shall be of ample dimensions to permit the conduit to be fixed in the desired manner. In the case of building under construction, conduits shall be buried in the wall before plastering and shall be finished neatly after erection of conduit. In case of exposed brick / rubble masonry work, special care shall be taken to fix the conduit and accessories in the position along with the building work.

2.6 Fixing of conduit in chase

Conduit pipe shall be fixed by means of staples or by means of saddles not more than 600mm apart. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves shall be maintained by bending the conduits itself with a higher bending radius, which will permit easy drawing in of conductors. All threaded joints of conduit shall be treated with approved preservative compound to secure protection against rust.

2.7 Fixing of MS/cast iron conduit boxes in wall

Conduit boxes of mild steel or cast iron shall be fixed in the wall with cement and sand mortar 1:2. No screwing of conduit boxes shall be required when fixed in recessed conduit wiring system.

2.8 Inspection Boxes

Inspection boxes shall be provided to permit periodical inspection and to facilitate replacement of wires, when necessary. These shall be mounted flush with the wall. Suitable ventilating holes shall be provided in the inspection cover box.

To facilitate drawing of wires in the conduit, galvanized iron fish wire of 3.25mm diameter shall be provided along with laying of recessed conduit.

2.9 Bends in conduit

All necessary bends in the system including diversion shall be done by bending conduit or by inserting suitable solid or inspection type normal bends, elbows or similar fittings or by fixing cast iron inspection boxes as approved by PM. Conduit fittings shall be avoided, as far as possible, in outdoor installations. Radius of bends in conduit shall not be less than 75mm.

2.10 Outlets

2.10.1 The switch or regulator box shall be made of metal on all sides, except on the front.In the case of cast boxes wall thickness shall not be at least 3mm and in case of welded mild steel boxes, the wall thickness shall not be less than 1.22mm for boxes upto size of 200x300mm; and above the size, 1.63mm thick mild steel boxes shall be used. Except where otherwise mentioned, 3mm thick phenolic laminated sheets shall be fixed on the front with brass screws. Clear depth of the box shall not be less than 60mm and this shall be increased suitably to accommodate mounting of fan regulatorsin flush pattern. The metal box shall be effectively earthed with conduit.

In order to minimize condensation or sweating inside the conduit, all outlets of conduits system shall be properly drained and ventilated but in such a manner as to prevent the entry of insects, etc. as far as possible.

2.10.2 Heat may be used to soften the conduit for bending and forming joints in case of plain conduits. Caution should be exercised in the use of this conduit in locations where the ambient temperature is 40º C or above. Use of such conduits in places where ambient temperature is 45º C or above is prohibited. Conduits to be rendered continuous before pulling the wires.

2.10.3 Conduits to be free from sharp edges and burrs and necessary check nuts & spring washers etc. to be provided for fixing of conduit at each junction box and out boxes.

Wiring shall be carried out in any of the following system as indicated: -

(a) Conduit wiring system recessed type.

All conductors as far as possible shall run near walls and ceiling so as to be easily

2.1.1 accessible and capable of being thoroughly inspected. 'Power' wiring shall be kept separate and distinct from 'Light' wiring. In all types of wiring due consideration shallbe given for neatness, good appearance and safety. Diagonal runs will not be permitted.

2.1.2 The balancing of circuits in three wire or polyphase installations shall be arranged beforehand. Circuits on different phase of a polyphase system shall be kept apart at a

minimum distance of 2m unless they are enclosed in earthed metal casing suitably marked to indicate the risk of dangerous shock due to the voltage between the conductors contained in them. In large or important rooms, light and socket outlet points shall be distributed over more than one circuit on different phases where possible.

Medium pressure wiring shall be carried out as specified in IS-732-1989 Code of practice for electrical wiring installations (system voltage not exceeding 650 volts).

3. Pressure and Frequency of Supply

All current consuming devices shall be suitable for the pressure and frequency of thesupply to which these are to be connected.

3.1 Controls at Point of Entry of Supply

3.1.1 There shall be linked main switchgear with fuse on each live conductor of thesupply mains at the point of entry. The wiring throughout the installation shall be such that there is no break in the neutral wire except in the form of linked switchgear. No fuse should be inserted in the earthed neutral. The neutral shall also be distinctly marked. In this connection Rule 32(2) of the Indian Electricity Rules 1956 shall be referred.

The main switchgear shall be situated as near as practicable to the termination of service line and shall be easily accessible without the use of any external aid.

3.1.2 On the main switchgear where the conductors include an earthed conductor of a two wire system or an earthed neutral conductor of a multi-wire system or a

conductor which is to be connected there to, an indication of a permanent nature shall be provided to identify the earthed neutral conductor. In this connection Rule 32 of Indian Electricity Rules 1956 shall be referred.

Termination of all wiring in to MCBs/ MCCBs/ DBs shall be through copper/lugs/thimbles of adequate capacity.

4. Main Switchgears, Switch Board and their Location

4.1 Main switch boards shall be installed in rooms or cupboards having provision forlocking arrangement.

4.2 Switch boards shall not be erected above gas, stoves or sinks or within 2.5m of any washing unit i.e. the washing rooms to laundries or in the bathrooms, lavatories, toilets or kitchens.

4.3 Switch boards, where indicated, shall have weather proof outlet casing and shall be provided with glands or bushings or adopters to receive screwed conduit according tothe manner in which, cables are run. PVC double flanged bushes shall be fitted in the holes of the switches for entry and exit of wires.

A switch board shall be installed so that its bottom is not within 1.25m above the floor unless the front of the switch board is completely enclosed by a door.

4.4 Switch boards shall be recessed in the wall, if so specified. The front shall be fitted with hinged panel as indicated, with locking arrangement, the outer surface of door being flush with the walls unless otherwise indicated. Ample room shall be provided at the back for connections and at the front between the switchgear mountings and the door.

4.5 Equipments which are on the front of a switch board shall be so arranged that inadvertent personal contact with live parts is unlikely during the manipulation of switchgears, changing of fuses or like operations.

4.6 No holes other than the holes by means of which the switch board panel is fixed shall be drilled closer than 13 mm from any edge of the panel.

4.7 Various live parts, unless they are effectively screened by substantial barriers of non- hygroscopic, non-inflammable, insulating material shall be so spaced that an arc cannot be maintained between such parts and earth.

The arrangement of the switchgears shall be such that they shall be readily accessible and their connections to all instruments and apparatus shall also be traceable.

4.8 In every case in which switches and fuses are fitted on the same pole, these fuses shall be so arranged that the fuses are not alive when their respective switches are in the 'off' position.

No fuses, other than those in instrument circuit, shall be fixed on the back of or behind a switch board panel or frame.

4.9 All the metal switchgears and switch boards shall be painted prior to erection with onecoat of anti-rust primer. After erection they shall be painted with two coats of approvedenamel or aluminium paint as directed on all sides where accessible.

4.10 All switch boards connected to medium voltage and above shall be provided with"Danger Notice Plate".

5. Marking of Apparatus

5.1 When a board is connected to voltage higher than 250 volts all the terminals or leads of the apparatus mounted on it shall be marked in the following colours to indicate the different poles or phases to which the apparatus or its different terminals may have been connected.

AC	DC
Three Phases-Red, Blue and Yellow Neutral-Black	Three Wire System-2 Outer Wires- Red and Blue Neutral-Black

5.2 Where four wire there phase wiring is done the neutral is done the neutral shall preferably be in one colour and the other three wires in other colours. For the purposeof colour coding in conduits wiring particulars of the sample for make and colour of insulation of wires shall be got approved before the wires/cables are procured and drawn into conduit Red/ Yellow/ Blue wires for phases, black wire for neutral and green wire for earth shall be used for wiring in conduit without coding will not be acceptable. Wire/cables shall be 1100 volts grade single core conforming to IS 1596- 1977 or IS 694-1990.

5.3 Where a board has more than switchgear each such switchgear shall be marked to indicate which section of the installation it controls. The main switchgear shall be marked as such switch board shall be marked to indicate which section of the installation and building it controls.

All markings required under this rule shall be clear and permanent.

5.4 All distribution boards shall be marked 'Lighting' or 'Power' as the case may be and also marked with the pressure and number of phases of the supply. Each shall be provided with circuit list giving details of each circuit which it controls, the current rating of the circuit .

6. Main and Branch Distribution Boards and their Location

6.1 Main distribution boards shall be controlled by a circuit breaker.

Branch distribution boards shall be controlled by a circuit breaker. The earthed neutral conductor shall be connected to a common link and be capable of being disconnected individually for testing purposes.

6.2 The distribution fuse boards shall be located as near as possible to the centre of the load they are intended to control.

The distribution boards shall be fixed on suitable wall.

6.3 These shall be or metal clad type but if exposed to weather or damp situations they shall be of the weather proof type and if installed where exposed to explosive dust vapour or gas they shall be flameproof type.

6.4 Where two or more distribution fuse boards are connected at different phases these distribution boards shall be:

(a) Fixed not less than 2 meter apart or

(b) Arranged so that two cannot be opened at a time, such as they are interlocked and metal case is marked 'Danger 415 volts'

7. Wiring of Distribution Boards

7.1 In wiring a branch distribution board the total load of the consuming devices shall be divided as far as possible evenly between the number of ways of the board, leaving the spare circuit for future extension.

7.2 All connections between pieces of apparatus or between apparatus and terminals on a board shall be neatly arranged in a definite sequence following the arrangement of the apparatus mounted thereon and avoiding unnecessary crossing.

All bare conductors shall be rigidly fixed in such a manner that a clearance of at least 25 mm is maintained between conductors of opposite polarity or phase and between the conductors and any material other than insulating material.

7.3 In a hinged board the incoming and outgoing cables shall be neatly bunched and shallbe fixed in such a way that the door shall be capable of swinging through an angle of not less than 90 degrees.

7.4 Where indicated a pilot lamp shall be fixed and connected through an independent single pole switch and fuse to the bus bars of the board.

8. Joints and Looping Back

8.1 Unless otherwise indicated, looping back system of wiring shall be done without anyjunction or connector boxes on the line. Where joint box system is indicated all joints in conductors shall be made by means of approved mechanical connectors in suitable and approved joint boxes.

8.2 In any system of wiring, no bare or twist joints shall be made at intermediate points in the through run of cables; unless the length of a final sub-circuit, sub-main or main is more than the length of the standard coil as given by the manufacturer of the cable. If any jointing become unavoidable such joint shall be made through proper cut-outs, or through proper junction boxes open to easy inspection but in looping back system no such junction boxes shall be allowed.

9. Connection to Ancillary Buildings

Electrical connections to ancillary building like out houses, garages etc., adjacent to main buildings at a distance not grater than 3 metre and when no roadway intervenes shall be taken in an earthed galvanised steel pipe of suitable sixe in the exposed portion at a height of not less than 2.5 metre or by underground cables as indicated. This applied to both runs of mains or sub-mains or final sub-circuit wirings between the buildings. When the distance between the buildings exceeds 3 metre or a roadway intervenes, normally separate mains or sub-mains shall be run from the main building to ancillary buildings and the portion of the same exposed to weather shall be carriedin weather-proof cable

on galvanised steel bearer wire at height not less than 4 meter above the ground as directed.

10. Passing through Walls and Floors

10.1 Where conductors pass through walls and floors, the following methods shall beemployed. Care shall be taken to see that wires pass freely through protective pipe or

box and that the wires pass through in a straight line without any twist or cross in wires on either ends of such holes:

(a) The conductor shall be carried either in a rigid steel conduit or a rigid non-metallic conduit or in a porcelain tube of such a size which permits easy drawing in. The endsof conduit or tube shall be neatly and securely bushed.

(b) Insulated conductors while passing through floors shall be protected from mechanical injury by means of rigid steel conduit to a height not less than 1.5 meter above the floors and flush with the ceiling below.
This steel conduit shall be earthed and securely bushed.

10.2 Where a wall tube passes outside a building so as to exposed to weather the outer end shall be bell-mounted and turned downwards and properly bushed on the open end or shall be sealed to prevent entry or water.

11. Fittings

11.1 Where conductors are required to be drawn through tube or channel leading to the fittings, the tube or channel must be free from sharp angles or projecting edge and of such size as will enable them to be wired with the conductors used for the final circuit without removing the braiding or tapping. As far as possible all tubes or channel should be of sufficient size to permit of looping back.

11.2 Enclosed type fittings shall be provided with a removable glass receptacle and of suchsize or construction as to prevent undue heating of the lamp, or if the position of fittings be such that the glass receptacle is liable to mechanical damage, the glass shall be protected by a suitable wire guard.

The leads of pre-wired fixture shall be terminated on ceiling rose or connector.

12. Outdoor Fittings

External and road lamps shall have weather proof fittings or as indicated so as to effectively prevent the admission of moisture. An insulating distance piece of moisture proof material shall be inserted between the lamp holder nipple and the fitting. Flexiblecord conductors and cord grip lamp holders shall not be used where exposed to weather.

13. Bulk Head Fittings

Bulk head fittings shall be of cast iron or cast aluminium body as indicated suitably painted white inside and grey outside or any other colour complete with heat resistant

glass cover, B.C. holder and wire guard suitable for 100 watts incandescent lamp.Where specified, gasket for glass cover and B.C. holder of shock proof material shall be provided.

IV. ACCESSORIES

1. Lamp Holders

Lamp holders for use on brackets and the like shall have not less than 13 mm nippleand all those for use with flexible pendant shall be provided with cord grips. All lamp holders shall be provided with shade carriers. Where centre contact. Edison Screw lamp holders are used; the outer or screw contact shall be connected to the middle wire or the neural or to the earthed conductor of the circuit.

2. Lamps

All CFL lamps, unless otherwise required, shall be hung at height 2.5 metre above thefloor level. They shall be provided with caps of the following patterns:

(a) Up to and including 300 watts (i) Standard Bayonet (B)
(ii) Edison Screw (ES)
Goliath Screw (GS)

(b) Above 300 watts

3. Ceiling Rose

A ceiling rose shall not be used on a circuit, if the voltage exceeds 250 Volts. Normally,only one flexible cord shall be attached to ceiling rose.

4. Socket Outlets

4.1 Every socket outlet shall be controlled by a switch. The switch controlling the socket outlet shall be on the 'Live' side of the line.

4.2 5A and 15A Socket outlets or multi-socket outlets shall be controlled by a

switch, which preferably be located immediately adjacent thereto or combined therewith. The switch controlling the socket outlet shall be on the live side of the line. Socket outlets shall normally be fixed at any convenient place above 230 mm from the floor level. However if desired by EIC the 5A socket outlet shall be placed at the normal switch

level. 15A socket outlet in the kitchen shall be fixed at convenient place 230 mm aboveworking place form.

5. Attachment of Fitting and Accessories

5.1 In case of conduit wiring, all accessories like switches, socket outlets, call bell pushes and regulators shall be fixed in flush pattern inside metal boxes. Accessories like ceiling roses, brackets, battens, stiff pendants, etc. Shall be fixed on metal outlet boxes.

5.2 Aluminium alloy or cadmium plated iron screws shall be used to fix the accessories to their boxes or as indicated.

6. Fan Regulators and Clamps

6.1 All ceiling fans shall be wired to ceiling roses or to special connector boxes and suspended from hook or shackles with insulators between hooks and suspension roads. There shall be no joint in the suspension rod.

6.2 For wooden joists and beams, the suspension shall consist of MS flat of sixe not less than 40x6 mm secured on the sides of the joists or beams by means of two coach screws of size not less than 50 mm for each flat. Where there is space above the beam,a through bolt of sixe not less than 15 mm dia shall be placed above the beam from which the flats are suspended. In the latter case the flats shall be secured from movements by means of another bolt and nut at the bottom of the beam, A hook consisting of MS rod of sixe not less than 15 mm dia, shall be inserted between the MSflat through oval holes on their sides. Alternatively the flats may be bent inwards to hold tightly between them by means of a bolt and nut, a hook of ‘S’ form.

6.3 In the case of I beam, flats shall be shaped suitably to catch the flanges and shall be held together by means of a long bolt and nut. As regards RCC roofs, a 10 cm dia CIbox with a bent hook shall be provided.

Canopies on to top of suspension rod shall effectively hide the suspension.

The lead in wire shall be of nominal cross sectional area not less than 1.5 sq mm with aluminium conductor and shall be protected from abrasion.

Unless otherwise indicated, all ceiling fans shall be hung 2.75 meter, above the floor.

6.4 Exhaust fans shall be erected at the places indicated by the Engineer-in-Charge. For fixing an exhaust fan a circular hole shall be provided in the wall to suit the size of the

frame which shall be fixed by means of rag bolts embedded in the wall. The hole shallbe neatly plastered to the original finish of the wall. The exhaust fan shall be connected to exhaust fan point which shall be wired as near to the hole as possible by means of a flexible cord, care being taken that the blades rotate in the proper direction.

7. Bends on Wiring

The wiring shall not in any circumstances be bent so as to form an abrupt right angle but must be rounded of corners to a radius not less than six times the overall diameter of the cable.

8. Protection of wiring from Mechanical Damage

In cases there are chances of any damage to the wiring, such wiring shall be covered with a sheet metal covering (not less than 1.63 mm) the base of which being flush with the plaster or brick-work as the case may the wiring shall be drawn through a conduit pipe by complying with all the requirements of conduit wiring as directed. Such protective covering shall in all cases be fitted on all down drops within 1.5 meter fromthe floor level upto the switch board which ever is less.

9. Passing through Floors

All cables taken through floors shall be enclosed in an insulated heavy gauge PVC conduit extending 1.5 meter above the floor or upto the switch board whichever is less and flush with the ceiling below or by means of any other approved type of metallic covering. The ends of all conduits or pipes shall be neatly bushed with porcelain, wood or other a materials. The conduit pipes, wherever accessible shall be securely earthed.

10. Passing through Walls

The conductor shall be carried in PVC conduit or porcelain tube of such a size that it permits easy drawing in. Of conduit shall be neatly bushed with porcelain, wood or other approved material in such a case there shall be conduit for every twin core cable or two runs of single core cable and the conduits shall be neatly arranged so cables enter them straight without bending.

11. Stripping of Outer Covering

11.1 While cutting and stripping of the outer covering of the cable care shall be taken that the sharp edge of the instrument does not touch the inner insulation of the conductors. The protective outer covering of the cables striped off near connecting terminals as far as practicable. Care shall be taken to avoid hammering on link clips

with any metal instrument after the cables are laid. Where junction boxes are provided, they shall be made moisture-proof with a plastic compound.

11.2 Identification of cables/wires and painting of surface wiring if so required to match the surrounding finish walls/ceilings etc.

(a) Where colour coding is not followed and only one single colour cables/wires used in wiring the cables/wires shall be in identified by taping coloured PVC tapes in the terminal boards/switch board the cables/wires terminal ends for easy identification for the wires/cables. Red/yellow/blue colour for phases and black for neutral shall be used.

(b) If so required the wiring after installation shall be painted with enamelled paint and neatly finished match the surrounding finish on the walls etc. As directed.

V. SURFACE METALLIC AND NON-METALLIC CONDUIT WIRING SYSTEM

1. Bunching of Cables

Cables carrying direct current may, if desired, be bunched whatever their polarity, but cables carrying alternating current, if installed in metal conduit shall always be bunched so that the outgoing and return cables drawn into the same conduit.

2. Conduit and Conduit Fittings

The number of cables allowed in the steel and non-metallic PVC rigid conduits shall beas given in the following tables :-

3. Conduit Joints

Conduit pipes shall be joined by means of screwed couplers and screwed accessories only. Where there are long runs of straight conduit, inspection type couplers shall be provided at suitable intervals or running threads with couplers and jam nuts shall be provide. In the latter case the bare threaded portion shall be treated with anti-corrosive preservative. Threads on conduit pipes, in all cases, shall be between 13 mm to 19 mm long, sufficient to accommodate pipes to full threaded portion of couplers or accessories. Cut ends of conduit pipes shall have neither sharp edges nor any burrs as otherwise these may damage the insulation of conductors while drawing them through such pipes.

4. Protection against Dampness

The layout of conduits should be such that any condensation or sweating inside conduit is drained out. Suitable precaution shall be taken to prevent entry of insects inside the conduit.

5. Fixing of Conduit

5.1 Conduit pipes shall be fixed by heavy gauge saddles and spacing plates secured to suitable wood plugs or other approved plugs with screws in an approved manner, at an interval of not more than one metre. In case of the couplers or bends or similar fittings saddles shall be fixed at a distance of 300 mm from the centre of such fittings. The saddle shall comply with the requirements of IS : 3887-1976.

5.2 Where conduit pipes are to be laid along the trusses, steel joists etc. The same shallbe secured by means of ordinary clips or girder clips as required. Where it is not permitted to drill holes in the truss members, suitable clamps with bolts and nuts shall be used. The width and the thickness of the ordinary clips or girder clips shall not be less than as given in the following table:-

Sl. No.	**Size of Conduit**	**Width of ordinary clip**	**Thickness ofordinary clip**
	mm	mm	mm
1	20	20	0.90
2	25	20	0.90
3	32 and above	25	1.25

6. Bends on Conduit

All necessary bends in the system including diversion shall be done by bending conduit pipes or by inserting suitable solid or inspection type normal bends, elbows or similar fillings or by fixing cast iron inspection boxes as approved by EIC. Conduit fittings shall be avoided as far as possible on conduit system exposed to weather and

where considered necessary solid type fittings shall be used. Radius of bends inconduit pipes shall not be less than 75 mm.

7. Outlets

The switch or regulator box shall be made of metal on all sides, except on the front. In the case of cast boxes wall thickness shall be at least 3 mm and in case of welded mild steel sheet boxes, the wall thickness shall be not less than 1.22 mm for boxes up to a size of 200x300 mm; and above this size 1.63 mm thick mild steel boxes shall be used.

Only a portion of the outlet box shall be sunk in the wall: the outer portion being projected out for suitable entry of conduit pipes into the box.

The outlet box shall be mounted flush with wall. The metal box shall be efficiently earthed with conduit.

8. Erection and earthing of Conduit

The conduit of each circuit or section shall be fixed before conductors are drawn in. The entire system of conduit after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth conforming to the requirements specified for earthing. Gas or water pipe shall not be used as earth medium. If conduit pipes are liable to mechanical damage, they shall be adequately protected. In a conduit system, conduit pipe shall be continuous when passing through walls or floors.

9. Recessed Conduit Wiring System

9.1 General

Recessed conduit wiring system shall comply with all the requirements of surface conduit wiring system except with regard to fixing of conduits and in addition the requirements specified in the following clauses shall also be compiled with.

10. Making of Chases

Chases in the wall shall be neatly made and of ample dimensions to permit the conduit to be fixed in the desired manner. In the case of buildings under construction, conduits shall be buried in the wall before plastering and shall be finished neatly after erection of conduit. In case of exposed brick/ rubble masonry work special care shall be taken to fix the conduit and accessories in position along with the building work.

11. Fixing of Conduit In Chase

Conduit pipe shall be fixed by means of staples or by means of saddles not more than 600 mm apart. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves shall be maintained by bending the conduit pipe itself with a long radius which will permit easy drawing in of conductors. All threaded joints of conduit pipes shall be treated with approved preservative compound to secure protection against rust.

12. Fixing of MS/Cast Iron Conduit Boxes In Walls

Conduits boxes of mild steel or cast iron shall be fixed in the walls with cement and sand mortar 1:2 No screwing of conduit boxes shall be required when fixed in recessed conduit wiring system.

13. Inspection Boxes

Inspection boxes shall be provided to permit periodical inspection and to facilitate replacement of wires, if necessary. These shall be mounted flush with the wall. Suitable ventilating holes shall be provided in the inspection box covers.To facilitate drawing of wires in the conduit, galvanised iron fish wire of 3.25 mm diameter shall be provided along with laying of recessed conduit.

VI. BUS BAR CHAMBERS

Bus bar chamber shall be fabricated with mild steel angle frame work and covered all- round with steel sheet of thickness not less than 1.5 mm in a box form. It shall be provided with detachable covers on all sides fitted with dust excluding gasket secured with sufficient numbers of cadmium plated iron screws to ensure that the covers are dust tight. Bus-bar chambers for bus-bar of more than 900 mm length shall have horizontal and vertical stiffeners welded to the main frame. Alternatively the bus-bar chamber shall be made of steel sheet of thickness not less than 3 mm in a box form with detachable covers on all sides and dust excluding gasket. The joints shall be continuous welded. The detachable covers shall be secured to the box with sufficient number of cadmium plated iron screws to ensure dust tightness. This type of bus-bar chamber shall be restricted for bus-bar upto 900 mm length. Bus-bar chambers of size up to 900 mm can be extended from the ends having detachable end covers. The bus- bar chamber shall be painted with a coat of primer of red oxide paint and finished withtwo coats of synthetic enamel paint, as indicated.

1. Bus-Bar

Bus-bar shall be made of wrought copper or aluminium alloy conforming to relevant Indian standards and shall be of sufficient cross section so that current density of 130 A/cm2 is not exceeded at nominal current rating. For bus-bar of capacities up to 200A the cross section of neutral bus-bar shall be the same as that of the phase bus-barand for higher capacities the neutral bus-bar shall be not less than half the crosssection of that of phase bus-bar. When bus-bars are used as vertical risers in a multi- storeyed buildings a fireproof barrier inside the bus-bar chamber shall be provided at each floor crossing.

2. Bus-Bar Supports and Attachments

2.1 Supports

Bus-Bar shall be firmly fixed on supports constructed from a suitable insulated material such as phenolic laminated sheet as approved by the EIC or as indicated. Alternatively bus-bars shall be supported on insulators of suitable lengths conforming to relevant Indian Standards. The supports shall be sufficiently robust to effectively withstand electro-mechanical stresses produced in the event of short circuit.

2.2 Connections to Bus-Bars

Connections to bus-bars of ratings more than 200A shall preferably be made with clamping arrangement with bolts and nuts; and for bus-bars of smaller rating use of holes drilled into the bus-bars may be made.

Bolts and nuts used for connections to bus-bars shall be of aluminium alloy, tinned forged brass or galvanised iron. Suitable precaution shall be taken against heating due to bimetallic contact. Further for tapping off connections from bus-bars. Elastomer Insulated or PVC insulated wire may be used for current capacities upto 100A and for higher current capacities solid conductors/strips suitably connected with PVC sleeve/tape shall be used.

3. Clearances

The minimum clearances to be maintained for open and enclosed indoor air insulated bus-bars, electrically non-exposed and working at system voltages upto 600 volts shall be as follows:

	Phase connection	Minimum Clearance
(a)	Phase to Earth	26mm
(b)	Phase to Phase	32mm

4. Marking of Bus Bar and Main Connections

For marking bus-bars and main connections the following colours or letters (orsymbols) or both as given in IS: 375-1963 shall be used:-

Bus-Bar and Main Connections	Colour	Letter (or Symbol)
(1)	(2)	(3)
For AC Phase Connection:		
Three-Phase	Red, Yellow & Blue	RYB
Two-Phase	Red & Blue	RY
Single-Phase	Red	R
Neutral Connection	Black	N
Connection to earth	Green	E
Phases Variable (such as in GYConnections to reversible motors)	Grey	Grey or

1. Phase Sequence and Polarity

(a) Bus Bars and main connections, when marked shall be marked as under:-

System	Phase Sequence

	As indicated by colours byor letters	As Indicated vectorially
(1)	(2)	(3)
Three-Phase	Red, Yellow & Blue	RYB
Two-Phase	Red & Blue	RY

TECHNICAL SPECIFICATION FOR TELEPHONE DISTRIBUTION & LAN SYSTEM

1.0 SCOPE

The scope of work shall cover supply, installation, testing and commissioning oftelephone cables, telephone tag blocks, telephone & LAN wiring in conduits, etc.

The telephone exchange equipments and the hand sets shall be supplied by the client.

2.0 CONDUITS

Conduits shall be heavy gauge rigid PVC/MS conduits as specified

The conduit shall generally be as specified under section "CONDUIT WIRING".

3.0 CABLES AND WIRES

The type of cables and the services shall be as follows:

a) Indoor : Multipair, PVC insulated sheathedArmoured and sheathed cable.

ii) Inside Conduit : Twin core PVC insulated, with twisted cores

All multicore cables and wires shall be of tinned copper conductor of not less than 0.61mm dia. and shall be colour coded twisted pairs with rip cord.

The conductor resistance shall be less than 150 ohms per Km and the insulation resistance between the conductor's not less than 50 megohms and the nominal capacitance of about 0.1 micro farad per kilometer.

Cables laid under ground or locations subject to dampness and flooding shall be filled with polythelene compound and shall have sufficient protection against moisture and water ingress.

All armouring shall be of galvanised steel wires and protected against corrosion by an outer sheath of PVC in the case of indoor cables and polythelene in the case of outdoor cables. Outer sheathing must be fire retarding and anti-termite.

All unarmoured cables and inner sheath of armoured cables shall be provided with rip cord.
All 2 pair / 5 pair cables for final extension to the telephone outlet box shall be unarmoured tinned copper conductors of not less than 0.61 mm dia. and shall be drawn in conduits. All telephone outlets shall consist of 2A 2 pair polythene connector in box with 3mm Perspex with bevelled edges and chromium plated brass hardware.

4.0 TAG BLOCKS

The telephone tag blocks shall be suitable for the multicore telephone cables and shall have two terminal blocks, cross connect type. All incoming and outgoing cables shall be terminated on separate terminal blocks and terminations shall be silver soldered. The cross connecting jumpers shall be insulated wires of same diameter and screw connected.

The tag blocks shall be mounted inside fabricated sheet steel box or teakwood board with removable hinged covers and shall be fully accessible. The enclosure shall be painted with 2 coats of red oxide and stove enamelled.

5.0 INSTALLATION

The installation of conduits shall generally be as specified under section "CONDUITWIRING".

cables laid on cable racks shall be neatly stitched together.

The connection at the tag blocks shall be silver soldered so as to achieve minimumcontact resistance.

The final branch connections with 2 / 5 pair cables in conduits and the maximumnumber of cables in each conduit shall be as follows:

Conduit dia. inch (mm)

Max. No. of cables

3/4"	20 mm	2 Nos.	single pair
1"	25 mm	6 Nos.	Single pair
1.1/4"	32 mm	12 Nos.	single pair
1.1/2"	40 mm	18 Nos.	single pair
1"	25 mm	4 Nos.	Two pair
1"	25 mm	3 Nos.	Five pair

6.0 Cabling for LAN System

LAN system will have concealed conduits for pulling the CAT-UTP-5 cable inside 25 mm dia M.S. pipe. Maximum 5 Nos. of Cat - UTP- 5 cables can be laid in 1 NO.2 5 mmdia M. S. pipe. Contractor to provide junction box including "RJ45"computer data outlet.

PREAMABLE TO SCHEDULE OF QUANTITIES

All items of work mentioned in the Schedule of Quantities shall be read and executed strictly in accordance with the description of the item in the Schedule of Quantities, Data sheet, drawing and standard technical specifications read in conjunction with the appropriate IS and conditions of contract.

The rate for each item of work included in the bill of quantities shall unless otherwise stated includes cost of:

Supply, installation, testing and commissioning of all materials, fixing materials, accessories, hardware, operations, tools, equipment, consumables, minor civil works wherever involved and incidentals required in preparations for in the full and entire execution and completion of the work called for the item and as per specifications and drawings completely.

Wastage on materials and labour.

All taxes (except GST), duties including, transit insurance, packing and forwarding charges, loading, transportation, unloading handling, hoisting to all levels, setting and fixing in position, disposal of debris and all other labour necessary in accordance with contract documents.

Liabilities, obligations and risks arising out of conditions of contract. Liaison service charges.

All requirements of system whether such of them are mentioned in the item or not in the specifications and drawings are to be read and execute to complete the work up to full operating condition.

In the event of conflict between the bill of quantities and other documents,the most stringent shall apply and interpretations of the Consultant shall be final and binding.

The installation price of switchboards, metering panels, DB's or any other items shall include supply and fixing of supporting steel structures /MS channels grouting of the same civil works etc. as required.

No change in unit rate shall be allowed for any change in quantity or for any other reason Whatsoever.

The successful contractors shall submit the Schematic diagrams, fabrication drawings with details of equipment wiring diagrams etc. to consultants for approval prior to supply / commencement of such works. The approval of these drawings will be general and will not absolve to contractor of the responsibility of the correctness of these drawings. At least six copies of the approved drawings supplied to consultant for their distribution to various agencies at site at no cost to employer.

The Tenderers must see the site conditions such as type of soil, locations etc. and take all factors into consideration while quoting the rates as no extra cost will be allowed on any ground arising out or relating to the site conditions.

Any error in description or in quantity or omission of items from the contact shall not vitiate this contract but shall be corrected and deemed tobe a variation required by the consultant / client.

PREAMBLE TO B.O.Q.

1. ABBREVIATIONS

M.S.	-	Mild Steel
O.B.T. Wood	-	Old Burma Teak
Wood. N.B.T.W.	-	New Burma Teakwood.
C.F. Teak Wood	-	Central Province Teak
Wood. RFT	-	Running Foot.
SFT	-	Square
Foot CFT	-	Cubic
Foot T.W. Wood	-	Teak
Q.R.O.	-	Quote Rate
Only C/C	-	Centre to Centre
C.M.	-	Cement Mortar
M.T.	-	Metric Ton
C.P.	-	Chrome Plated.
No.	-	Numbers
G.I.	-	Galvanised Iron.
A.C.	-	Asbestos Cement
C.I.	-	Cast Iron

2. All dimensions are in mm unless otherwise stated.

3. The quoted rate shall be all inclusive and cover the cost of material including wastage, freight, all types of taxes, duties, royalties,

erection, construction, testing of materials, samples brought for approval, tools and tackles, plant and equipment, supervision,
Overheads, profit and any other expenditure incurred for completion of work as per drawings, specifications and to the full satisfaction of Client/ Architect.

4. The rates quoted shall be valid for working at all heights, depths and on all floorlevels.
No extra payment shall be made for scaffolding, staging, ladders etc. for transportation of men and material at higher or lower levels.

5. The item rate specifications are indicative. The Contractor will have to carry out the work in accordance with the drawings, technical specifications and/or other conditions laid down in tender document and tothe full satisfaction of Client / Architect.

6. Quantities mentioned against respective items are approximate and can vary. Payment shall be made on actually executed quantities.

7. No claims shall be entertained in case of increase or decrease in quantities. Client/ Architect reserve the right to increase/ decrease quantities of any item and also to add/delete any item in totality.

8. Client/ Architect reserve right of operating any item for any work on any floor.

9. All wooden frame work/ member sizes mentioned as out of shall be full size with maximum paining tolerance of 3mm both ways.

10. Rates for doors include all brass oxidized heavy-duty hardware, locks, floor-springs, door-closers, special door handles etc. as specified in relative items.

11. Size and type of door closer/ floor-spring shall be suitable for type of door. The contractor shall give guarantee for performance of door closer/ floor-spring from him as well as from manufacturer.

12. Rates for painting and polishing shall include cleaning of glass panels, fans, floor, Air- conditioning Grill etc.

13. After completion of work the site shall be handed over absolutely clean, after ensuring that all laminates, floors, carpet, walls, etc. as spotless clean.

14. Rates of all items shall remain constant irrespective of floor level and no extra shall be paid for handling and stacking of material, removing debris etc. from the site.

15. Contractor shall clean the site and mark the lining out on mixing by mixer machine, compaction by mechanical vibrator, cost of mix design and testing cubes etc.

16. Unless otherwise noted, the method of measurement will be as per

I.S. 1200 (for method of measurements technical specification may be referred).

17. All pipes and fittings shall emerge at tile joints only or otherwise specified.No fittings or pipe shall be taken out by breaking tiles.

18. Client/ Architect reserve the right of operating all "Quote Rate Only" items.

19. Contractor shall quote basic rate of all sanitary ware in white glazed material.

20. Quoted rated for plumbing work shall be all inclusive and cover the cost of threading pipes, cost of caulking material, painting etc. and all other items covered in the detailed technical specifications for work.

21. Wherever contractor proposed to use 'equivalent' makes (i.e. other than specified) he shall obtain Architect prior approval. Any additional cost and time lost due to this will be on Contractor's account and no claims will be entertained.

22. Rates for all plumbing fixtures, pipes etc. should include cost of testing the same under required pressure.

23. The rate for concealed pipes should include cost of making good the wall / floor in which it has been concealed.

24. The back of marble slab should be applied with white cement paste before fixing.

25. The contractor should take approval for make & manufacturer from the Architect before using any material which does not appear in the list of approvedmanufacturers.

MODE OF MEASUREMENTS

1. Partition – Panelling - Sq. ft. area – one side only till the bottom - of the

2. Storage Units - Sq. ft. Area – Front Elevation.

3. Staff desk units - Per number – single unit, Double unit Refer specific item in Bill of Quantities.

4. Facia, Skirting - Skirting Total Running length in Rmt / Rft. measured. Sill board facias skirting along bottom edge , regardlessof the shape on

5. False Ceiling - Sq. ft. area finished length finished width.
No deduction for A.C. Grills, lights, cut-

6. Soffits - Sq. Ft. total finished length x total finished depth of 150mm

7. Side Units - Rear Credenza etc. Sq. Ft. – Same as storage units (Front Elevation)

8. Venetian / Roller Blinds - Total Sq. Ft. area covered

9. Painting - Sq. Ft. Finished area only. As specified in IS Code
Windows – one side – 1.5 times. Grills – both side – 2.5

10. Carpet and other floor - As laid Sq. Mt. area. No wastage to be added.

11. Rounding off measurement. All measurements shall be rounded off to nearestsecond decimal point eg. 21.465 FT will be recorded as 21.47 FT.