

**M/s HLL Infra Tech Services Ltd. (HITES)  
(Subsidiary of HLL Lifecare Ltd., A Government of India  
Enterprise)**

**As Executing Agency of  
Ministry of Health & Family Welfare,  
Government of India, New Delhi**

**INVITES  
e-TENDER**

**FOR**

**Construction of Boundary Wall for Proposed New AIIMS at  
Majra Mustil Bhalkhi, District Rewari In Haryana**

**Under**

**Pradhan Mantri Swasthya Suraksha Yojna, (PMSSY)**

**VOLUME – IV**

**Technical Specifications**

**Tender No. HITES/IDN/AIIMS-Rewari-R/BW/2023**



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**TECHNICAL SPECIFICATIONS**

**CHAPTER A**

**A BRIEF OF REQUIREMENT OF THE WORK:**

**1. General Scope of Work :**

The scope of work comprises of Construction of Boundary wall with Gate, Guard Room with approach Roadwork including finishing works, internal water supply, sanitary installations and internal electrical installation, signage's, etc., all composite. The scope of work also includes preparation of all detailed shop drawings, obtaining approvals at different stages from local authorities, permission/approval for tree cuttings, permission for bore well, completion certificates, and all other required statutory approvals /clearances from relevant Statutory authorities. The salient features of the work are :

- a. Foundations & other works.
- b. Super structure
- c. Internal and External water supply, sewerage,
- d. Infrastructure Development i.e. Roads, etc.
- e. Electrical Installation ( Internal & External)

**2. Appointment of agencies for execution of works:**

The Contractor shall submit credentials of the agencies proposed to be engaged by him/them for execution of specialised works, as applicable, to the HITES. Particular agency shall be approved by HITES and only such agencies shall be allowed to execute the work on behalf of the contractor. The contractor shall get the specialized works including the following works executed through a particular agency, approved by HITES and only such agencies shall be allowed to execute such works on behalf of the contractor.

- a. Water proofing treatment works
- b. Aluminum door and windows, aluminum partition etc.

**3. Specifications :**

The work shall, in general, conform to the Latest CPWD Specifications for Civil, Electrical and all other works with up to date correction slips for all sub heads of work as applicable, and, Technical Specifications included in the tender documents, wherever applicable. Wherever any aspect of design / construction / material standards is not covered under the above mentioned specification, relevant standards shall be referred to in the order of precedence which shall be as follows. In the case of discrepancy between the Schedule of Quantities, the Specifications and /or the Drawings, the following order of preference shall be observed –

- a. Description of Schedule of Quantities
- b. Particular specification and Specific Condition, if any
- c. Drawings
- d. CPWD Specifications
- e. Indian Standard Specifications of BIS/ NBC/ IRC/ BS/ ASTM/ DIN
- f. For items not covered by any of the above, the work shall be done, as per sound engineering practices and as directed by the Engineer-in-charge.

## **CHAPTER B**

### **TECHNICAL SPECIFICATIONS AND CONDITIONS- CIVIL WORKS**

#### **1. GENERAL**

All the Civil and Plumbing works for DSR items are to be carried out as per Latest CPWD specifications. In respect of the items not covered in the Latest CPWD specifications, the specifications as per Bill of Quantities shall be followed and as per guidelines under Para-3, Chapter A of this document.

#### **2. EARTH WORK: As per relevant CPWD specifications.**

- a. Irrespective of the stipulations in the relevant CPWD Specifications or elsewhere in the Contract, the excavated earth shall be disposed of by the contractor at his own cost to the place as directed by Engineer – in-charge and/or permitted by the local authority after obtaining written permission of the Engineer – in-charge and no payment will be made by the HITES for disposal of this excavated earth.
- b. The Contractor shall, at his own expense and without extra charges, make provision for all shoring, pumping, dredging or bailing out water, encountered from any sources such as rains, floods, springs, subsoil water table being high or due to any other cause whatsoever. The foundation trenches shall be kept free from water while all the works below ground level are in progress without any extra payment.
- c. Filling in plinth shall be consolidated with water and compacted with pneumatic rammers, to achieve 90% relative density on testing. One test is to be carried out for 1000 sq.ms. of compacted area.

#### **3. PLAIN CEMENT CONCRETE AND REINFORCED CEMENT CONCRETE WORK:**

##### **A. STONE AGGREGATE:**

- i. Stone aggregate used in the work shall be of hard broken stone to be obtained from approved source (Quarries to be approved by the Engineer in charge) and shall conform to relevant provision in the Latest CPWD Specifications for works.

##### **B. SAND**

- i. Sand to be used for the work shall be of as specified in CPWD Specifications 2009. Sand shall be obtained from the source to be got approved by the Engineer in charge and washed if required, with appropriate equipment to bring down the chemical, inorganic and organic impurities within the permissible limits as per the direction of the Engineer in charge. The same shall consist of hard siliceous materials.

**Note:** Where only one variety of sand is available the sand will be sieved for use in finishing work as directed by the Engineer – in – charge in order to obtain smooth surface and nothing extra will be paid on this account.

- ii. Nothing extra shall be paid for screening or washing the sand as prescribed above.

**C. FLYASH**

Flyash conforming to grade 1 of IS 3812 (Part 1) may be used as part replacement of OPC provided uniform blending with cement is ensured in accordance with clauses 5.2 and 5.2.1 of I.S.456-2000 in the items of BMC and RMC. However this shall not override the provisions of the respective items.

**D. CENTERING SHUTTERING AND SCAFFOLDING:**

- i. All Scaffolding centering for RCC shall be with properly designed system and brought to site well in advance so that the progress of the work is not hampered for non-availability of the same.
- ii. All shuttering for RCC work shall be Mivan shuttering for boundary wall-as approved by the Engineer in charge.

**E. REINFORCEMENT:**

- i. TMT reinforcement steel shall be used shall be as per design and conforming to IS: 1786 pertaining to Fe 500D OR Fe 550D grade of steel.
- ii. TMT steel bars manufactured by main producers, as per list of makes, shall be allowed in the work. Contractor shall produce manufacturer Test Report for each dia and each lot Tests. Nothing extra will be paid for "straightening of bars" received from market in coils or with bends. All incidental charges of any kind whatsoever including cartage, storage, safe custody of materials, cutting and wastage etc. shall be borne by the contractor.
- iii. The actual average sectional weight for dia up to 10 mm shall be arrived at from one meter long samples (minimum 3 from each dia) taken from each lot of steel. The discretion of the Engineer – in – charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will constitute the single lot for this purpose.
- iv. The weight of each lot of a particular diameter of 10mm and below shall be reckoned as the weight as per actual issue multiplied by a factor equal to the standard sectional weight of the particular diameter divided by the average sectional weight of the particular dia in a particular lot worked out as per above para. Adjustment for the steel shall be effected on the basis of the weight as modified above for quantity payable.
- v. Measurement of all diameters of steel be on linear basis and will be converted into weight on the basis of standard sectional weight coefficients given in relevant CPWD specifications mentioned in schedule 'F' of General Conditions of Contract.
- vi. Measurement of reinforcement shall be as per procedure described in the relevant CPWD specifications mentioned in schedule 'F' of

General Conditions of Contract.

**F. Concrete Mix Design**

The mix design shall be for MODERATE exposure and GOOD degree of quality control, unless otherwise specified.

**G. Concrete Batching Plant (Design Mix)**

- i. The Concrete Batching Plant of suitable capacity to be installed, as per requirement at site, within a period of 30 days from award of work. The contractor shall install batching plants (within 50 meters distance from the site of work) supplying Concrete at site. The batching plant proposed to be engaged by the contractor shall fulfill the following requirements.
  1. It shall be fully computerized.
  2. Facility to pump concrete upto the highest point of the building.
  3. It should have facility for providing printed advice showing ingredients of concrete carried by each mixer.
  4. It should have sufficient capacity to meet the requirement as per schedule.

In case of failure of Batching Plant, RMC may be allowed with a written permission of the Engineer in Charge

- ii. Approved admixtures conforming to IS.9103 shall be permitted to be used. The chloride content in the admixture shall satisfy the requirement of BS 5075. The total amount of chloride content in the admixture mixed Concrete shall satisfy the requirement of IS 456-2000.
- iii. The concrete mix design with and without admixture will be carried out by the contractor through the Laboratories / Test house as approved by Engineer-in-charge.
- iv. The various ingredients for mix design \laboratory tests shall be sent to the lab test house through the Engineer and the sample of such ingredients sent shall be preserved at site by the department till completion of work or change in Design Mix whichever is earlier. The sample shall be taken from the approved materials which are proposed to be used in the work.
- v. The batching and mixing plant shall be fully automatic.
- vi. The contractor has to arrange to erect batching plant for the design mix concrete on his own.
- vii. The concrete shall be transported to the site in specially made Transit Mixers & shall have suitable retarders so that it should not set before placing in position. It should have sufficient flow so that at height the concrete shall be placed by pumping only.
- viii. Each Transit Mixer reaching site shall invariably have manufacturer's certificate containing details like truck number Grade of mix, time of leaving the plant, time of reaching a site etc. A

copy of the same shall be handed over to E- in – C or his authorized representative.

- ix. However samples for testing etc. shall be taken as per the mandatory tests prescribed in latest CPWD specifications.
- x. All cubes shall be tested for 7 days and 28 days tests in conformity with the relevant CPWD specifications.
- xi. In respect of projected balconies, projected slabs at roof level and projected verandah, the payment for the RCC work shall be made under the items of RCC slabs. Nothing extra shall be paid for the side shuttering at the edges of these projected balconies and projected verandah. All the exposed edge shall however be finished as per specifications and nothing extra shall be paid for this.
- xii. In the items of RCC walls, railings and roofs etc. nothing extra shall be paid for making designs as per patterns given by Engineer-in-charge or for thickness of sections.
- xiii. The water will be tested with regard to its suitability for use in CC/RCC work and nothing extra will be paid for on this account.
- xiv. To receive anchor bolt / foundation for machines to be installed at later date, pocket of size minimum 110x100x300 mm shall be kept while concreting of RCC/ CC members and shall be filled with CC 1:1:2 with plasticizer and as per the direction of Engineer in charge.

#### **H. Ready Mix Concrete (RMC)**

- i. The contractor shall engage Ready Mix Concrete (RMC) producing plants (Distance of plant from site to be approved by Engineer in Charge) to supply RMC for the work. The RMC plant proposed to be engaged by the contractor shall fulfill the following requirements.
  - a) It shall be fully computerised.
  - b) It should have supplied RMC for Govt. projects of similar magnitude.
  - c) It should have facility for providing printed advice showing ingredients of concrete carried by each mixer.
- ii. The Ready Mix Concrete (RMC) producing plants of the main Cement producers shall be preferred.
- iii. The contractor shall, within 10 days of award of the work submit list of at least three reputed RMC plant companies along with details of such plants Including details of transit mixer, pumps etc. to be deployed indicating name of MoHFW/company, its location, capacity, technical establishment, past experience for approval by Engineer-in-charge.
- iv. The Engineer-in-Charge reserves the right to exercise check over the:-
  - a) Ingredients, water and admixtures purchased, stored and to be used in the concrete including conducting of tests for checking quality of materials recordings of test results and declaring the material fit or unfit for use in production of mix.



- b) Calibration check of the RMC.
- c) Weight and quality check on the ingredient, water and admixture added for batch mixing.
- d) Time of mixing of concrete.
- e) Testing of fresh concrete, recordings of results and declaring the mix fit or unfit for use. This will include continuous control on the workability during production and taking corrective action.

For exercising such control, the Engineer shall periodically depute his authorized representative at the RMC plant. It shall be the responsibility of the contractor to ensure that the necessary equipment manpower & facilities are made available to Engineer and/or his authorized representative at RMC plant

- v. Ingredients, admixtures & water declared unfit for use in production of mix shall not be used. A batch mix found unfit for use shall not be loaded into the truck for transportation.
- vi. All required relevant records of RMC shall be made available to the Engineer or his authorized representative. Engineer shall, as required, specify guidelines & additional procedures for quality control & other parameters in respect of materials, production and transportation of concrete mix which shall be binding on the contractor & the RMC plant.
- vii. It shall be the responsibility of the Contractor to ensure that the RMC producer provides all necessary testing equipment and takes all necessary measures to ensure Quality control of ready -mixed concrete. In general the required measures shall be:-
  - a) CONTROL OF PURCHASED MATERIAL QUALITY  
RMC producer shall ensure that the materials purchased and used in the production of concrete conform to the stipulation of the relevant agreed standards with the material Supplier and the requirement of the product mix design and quality control producer's. This shall be accomplished by visual checks, sampling and testing, certification from materials suppliers and information /data from material supplier. Necessary equipment for the testing of all material shall be provided and maintained in calibration condition at the plant by the RMC producer.
  - b) CONTROL OF MATERIAL STORAGE  
Adequate and effective storage arrangement shall be provided by RMC producer at RMC plant for prevention of contamination, reliable transfer and feed system, drainage of aggregates, prevention of freeing or excessive solar heating of Aggregate etc,
  - c) RECORD OF MIX DESIGN AND MIX DESIGN MODIFICATION  
RMC producer shall ensure that record of mix design and mix design modification is available in his computer at RMC plant for

inspection of Engineer or his representative at any time.

d) COMPUTER PRINT OUTS OF EACH TRUCK LOAD

Each truckload / transit mixer dispatched to site shall carry computer printout of the ingredients of the concrete it is carrying. The printout shall be produced to Engineer or his representative at site before RMC issued in work.

e) TRANSFER AND WEIGHING EQUIPMENT RMC

Producer shall ensure that a documented calibration is in place. Proper calibration records shall be made available indicating date of next calibration due, corrective action taken etc. RMC producer shall ensure additional calibration checks whenever required by the Engineer in writing to contractor. RMC producer shall also maintain a daily production record including details of mixes supplied. Record shall be maintained of what materials were used for that day's production including water and admixtures.

f) MAINTENANCE OF PLANT, TRUCK Mixers AND PUMPS

Plant, Truck Mixers and Pumps should be well maintained so that it does not hamper any operation of production, transportation and placement.

g) PRODUCTION OF CONCRETE

The following precautions shall be taken during the production of RMC at the plant

- i) Weighing (correct reading of batch data and accurate weighing):- For each load, written, printed or graphical records shall be made of the weights of the materials batched, the estimated slump, the total amount of water added to load the delivery tickets number for that load and the time of loading the concrete into the truck.
- ii) Visual observation of concrete during production and delivery or during sampling and testing of fresh concrete assessment of uniformity, cohesion, workability adjustment to water content. The workability of the concrete shall be controlled on a continuous basis during production. The batch mix found unfit shall not be loaded into the truck for transportation. Necessary corrective action shall be taken in the production of mix as required for further batches.
- iii) Use of adequate equipment at the plant to measure surface moisture content of aggregates, particularly fine aggregates or the workability of the concrete, cube tests etc. shall also be ensured.
- iv) Making corresponding adjustment at the plant automatically or manually to batched quantities to allow for observed, measured or reported changes in materials or concrete qualities.
- v) Sampling of concrete, testing monitoring of results.

- vi) Diagnosis and correction of faults identified from observations /complaints.

The RMC plant produced concrete shall be accepted by Engineer at site after receipt of the same after fulfilling all the requirements of mix mentioned in the tender documents.

- viii. The rate for the Item of design mix cement concrete shall be inclusive of all the ingredients including admixtures, if required, labour, machinery T&P etc. (except shuttering which will be measured & paid for separately) required for a design mix concrete of required strength and workability. The rate quoted by the agency shall be net & nothing extra shall be payable on account of change in quantities of concrete, ingredients like cement and aggregates and admixtures etc. as per the approved mix design.
- ix. Ready mix concrete shall be arranged in quantity as required at site of work. The ready mix concrete shall be supplied as per the pre-agreed schedule approved by Engineer.
- x. Frequency of sampling and standards of acceptance shall be as per CPWD specifications.
- i) No addition of water or other ingredients shall be permitted in the RMC at site or during transit.
- ii) The RMC shall be placed by pump of suitable capacity and the contractor shall arrange sufficient length of pipe at site to place the RMC in the minimum required time. The contractor shall co-ordinate with RMC supplier and pumps hirer to have effective concrete placement.
- iii) Pre-paid delivery tickets shall be produced with each truck load of RMC.
- iv) The representative of RMC supplier shall attend the site meeting as and when decided by the Engineer
- xi. i) The contractor shall assess the quantity of RMC requirement at site well in advance and order accordingly to the RMC supplier. In case excess RMC is received at site, the department shall not be under any obligation to get extra quantities utilized and no payment for such RMC shall be made.
- ii) The contractor shall have to employ labour in shifts to ensure continuous casting of raft and other RCC members. No extra payment on this account shall be made.

#### **4. BRICK WORK**

- a. Bricks used in the work shall be obtained from kilns to be got approved from the Engineer in charge and shall be best quality well burnt ground moulded bricks as available in the vicinity. They shall have a

compressive strength of not less than 75 Kgs/sq.cm and an absorption percentage of not more than 15 (Fifteen) % of its dry weight when immersed in water for 24 hours. In all other respects they shall conform to the provision in Latest CPWD Specifications for works.

- b. Both the face of wall of thickness more than 23cm shall be kept in the proper plane. Walls of half brick thickness or less shall be measured separately and paid in sqm.
- c. Bricks wall beyond half brick thickness shall be measured in multiple of half brick (i.e. more than 115mm or equivalent) which shall be deemed to be inclusive of mortar joints. In all other respects they shall conform to the provision in relevant specifications of the work.
- d. For mortar, use of PP Cement shall be preferred.

**5. CEMENT PLASTER:** - The use of PP Cement shall be preferred

**6. STEEL GRILL WORK:**

- a. All steel grills shall be according to the detailed drawings and obtained from approved suppliers. These shall conform to Latest CPWD Specifications for works.
- b. In case of grills an approved quality priming coat of zinc chromate shall be applied over and above a shop coat of primer. Nothing extra shall be payable for providing shop coat primer, but the zinc chromate primer, if additionally required, will be paid for separately.

**7. FLOORING:**

- a. The flooring in the building shall be as per the approved floor finish drawings and laid in such a way that limits in floor levels would not exceed the limits provided in the latest CPWD specifications or manufactures specifications.
- b. Wherever Vitrified Tile flooring is done, it shall be with multy grade/range 1<sup>st</sup> Quality tiles.
- c. Slope in floors shall be provided as per architectural drawings, else the levels at any place when checked over a distance of one meters in any direction should not show variation in floor level more than 3 mm.
- d. Rate for the items of flooring is inclusive of provision of sunken flooring and finishing edges of the same in bath kitchen, toilets, cutting holes for traps/ pipes etc., and nothing extra shall be paid on this account unless otherwise specified.
- e. Protective layer to be provided of any type of flooring and nothing extra shall be paid on this account.

**8. WATER PROOFING TREATMENT:**

All the items for water proofing treatment with cement based water proofing treatment for roof slab and sunken portion in schedule of quantities shall be guaranteed for TEN YEARS the case of cement based treatment by the contractor as per Performa prescribed. The water

proofing treatment work should be got done through specialized agency approved by EIC.

#### **9. SAMPLES OF MATERIALS:**

- f. Sample of all materials/ fittings and fixture to be used in the work such as doors, windows, tiles, sanitary, water supply, drainage fittings and fixtures shall be submitted well in advance by the contractor for approval from the Engineer-in charge of work in writing before placing orders for the entire quantity required for completion of work. Samples approved by the EIC shall be kept in Sample Room under the charge of Engineer-in-Charge and shall retain till completion of work.
- g. Finished items in respect of typical portion of works of repetitive nature such as typical room, toilet, railing, door, window or any other work desired by the engineer-in- charge shall be prepared by the contractor to the satisfaction of Engineer-in – charge and got approved from him in writing before the commencement of these items for the entire work.
- h. The requirements for preparation of samples shall be observed and fulfilled by the contractor well in advance to avoid any detriment to the general progress of work. In other words, this will not be allowed to have any effects on the general progress of work or on any of the terms and conditions of the contract. No claims of any kind whatsoever including the claims of extension of time will be entertained due to the incorporation of this requirement.

#### **10. VARIATION IN CONSUMPTION OF MATERIALS:**

The variation in consumption of material shall be governed as per CPWD specification and clauses of the contract to the extent applicable.

#### **11. MISCELLANEOUS:**

Materials manufacture by reputed firms and approved by Engineer – in charge shall only be used. Only articles classified as “First Quality” by the manufactures shall be used unless otherwise specified. Preference shall be given to those articles which bear ISI certification marks. In case articles bearing ISI certification marks are not available the quality of sample brought by the contractor shall be judged by the standards laid down in the latest CPWD specifications. For items not covered by the latest CPWD specification, relevant ISI standards shall apply.

#### **12. TESTS:**

- i. Materials brought at site of work shall not be used in the work before getting satisfactory test results for Mandatory tests as per relevant provisions in Latest CPWD Specifications for works. Normally, part rate payment shall be allowed in the running account bills only if the materials are tested and test results are found to be satisfactory to by the Engineer-in-charge. These tests shall be got

done from laboratories approved by Engineer-in - charge or the laboratory set up by the contractor at site as per directions of Engineer-in - charge.

- j. The Engineer-in - charge of work shall check the test results and satisfy himself before allowing any payment in the running /final bill.

### **13. Technical Specifications Plumbing & Sanitary Works**

The work shall in general conform to the Latest CPWD Specifications for works as mentioned in Schedule 'F' of the GCC. Work under this Contract shall consist of furnishing all labour, materials, equipment and appliances necessary and required. The Contractor is required to completely furnish all the plumbing and other specialized services as described hereinafter and as specified in the schedule of quantities and / or shown on the plumbing drawings.

## CHAPTER C

### TECHNICAL SPECIFICATIONS FOR ELECTRICAL WORKS

#### **1 GENERAL**

To provide an electrical system for the distribution of electric power from the point of supply (Electrical Room), all as shown in the drawings and described in these specifications. The quantities mentioned in BOQ are tentative. It will be the bidder's responsibility to work out the exact quantities from drawings or from work site, which trade provides said equipment, materials, tools and labour.

#### **2 SCOPE**

The bidder shall supply, install and commission along with requisite spare, maintenance tools and tackles the following equipment and system in the Project. The scope also covers the detailed engineering and calculations of the various equipment/system mentioned hereunder and the same shall be approved by the Consultant/Architect prior to execution of the job.

- Medium voltage switchgear.
- Laying and termination of L.T. cables/wires.
- Complete internal building wiring as per specification.
- Safety to personnel and equipment during both operation and maintenance.
- Reliability of Service.
- Ease of maintenance and convenience of operation.

This specification defines the basic guidelines to develop a suitable electrical system as necessary for the commercial building. All data required in this regard shall be taken into consideration to develop a detailed engineering of the system. Site conditions as applicable are mentioned elsewhere.

Compliance with these specifications and/or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

All work to be performed and supplies shall be affected as a part of contract requires specific approval /review of Owner or his authorised representative. Major activities requiring approval /review shall include but not be limited to the following:

The engineering activities shall comprise the submission for approval of the following:

- Basic engineering documents e.g. overall single line diagram, area classification drawing, overall cable/wire layout, testing, guaranteed particulars of all equipment and maintenance manuals.
- Quality assurance procedures.
- Field testing and commissioning procedures.
- Basic engineering calculations viz. load analysis; load flow, fault level calculations, and voltage drop calculations etc.
- Load sharing and annunciation scheme,
- Area-wise illumination level calculation and preparation of power supply distribution drawing.

**Bidder shall be responsible for:**

- Detailed co-ordination with other services, shop drawings for various electrical layouts such as lighting layouts, cabling layouts, installation and cable termination details etc. prior to start of work.
- Preparation of bill of materials for cabling, lighting, and miscellaneous items etc.
- Cable schedule.
- Lighting/power DB schedule.
- Interconnection drawing.
- Preparation of as built drawings for all services.
- Any other work/activity which is not listed above however is necessary for completeness of electrical system.

**3 CODES & STANDARDS**

The design engineering manufacturing and the installation shall be in accordance with established codes, sound engineering practices, and specifications and shall conform to the statutory regulations applicable in the country.

- Indian Electricity Act.
- Indian Electricity Rules.

|             |   |
|-------------|---|
| IS-732:     | Code of practice for electrical wiring installation system voltage not exceeding 650V.          |
| IS-7689:    | Guide for control of undesirable static electricity.  |
| IS-3716:    | Insulation co-ordination application guide.   |
| IS-8130:    | Conductors for insulated electrical cables and flexible cords.                                  |
| IS-5831:    | PVC insulation and sheath of electric cables..  |
| IS-3961:    | Current rating of cables/wires  |
| IS-694:     | PVC insulated (heavy duty) electric cables for working. Voltage up to and including 1100 volts. |
| IS-1554:    | PVC insulated cables up to 1100 volts.  |
| IS-6121:    | Cable glands.   |
| IEC-754(1): | FRLS PVC insulated cable.   |

Any other standard may be followed provided it is equivalent or more stringent than the standards specified above.

In case of any deviation /conflict of this specification with the codes & standards, the following order of precedence shall govern.

- a) Specification, particular specification if any, and drawings.
- b) Indian regulations/codes and standards.



## 4 DESIGN CRITERIA

### L.T. Power Distribution Systems

|   |  |  |
|---|--|--|
| a | Voltage                                | 415 V / 240 V  |
| b | Frequency                              | 50 Hz  |
| c | Neutral Earthing                       | Grounded   |
| d | Short Circuit Fault withstand Capacity | 10 KA - 50 KA (1 Sec.) as per B.O.Q. and specification |

## 5 CABLE DETAILS

- Internal Wiring:- Copper conductor FRLS PVC insulated 1.1 KV grade as per in BOQ

## 6 L.T. PANELS & SWITCHGEARS

**The contractor shall consider the following details in their scope of works no additional cost shall be paid, wherever required:**

- All MCB's /MCCB shall be of minimum KA breaking capacity as per CPWD General Specification Part-IV Substation
- Distribution panels shall be Powder Coated with Siemens gray paint shade no. RAL-7032 of IS-5 or as pwer direction of EIC.
- Degree of protection for following type of distribution panel enclosure shall be as per IS: 13947-1993.
- All MCCB's shall be provided with operating mechanism for door interlock.
- All MCB's used for protection of resistive and lightly inductive load shall be type "B" characteristic and inductive (motor) load shall be of type "C" characteristic and discharge lamps and UPS etc. shall be of type D characteristic.
- All incoming and outgoing air circuit breakers shall be placed on middle portion of the vertical in single tier formation.

## DRAWINGS AND INFORMATION

The Vendor shall furnish following drawings/documents in accordance with enclosed requirements:

- General Arrangement drawing of the Switchboard, showing front view, plan, foundation plan, floor cutouts/trenches for external cables and elevations, transport sections and weights.
- Sectional drawings of the circuit breaker panels, showing general constructional features, mounting details of various devices, bus bars, current transformers, cable boxes, terminal boxes for control cables etc.
- Schematic and control wiring diagram for circuit breaker and protection including indicating devices, metering instruments, alarms, space heaters etc.
- Terminal plans showing terminal numbers, ferrules markings, device terminal numbers, function etc.

The information furnished shall include the following:

- Technical literature giving complete information of the equipment.

- ii) Erection, Operation and Maintenance Manual complete with all relevant information, drawings and literature for auxiliary equipment and accessories, characteristics curves for relays etc.
- iii) A comprehensive spare parts catalogue.

## DEVIATIONS

Deviation from specification must be stated in writing at the quotation stage.

In absence of such a statement, it will be assumed that the requirements of the specifications are met without exception.

## 7 L.T. CABLES & WIRE

### a) Wires

The design manufacture, testing and supply of single core **LEAD FREE FRLS PVC** insulated 1.1 KV grade multi-stranded twisted wires under this specification shall comply with latest edition of following standards.

IS : 3961 Current rating for cables.

IS : 5831 PVC insulation and sheath of electric cables.

IS : 694 PVC insulated cables for working voltage upto and including 1100 volts.

IEC: 754(i) FRLS PVC insulated cable.

Copper multi-stranded twisted conductor FRLS PVC insulated wires shall be used in conduit as per item of work.

The wires shall be colour coded R Y B, for phases, Black for neutral and Green for earth.

Progressive automatic in line indelible, legible and sequential marking of the length of cable in metres at every one metre shall be provided on the outer sheath of wire.

The material & insulation of wires shall be **ROHS compliant** (Reduction Of Hazardous Substance) and shall comply the following directives:

- EU Directive 2002/95/EC Issued Jan 2003
- EU Directive 94/62/EC and 2004/12/EC (amendment)
- EU Directive 91/338/EEC
- EU Directive 91/157/EEC & 98/101/EC (amendment)

### Summary on related directives

| Directive Ref. | Date    | Objective   | Remarks   |
|----------------|---------|---|---|
| 2002/95/EC     | 27Jan03 | Restriction of the use of certain hazardous substances in electrical and electronic equipment ( <b>EEE</b> ) and to contribute to the protection of | 6 banned materials included Pb (Lead), Hg (mercury), Cr6+ (Hexavalent Chromium), Cd (Cadmium) and Flame Retardants- Polybrominated Biphenyls - PBB 1000ppm & Polybrominated Diphenyls Esters- PBDE 1000ppm. |

|                                       |                   |   |   |
|---------------------------------------|-------------------|---|---|
|                                       |                   | human health and the environmentally sound recovery and disposal of waste EEE.  | <ul style="list-style-type: none"> <li>• <i>Max. conc. value - 0.1% by weight in homogeneous material for Pb, Hg, Cr6+, PBB/ PBDE</i></li> <li>• <i>Max. conc. value - 0.01% weight in homogenous material for Cd.</i></li> </ul>   |
| 94/62/EC<br>2004/12/EC<br>(amendment) | 20Dec94<br>2Nov04 | Amending directive 94/62/EC, on <b>Packaging</b> and Packaging Waste is to prevent packaging waste by encouraging packaging re-use and recycling while at the same time avoid distortions in the internal market. | The targets defined are the following: <ul style="list-style-type: none"> <li>• <i>Recovery of minimum 60% by weight of the packaging waste</i></li> <li>• <i>Recycling of at least 55% and a maximum 80% by weight of the totally of packaging materials, with a material-specific minimum recycling rate for plastic of 22.5%</i></li> <li>• <i>Max. sum of concentration levels of Pb, Cd, Hg and Cr6+ &gt; 100 ppm by weight</i></li> </ul> |
| 91/338/EEC                            | 18Jun91           | Restriction on the use of Cadmium pigment (amending for the 10th time Directive 76/769/EEC)   | The cadmium content (expressed as Cd metal) exceeds 0,01 % by mass is prohibited in the finished products or components of products manufactured from polymers or copolymers of vinyl chloride and stabilized by substances.  |

## 8 INTERNAL ELECTRICAL WORKS

### A. PVC Conduit

All conduits shall be high impact rigid 2mm thickness PVC heavy duty type and shall comply with I.E.E. regulations for non-metallic conduit 2mm thick as per IS-9537/1983 (Part-III). All sections of conduit and relevant boxes shall be properly cleaned and glued by using epoxy resin glue and the proper connecting pieces. Inspection type conduit fittings such as inspection boxes, drawn boxes, fan boxes and outlet boxes shall be M.S. or otherwise mentioned. Conduit shall be terminated with adopter/PVC glands as required.

### B. Accessories

Conduit accessories such as normal bends, unions, circular junction boxes and pull boxes, locknuts etc. shall be heavy gauge type and approved make. Conduit accessories shall conform in all respects to IS: 3837-1966 with latest amendment. Wherever several conduits are running together, adequately sized adoptable boxes common to all runs shall be used to avoid inserting inspection boxes in the individual run. Where it is necessary to segregate wiring metal filler shall be fixed with in the box.

Conduits shall be laid before casting in the upper portion of a slab or otherwise, as may be instructed or in accordance with approved drawings, so as to conceal the entire run of conduits and ceiling outlet boxes. Vertical drops shall be buried in

columns or walls. Wherever necessary, chases will be cut by the contractor with the help of chase cutting m/c or by hand. Nothing extra shall be paid to the contractor on this account. 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. Sufficient depth of the chases will be made to accommodate the required number of conduits. The chase will be filled with cement, coarse sand mortar (1:3) and properly cured by watering for one week.

If a chase is cut in an already finished surface the contractor shall fill the chase and finish it to match the existing finish. Contractor must not cut any iron bars to fix conduits. Conduits shall be kept at a minimum distance of 100mm from the pipes of other non-electrical services. Where the conduit is to be embedded in a concrete member it shall be adequately tied to the reinforcement to prevent displacement during casting, conduits in chases shall be held by steel hooks of approved design at maximum of 100 cm centres. The embedding of conduits in walls shall be so arranged as to allow at least 12mm plaster cover the same. All threaded joints of conduit pipes shall be treated with some approved 'preservative compound' to secure protection against rust.

Suitable expansion joints fittings of approved make and design shall be provided at all the points where the conduit crosses the expansion joint in the building. (Preferably with Pilca metallic watertight conduits). Conduits shall cross at right angles of the joints only.

Separate conduit shall be used for:

- 1) Normal / Emergency light
- 2) 16 A power outlets
- 3) Computer Outlets
- 4) Telephone system
- 5) TV Network
- 6) Or any other services not mentioned here.

Wiring for short extensions to outlets in hung ceiling or to vibrating equipments, motors etc. shall be installed in flexible conduits. Flexible conduits shall be formed from a continuous length of spirally wound interlocked wire steel with a fused zinc coating on both sides. The conduit shall be provided with approved type adaptor. A separate and accessible earth connection shall bond across the flexible conduit.

Conduit runs on surfaces shall be supported with metal 1.2 mm thick saddles, which in turn are properly secured on to GI spacer to the wall or ceiling. Fixing screws shall be with round or cheese head and of rust proof materials. Exposed conduits shall be neatly run parallel or at right angles to the walls of the building and shall be painted in color matching the adjoining area. Unseemly conduit bends and offsets shall be avoided by using better appearance. Cross cover of conduits shall be minimum and entire conduit installation shall be clean and with good appearance. For surface work, the boxes shall be raised back pattern type, designed for use with distance saddles to give clearance of 6mm between the back of conduit and the fixing surface.

Where conduits are run on steel work, they will be fixed by means of purpose made GI Caddy clips in manner meeting with the approval of the Engineer prior to the

installation being carried out. Other methods of fixing may be agreed in special circumstances, but approval must first be obtained from the site engineer.

The spacing of saddles shall be not more than 600mm centers for up to 32mm diameter conduits and at 750mm for conduit sizes of 40mm diameter and above in case of MS conduit and not more than 600 mm for PVC conduit. In addition, saddles shall be fixed at each side of any bend/Tee, or set at a distance of 200mm from the bend/Tee. The holes in the brickwork or concrete for fixing plugs shall be neatly drilled by means of a masonry drill of the appropriate size.

All the GI sheet steel /passivated boxes used for housing switches, plugs, fan regulator etc. shall be five sided conforming to IS: 5133 Part I-1969. Suitable size of boxes shall be provided a minimum of 2 adjustable fixing lugs on vertical sides. Suitable earth terminal inside each box shall be provided. All fixing lugs shall be threaded to receive standard machined chromium plated brass screws. Sufficient number of knockouts shall be provided for conduit entry. Conduits carrying wires of different circuit can terminate in common J.B having metal compartments. Necessary GI pull wires shall be inserted into the conduit for drawings wires. In case conduit pipe is required to cross any RCC beam special adopter boxes shall be provided for crossing & nothing shall be paid extra.

Where conduits are used for non-air-conditioned space to air-conditioned space or into a fan chamber or duct, a junction box shall be installed to break the continuity of such conduit at the point of entry or just outside and conduit shall be sealed around the conductors.

Particular care shall be taken during the progress of the work to prevent the ingress of dirt and rubbish such as plaster droppings into erected conduits. Conduit which has become so clogged shall be entirely freed from these accumulations or will be replaced. Screwed plastic or metal caps or turned wooden plugs shall be employed to protect all open ends. Plugs of waste wood, paper, cotton or other fibrous matter shall not be used. All unused conduit entries shall be blanked off in an approved manner and where conduits terminate in adaptable boxes, all removable box covers shall be firmly secured to provide complete enclosure. If considered necessary by the Engineer-in-charge, the conduits shall be swabbed out by drawing swabs of rag through the conduit to remove moisture prior to any cables being drawn in.

All conduit installations must be completed and erected in their totality before they are wired and must be fully rewirable from outlets to distribution boards or trunking systems etc. to which they connect. No wiring of any part of the installation shall be commenced until instructions are received to do so by the Engineer-in-charge at such time as he is satisfied that the wiring will not be damaged due to building operations.

Conduits shall be installed so that they are self-draining in the event of ingress of moisture due to condensation or any other reason. A suitable drainage hole shall be drilled at the bottom of the lowest conduit box in every 9-meter of horizontal run.

PVC bush of good quality shall be used in each conduit termination in a switch box, draw box, lighting fixtures and circular junction boxes.

Exposed conduits running above false ceilings shall be suitably clamped independently along with the dropped ceiling. Perforated straphangers or twisted attachment shall not be acceptable. In no case shall raceways be supported or fastened to other pipe for repair and maintenance. They shall be arranged

symmetrically and in the cost compact design, in no way unduly criss-crossing each other. Proper spacing shall be maintained when two or more conduits run side by side. The layout of the pipes shall be co-ordinated with other services if any. The junction boxes and conduits used in hazardous areas shall be flameproof type with cast iron construction complete with threaded covers. The conduit of each circuit or section shall be completed 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 by means of special approved type of earthing clamp efficiently fastened to conduit pipe in a workman like manner for a perfect continuity between the earth and conduit.

The conduit system shall be so laid out that it will obviate the use of tees, elbows and sharp bends. No length of conduit shall have more than the equivalent of two-quarter bends from inlet to outlet. The conduit itself being given required smooth bend with radius of bends suiting to the site conditions but not less than 6 times overall diameter.

Outlet boxes shall be of heavy-duty sheet steel installed as to maintain continuity throughout. These shall be so protected at the time of laying that no mortar finds its way inside during concrete filling or plastering. For fluorescent fittings, the outlet boxes heavy duty shall be provided 300mm off centre for a 1200mm fitting and 150mm off centre for a 600mm fittings or as per B.O.Q.

Draw boxes of ample dimensions shall be provided at convenient points to facilitate pulling of long runs of cables. They shall be completely concealed with MS covers flush with plasterwork painted to match the wall. These boxes will be as few as possible and located where found suitable by the consultant.

### C. Switch Boxes

The switch boxes shall be zinc passivated & shall not be less than **18 SWG** thick or shall be as called for in BOQ. It will be so designed that accessories could be mounted on integral pedestals or on adjustable flat iron mounting straps with tapped holes by brass machine screw. Leaving ample space at the back and on the sides for accommodating wires and check nuts at conduit entries. These shall be attached to conduits by means of check nuts on either side of their walls. These shall be completely concealed leaving edges flush with wall surfaces. Earthing terminal inside box shall be provided.

Moulded plate switches screw less as specified in item of work shall be provided. No timber shall be used for any supports. Boxes, which come within concrete, shall be installed at the time of casting. Care shall be taken to fix the box rigidly so that its position is not shifted while concreting.

### D. Wiring

All the wiring installation shall be as per IS: 732 with latest amendment. PVC insulated copper conductor cables as specified in bills of quantity shall be used for sub-circuit runs from the distribution boards to the points and shall be pulled into conduits. They shall be twisted copper conductors with thermoplastic insulations of 660/1100 volts grade. Colour Code for wiring shall be followed.

Looping system of wiring shall be used, wires shall not be jointed. Where joints are unavoidable, they shall be made through approved mechanical connectors with prior permission of the consultant. No reduction of strands is permitted at terminations.

No wire smaller than 1.5 sq.mm shall be used and shall be as per B.O.Q. Wherever wiring is run through trunkings or raceways, the wires emerging from individual distributions shall be bunched together with cable straps at required regular intervals. Identification ferrules indicating the circuit and DB number shall be used for submains sub-circuit wiring. The ferrules shall be provided at both end of each submain and sub-circuit.

Where single-phase circuits are supplied from a three phase and a neutral distribution board, no conduit shall contain the wiring fed from more than one phase. In any one room in the premises where all or part of the electrical load consists of lights, fans and/or other single phase current consuming devices, all shall be connected to the same phase of the supply. Circuits fed from distinct sources of supply or from different distribution boards or through switches or MCBs shall not be bunched in one conduit. In large areas and other situations where the load is divided between two or three phase, no two single-phase switches connected to different phase shall be mounted within one box.

All splicing shall be done by means of terminal blocks or connectors and no twisting connection between conductors shall be allowed.

Industrial sockets shall be of moulded plastic BoQ and deeply recessed contact tubes. Visible scraping type earth terminal shall be provided. Socket shall have self-adjustable spring loaded protective cap. Socket shall have MCB/ELCB/RCCB as specified in the schedule of work.

Maximum number of PVC insulated 650/1100 V grade/copper conductor cable conforming to IS: 694-1990.

| Conduit size | 20mm |   | 25mm |    | 32mm |    | 40mm |   | 50mm |   |
|--------------|------|---|------|----|------|----|------|---|------|---|
|              | S    | B | S    | B  | S    | B  | S    | B | S    | B |
| 1.50         | 7    | 5 | 12   | 10 | 20   | 14 | -    | - | -    | - |
| 2.50         | 6    | 5 | 10   | 8  | 18   | 12 | -    | - | -    | - |
| 4            | 4    | 3 | 7    | 6  | 12   | 10 | -    | - | -    | - |
| 6            | 3    | 2 | 6    | 5  | 10   | 8  | -    | - | -    | - |
| 10           | 2    | - | 4    | 3  | 6    | 5  | 8    | 6 | -    | - |
| 16           | -    | - | 2    | -  | 4    | 3  | 7    | 6 | -    | - |
| 25           | -    | - | -    | -  | 3    | 2  | 5    | 4 | 8    | 6 |

**Notes:**

- 1) The above table shows the maximum capacity of conduits for a simultaneous drawing in of cables.

- 2) The columns heads 'S' apply to runs of conduits which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees. The columns heads 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees.
- 3) Conduit sizes are the nominal external diametres.

## **9 DISTRIBUTION BOARDS & MCBs**

### **A. General**

Distribution boards shall be of standard make with MCBs as per approved make given. Distribution boards shall be constructed out of steel sheet all weld enclosure with double door IP42 protection and shall be powder coated. Ample clearance between the conductors of opposite pole, between conductors and sheet steel body shall be maintained in order to obviate any chance of short circuit. Removable conduits entry or knockouts plates shall be provided at top and bottom to facilitate drilling holes at site to suit individual requirements. Also on additional/separate adopter box of suitable length and size shall be provided to accommodate wires and cables. No. of conduits etc. and nothing shall be payable on this account. The MCBs shall be mounted on high-grade rigid insulating support and connected by electrolytic copper bus bars. Each incoming MCB isolator shall be provided with solderless cable sockets for crimping. Phase separation barriers made out of arc resistant materials shall be provided between the phases. Bus bars shall be colour coded for phase identification.

Distribution boards shall be recessed in wall nitch or if required mounted on the surface of the wall with necessary clamp bolts etc. The mounting height shall not exceed 1200mm from finished floor level. Distribution board shall be provided with proper circuit identification nameplate and danger sticker/plate as per requirements.

All the distribution boards shall be provided with engraved nameplates with 'lighting', 'power' or 'UPS' with DB Nos., as the case may be. Each DB shall be provided with a circuit list giving details of each circuit. All the outgoing circuit wiring shall be provided with identification ferrules giving the circuit number & phase.

Each distribution board shall have a separate neutral connection bar and a separate earth connection bar mounted within the DB each having the same number of terminals as the total number of outgoing individual circuits from the distribution board. Conduit & cable armouring shall be bonded together & connected to the distribution board earth bar.

Where oversized cables are specified due to voltage drop problems, it shall be contractors responsibility to ensure that satisfactory terminal arrangements are provided without an extra cost.

### **B. Earth Leakage Circuit Breaker**

ELCB shall be 4 pole 415 volts 50Hz, 30-300mA sensitivity. These shall be of approved make. The rating of the ELCB shall be as specified in BOQ. These shall be suitable for manual closing and opening and automatic tripping under earth fault



circuit of 30-300mA as specified in item of work. The enclosure of the ELCB shall be moulded from high quality insulating material. The material shall be fire retardant, anti-tracking, non-hygroscopic, impact resistant and shall with stand high temperature. All parts of switching mechanism shall be non-greasing, self-lubricating material so as to provide consistent and trouble free operation. Operation of ELCB shall be independent of mounting position and shall be trip free type. The RCCB shall be protected against nuisance tripping by protective device.

### C. Miniature Circuit Breaker

1. The MCB shall be current limiting type and suitable for manual closing and opening and automatic tripping under overcurrent and short circuit. The MCB shall also be trip free type.
2. Single pole/three pole versions shall be furnished as required.
3. The MCB shall be rated for 10 KA/15 KA fault level.
4. The MCB shall be suitable for its housing in the distribution boards and shall be suitable for connection at the outgoing side by tinned cable lugs and for bus-bars connection on the incoming side.
5. The terminal of the MCBs and the open and close conditions shall be clearly and indelibly marked.
6. The MCB shall generally conform to IS: 8828. -1996
7. The MCB shall have 20,000 electrical operation upto 63A.
8. The MCB shall have minimum powerloss (Watts) as per I.S./ IEC.

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| LIST OF MAKES -CIVIL & PLUMBING WORKS |   |   |
|---------------------------------------|---|---|
| CIVIL & PLUMBING WORKS:               |   |   |
| S.No                                  | Details of equipment/ material                      | Approved Make   |
| <b>A. CIVIL WORKS</b>                 |   |   |
| 1.                                    | Acoustical Panelling                                | ECOTONE/Armstrong/ Anutone<br><b>Dexune, Hunter douglas,</b>  |
| 2.                                    | Adhesive for Ceramic tiles/ Stone/<br>Stone Sealers | Cico / Pidilite / Ardex Endura / MYK Laticrete/<br>Fosroc/ Berger/ Sika<br><b>Bal endura , kerakoll , goldstar, mtk, united saint</b> |

|     |  |  |
|-----|--|--|
|     |  | <b>gobain, Webar, weber/ mapei/ / ferrous crete</b>  |
| 3.  | Adhesive for Wood Work   | Fevicol/ Vamicol/ Dunlop/ 3M/ Sika<br><b>JIVANJOR, THERMOSHIELD, Speedex, Araldite, kerakol, Astral,</b>   |
| 4.  | Adhesive Tape  | 3M/Norton/ BOPD/ TESA  |
| 5.  | Aluminium Accessories and Hardware                             | Classic/ Crown /EBCO /Hardwyn/ Doorking<br><b>DNV GLOVEL, DORMO, GEZE, DORSET. Dorma (Crown)/ Kinlong/ Hafele/ Cotswold/ Geze/ Alu-Alpha/ Secure Style/ Lavaal Roto/ McCoy</b> |
| 6.  | Aluminium Composite Panels                                     | Aludecor / Alucobond /Alstone/ Reynobond/ Alpolic/ Virgo/ Alstrong/ Viva/ Eurobond<br><b>Durabuild/ /Hunter Douglas/ Alutuff</b>   |
| 7.  | Aluminium Die-Cast handles &two point locking kit              | Giesse / Securistyle / Alu – alpha<br><b>DNV GLOVEL, DORMO, GEZE, DORSET. Dorma (Crown)/ Kinlong/ Hafele/ Cotswold/ Geze/ Lavaal Roto/ McCoy</b>                               |
| 8.  | Aluminium Extrusion/ Sections                                  | Hindalco / Jindal / Bhoruka/ Nalco / Halco Aluminium Extrusions.<br><b>Schuco/ SAPA Building Systems / European Façade Product (EPF) / Rayners / Indoaluis. / INDALCO</b>      |
| 9.  | Anchor Fastner/Dash Fastner                                    | Hilti / Fischer /Bosch/ Wurth/ Konzept/ Canon<br><b>Axel / Trixel.</b>   |
| 10. | Anti – Termite Treatment                                       | It should be done by permanent members of IPCA as approved by Engineer-in-Charge.  |
| 11. | APP Polymeric Polyethylene Felt                                | BITUMAT/ STP/ Bengal Bitumen   |
| 12. | Back up rod  | Supreme Industry/ SYSTRANS Polymers/ Backer Rod Mfg. Inc.  |
| 13. | Batch Mix Concrete (BMC)                                       | The contractor to install his own computerized batching plant of suitable capacity and arrange for Transit Mixers, pumps etc. as per approval of Engineer – In- Charge.        |
| 14. | Bitumen  | Indian Oil, Hindustan Petroleum, Bharat Petroleum  |
| 15. | Cement   | ACC / Ultra tech / JK Cement / Jaypee / Ambuja / Lafarge / Bangur / Shree/ Vikram/ Dalmia / <b>Prism</b>   |
| 16. | Cement: White  | Birla White / JK / Ultratech/ Lafarge/ Travancore  |
| 17. | Cement bonded particle board                                   | Bison Panel/ Viroc/ Viva/ HIL/ NCL   |
| 18. | Clean Room Wall Panels with/ without return air risers, Doors/ | CLESTRA/ NICOMAC / HEMAIR / GMP / E-PACK   |

|     |  |  |
|-----|--|--|
|     | windows etc.   |  |
| 19. | Concrete Additive  | Pidilite / Fosroc / MC Bauchemie /Sika/ Cico/ CHRYSO/ STP Ltd./ Asian Fairmate/ MYK Arment/ Berger/ MC Bauchemie/ Sunanda Chemicals<br><br><b>BASF, Ferrouscrete, Ardex Endura, Cico,, Mapei, , CICO, CHRYSO, Myk Schomburg, Kerakoll , Supreme Bituchem ,Kunal Conchem pvt. Ltd</b> |
| 20. | Cover /Spacer Block  | Fosroc / Astron/ KK  |
| 21. | Curtain Rod/ Drapery Rod/ Venetian Blinds                          | Vista / Mac Decor/ Deck / Hunter /PHIFER   |
| 22. | Curing Compound  | Pidilite / Fosroc / Sika/ Cico/ STP Ltd./ BASF/ MYK Arment/ Berger/ MC Bauchemie   |
| 23. | Crash Guard/ Corner Guard  | Construction Specialities/ Gradus Inprop India Pvt. Ltd./ PD Projects/ DK Engineering Group<br><br><b>WINDOWTECH, JDV, PRIME TECHNOMED,LSR MEDICAL, TSI, DAKSHA ENTERPRIZEZ</b>  |
| 24. | Coupler (mechanical)   | Dextron/ Sanfield/ Usha Martin/ G-Tech Splicing/ Ascon   |
| 25. | Carpet Flooring & Skirting (Flotex)                                | Forbo/ Polyflor/ Tarket<br><b>TUNTEX, Milliken, Ege, Interface, Bloomsburg, Stantor</b>  |
| 26. | Compressed Chequered tiles   | Somany/ Kajaria/ Nitco/ Orient/ Johnson  |
| 27. | Door closer / Floor spring   | Godrej/ Dorma/ Geze/ Hafele/Assaabloy/ Hormann/KICH/ Hardwyn/Everite<br><b>DORSET, OZONE</b>   |
| 28. | Door Locks & Latches   | Godrej / Harrison / Dorma/Link/ GEZE/ Hafele/ Hettich/ Hormann<br><b>,DORSET, OZONE</b>  |
| 29. | Door Seal  | Anand Reddiplex/ Enviroseal / STP  |
| 30. | Door Shutters- Flush & Factory Hot Pressed Laminated Door Shutters | Duro / Greenply/ Archidply / Century / Merino/ Jayna / Kitply /JAIN DOORS/ AK Plywood.<br><b>KUTTY FLUSHDOOR, (SWASTIK), MODERN WOODTECH INDUSTRIES / ORION, KANCHAN PLY,</b>  |
| 31. | Doors & Windows Fixtures / Fitting.                                | Godrej/Ebco / Hafele/ Geze /Assaabloy / Hardwyn/ Hettich /Dorma/Hormann/ Everite/ Classic/ Crown/ Earl Bihari<br><b>KICH, ,DORSET, OZONE</b>   |
| 32. | Epoxy Flooring   | Fosroc/ Dr. Beck/ Famaflor / STP/Asian Paints/ MYK Arment/ Berger/Ardex /Endura/Cera-Chem<br><b>Sika / BASF / SupremeBituchem/CICO/ Laticrete/ Ferous</b>  |

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|-----|---|---|
| 33. | Epoxy Mortar  | Fosroc/ Sika/ MYK Arment/ Chryso/ BASF/ Pidilite/Dr. Fixit/Asian Paints/Cico/ Berger<br><b>MYK SCHOMBURG,LATICRETE, FERROSCRETE, UNITED</b> |
| 34. | Extruded Polystyrene Board  | Styrofoam by DOW Chemical's / Insuboard by Supreme Industries /STP Ltd.<br><b>Iso board ND ,</b>  |
| 35. | False Ceiling - Calcium Silicate Boards & Tiles   | Armstrong / Hilux / Saint Gobain (Gyproc)/Aerolite/ India Gypsum/ RAMCO(Hilux)<br><b>ULTRALITE, USG BORAL,KNAUF, AMF , ANUTONE.</b>         |
| 36. | False Ceiling - Metal   | Armstrong / Hunter-Douglas / USG-Knauf/ Saint Gobain/ Unimet/ DEXUNE/ Everest<br><b>AURA, DURLUM, ANUTONE,AEROLITE</b>                      |
| 37. | False Ceiling - Mineral fibre   | Armstrong / Decosonic / USG-Knauf/ AMF / Saint Gobain / DEXUNE<br><b>ANUTONE, RAMCO HILUX</b>   |
| 38. | False Ceiling – GRG Ceiling Tiles   | Saint Gobain /Diamond/or equivalent   |
| 39. | False Ceiling/ Dry wall partition system (ceiling/hanging sections)                                   | Gyproc/ USG-Knauf/Armstrong/ Western /DEXUNE/ Hunter-Douglas  |
| 40. | Fire Rated Doors & Frames with accessories  | Shakti-Hormann / Navair / Pacific/Promat/Bhawani Fire Protection/ Sukriti Fire Door/ ASES/ Jain Doors<br><b>KINDLE, GMP</b>                 |
| 41. | Fire Rated Glass  | Asahi India Safety Glass Ltd./ Saint Gobain/ Pilkington, Schott, Pyroguard, Glaverbel<br><b>CONTRAFLAM LITE,</b>                            |
| 42. | Fire Retardant Paint  | Viper (Navair) FRS 881/ Nullifire/ STP / Asian/ Berger<br><b>/ Juton,</b>   |
| 43. | Fire Seal   | Sealz/ Alstroflam/ Abacus   |
| 44. | Fire: Door Closures, Mortise Dead locks, D-Type Pull Handles, Hinges, Panic Exit Devices, Tower Bolts | Becker Fire Solution/ Ingersoll Rand/ Dorma/ Godrej/ Geze/ Hafele/ Shakti-Hormann/D-Line/ Suzu/ Nulite/ Dorset<br><b>MARSHALL,</b>          |
| 45. | Fire: Sealant   | Birla/ 3M/ Hilti<br><b>PROMAT, BOSCH</b>  |
| 46. | Floor Hardener  | Pidilite / SIKa/ Fairmate / BASF/STP Ltd./ Fosroc/ CHRYSO/ MYK Arment/ Asian Paints/ Berger   |
| 47. | Flooring -Synthetic Acrylic (as per ITF Specifications)   | Rebound/ PACE Court/Nova Cushion/ Sports Master   |
| 48. | Glass : Float / Mirror /Structural Glazing /Toughened Glass   | Modiguard / Atul / Saint Gobain/ Asahi India Safety Glass Ltd / Sisecam(HNG)/ Pilkington/ <b>Firelite /</b>                                 |

|     |   |   |
|-----|---|---|
|     |   | <b>Glaverbel</b>  |
| 49. | Glass Wool / Insulation Boards                          | Rockwool / UP Twiga / Lloyd Insulation/ Pidilite/ Berger  |
| 50. | GRC Jali  | Unistone/ Kuber Fibrostone/ Everest Composites/ Birla white<br><b>Mahesh GRC / KFPL</b>   |
| 51. | Grout: Non-Shrink                                       | Fosroc / Sika/ Pidilite / STP/ MYK Arment/ MC Bauchemie<br><b>Mapei, BASF, Asian, Berger</b>  |
| 52. | Grouting Compound                                       | Ardex Endura/ Pidilite/ Laticrete/ Unitile/ STP/ Asian Paints/ MYK Arment/ Berger / MC Bauchemie<br><b>Kerakoll, ferrous crete, Ultratech, united</b> |
| 53. | Gypsum Board / Gypsum False Ceiling/ Gypsum Partitions  | USG Knauf / Lafarge / Saint Gobain (Gyproc)/ Armstrong / India Gypsum<br><b>Saint gobain , usg boral, vans gypsum</b>                                 |
| 54. | Gypsum Plaster  | Ferrous crete / Ultratech/ Saint Gobain / Asian Paints Marvelloplast /USG Knauf<br><b>india gypsum</b>  |
| 55. | Laminates/ Veneers                                      | Century/ Archidply /Greenlam/ Formica/ Sunmica / Merino<br><b>Royaltouch</b>  |
| 56. | Lead Lined Door   | REBBON/ Kuty's/ AHALDA/ Navair/ Shakti-Hormann/ Metaflex  |
| 57. | Modular Grab bars and Disabled Hardware                 | Dorma / D-line/ KICH/ Jaquar/ Hindware/ Kohler  |
| 58. | Modular SS Railing System                               | Metallica India / D – Line International Denmark / Mobel Hardware /KICH/ Konzept  |
| 59. | Modular Kitchen Chimney                                 | Hindware/ Elica/ Glen/ Faber/ Sleek.  |
| 60. | Neutron Shielded Door                                   | Ray-Bar Enggcorp / A-FabcoIn/ A&L shielding INC/ Accurate Radiation Shielding   |
| 61. | OT: Conductive Tile Flooring: ESD-Control Tile Flooring | Tarkett/ Gerflor / Armstrong / Forbo/ Trilux<br><b>LG</b>   |
| 62. | Paints - Cement Based                                   | Snowcem Plus/, Berger / Nerolac / TATA Cem, Asian Paints /STP Ltd./ Dulux/ Jotun  |
| 63. | Paints - Epoxy paint                                    | Akzonobel DULUX/ Nerolac / Cico/ Sika / BASF / Berger / Pidilite/ STP Ltd./ Fosroc/ MC Bauchemie/ Jotun<br><b>ASIAN PAINT,</b>                        |

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| 64. | Paints - Oil Bound Distemper / Acrylic Washable Distemper /Plastic Emulsion Paint | Akzonobel DULUX/ Jenson & Nicholson/ Jotun<br><b>Berger ( Bison Acrylic Distemper), Asian ( Tractor Acrylic Distemper), AkzoNobel (Magik), Nerolac ( Nerolac Acrylic Distemper)</b> |
| 65. | Paints - Plastic Emulsion Paint (exterior)  | Asian Paints (Apex Ultima)/ Berger (Weathercoat all Guard)/ Akzonobel (DULUX weather shield max)/ Jotun<br><b>Nerolac (Excel ), RAINCOAT (Dr. Fixit)</b>                            |
| 66. | Paints - Synthetic Enamel Paints  | Akzonobel DULUX (Gloss), Berger (Luxol Gold), Asian Paints (Apolite), Goodlas Nerolac (Full gloss hard drying), Jenson & Nicholson (Borolock), Jotun                                |
| 67. | Paints - Texture paint  | Berger / Spectrum / Unilite/ Heritage /Asian Paints / Akzonobel DULUX/STP Ltd./ Jotun<br><b>ICI, KANSAI, NEROLAC</b>  |
| 68. | Paint: Anti-Fungal  | Sika by Liquid Plastic/ Viesmann/ SSK/ TRILUX/ STP Ltd./ Berger/ Ardex Endura/ Cera-Chem  |
| 69. | Paint-Wood Finish (Melamine & PU)   | Nippon/Jivanjor/ Asian Paints / Akzonobel/ Berger   |
| 70. | Putty (Wall)  | Ferroscrete/ JK/Birla/ Berger/ Asian Paints<br><b>SARAPUTTY,Nuvoco,</b>   |
| 71. | Paver blocks / Tiles (All Types)/ Grass crete pavers                              | KK / Uni Stone Products (India) Pvt. Ltd/ Hindustan Tiles/ NITCO/ PAVIT/ ULTRA/ DURACRETE<br><b>NTC TILES.</b>  |
| 72. | Plywood/Block board/Ply board   | Duroply / Greenply/ Archidply/ Century/ Kitply/ National / Anchor/ Merino / Jayna<br><b>Modern wudtech industries/orion, Kanchanply</b>   |
| 73. | Polycarbonate Sheets  | Danpanlon India/ Gallina/ Sabic Lexanc/ Ultralite/ Polygal / Coxwell Domes / GE Plastic / Skyarch/ Polytechno/ Tuflite  |
| 74. | Pre-coated Galvanised Steel Sheet/ Pre-coated Puff Sheet roofing                  | Tata BlueScope / Llyod Insulations India Ltd / S.R. Metals/Interarch / Bhushan/ Essar   |
| 75. | Pre-Laminated Particle Board  | Novapan /Century / Greenlam / Merino / Archidply/ Action Tesa/ NCL/ AK Plywood<br><b>ECOBORD,</b>   |
| 76. | PVC continuous fillet for periphery packing of glazings / Structural/ Glazing     | Roop / Anand / Forex Plastic/ Nagalia/ Trading Company  |
| 77. | PVC Doors   | Sintex/ Polyex/ Rajshri   |
| 78. | PVC Flooring  | Tarkett Floors / LG Floors / Gerflor / Premier Vinyl flooring / Regent / Armstrong / Responsive/ Wonderfloor  |

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| 79. | Powder Coating Material pure Polyester                         | Jotun / Berger / Goodlass Nerolac<br><b>Jotun, Akzo nobel (Interpon), Valspar, Asian PPG</b>   |
| 80. | PVC Water Stops  | Prince /Supreme/ Finolex/ Maruti/ Astral   |
| 81. | RF Shielded Door   | ETS Lindgern/ Synchrony Agency/ Huaming EMC India  |
| 82. | Reinforcement Steel / Structural Steel                         | SAIL/ RINL/ TATA Steel Ltd./ Jindal Steel & Power Ltd./ JSW Steel Ltd./ Shyam Steel Industries Limited / Prakash Surya (Structural Steel) / ESL Steel Ltd.   |
| 83. | Structural Steel (Hollow Sections)                             | SAIL/ RINL/ TATA Steel Ltd./ Jindal Steel & Power Ltd./ Apollo Tubes <b>Parkash Steel</b>  |
| 84. | Restroom Cubicles  | Merino/ Century/ Greenlam/ Action Tesa <b>DORMA</b>  |
| 85. | Sealant: Poly-sulphide   | Pidilite / Fosroc / CICO / Sika /Berger/ Dr. Fixit/ Chowksey Chemical/ Wacker/Asian Smartcare/ MYK Arment<br><b>IWL India Limited.</b>   |
| 86. | SFRC / RCC Manhole Covers/ Perfect RCC Grating                 | KK Manholes / SK Precast Concrete/ Advent concrete vision / Daya concrete<br><b>Dalal Tiles, Tokas concreteproduct, Nimco precast</b>  |
| 87. | Silicon sealants /Weather Sealant / Structural Glazing Sealant | GE- Silicon / Pidilite / Forsoc / Cico /Dow Corning / Sika/ Wacker/STP/ Asian Smartcare/ MYK Arment/ Berger / Cera-Chem<br><b>ORDINARY PIDISEAL TUFFESEAL BY M/s HINDUSTAN BROTHERS 225 RUE FRANCUIS MARTIN, FAIRMATE , MASTERFLEX 700I OF BASF. CHRYSO,</b> |
| 88. | Stainless Steel  | Salem Steel/ Jindal / TATA Steel/ SAIL   |
| 89. | Outdoor Sports Flooring  | Great Sports Infra/PORPLASTIC/Sunflex  |
| 90. | Stainless Steel bolts, Screws, Nuts & Washers                  | Kundan / Puja / Atul/ GKW/Alloy<br><b>PRIYA, AXISL, BOUN</b>   |
| 91. | Stainless Steel Clamps   | Hilti /Intellotech / Konzept/ WURTH<br><b>Dorma / Fischer</b>  |
| 92. | Stainless Steel CP Grating                                     | Chilly / Camry/ Neer or equivalent<br><b>Cardin</b>  |
| 93. | Stainless Steel D-handles                                      | D-line / Giesse /Dorma/ Hormann<br><b>Cotswold / Securistyle/ Schuco/ SAPA Building Systems / European Façade Product (EPF) / Rayners</b>  |
| 94. | Stainless Steel Friction Stay                                  | Earl Bihari / Securistyle / EBCO   |

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|------|---|--|
|      |   | <b>Giesse / Cotswold / Schuco/ SAPA Building Systems / European Façade Product (EPF) / Rayners</b>   |
| 95.  | Stainless Steel Hinges/Handles/Door Window Fixtures                   | Hettich/ Godrej/ Dorma/ Hafele/ Gezze/ KICH/ Dorset/ Hormann / Sleek<br><b>Giesse / Cotswold / Securistyle/ Schuco/ SAPA Building Systems / European Façade Product (EPF) / Rayners</b>  |
| 96.  | Sunken Portion Treatment  | Choksey / Sika / CICO/ MC Bauchemie / BASF/ Berger / MYK Arment / Bostik/ Dr. Fixit/ Ardex Endura/ Cera-Chem   |
| 97.  | Super plasticizer   | CICO/ Roffes Construction Chemicals/ Pidilite / Berger/ Asian Paints/ MYK Arment/ MC Bauchemie / Bostik/ Cera-Chem/<br><b>Dr. Fixit, STP LTD,. IWL India Ltd., Shivalik, koster, fosroc, sika, Huntsman.</b>                           |
| 98.  | Tiles: Glass Mosaic Tiles   | MRIDUL/ BIZZARE<br><b>BISAZZA, OPTO, MUSAICA</b>   |
| 99.  | Tiles: Glazed /Ceramic Tiles  | Kajaria / Somany/ RAK/ CERA / Johnson / AGL/ Varmora<br><b>ORIENT (BELL), NITCO,OASIS, RESTILE, QUOTONE</b>  |
| 100. | Tiles: Heat Resistant Terrace Tiles                                   | Thermatek/ Hindustan/ Johnson  |
| 101. | Tiles: Vitrified Tiles (Double / Multi Charged)/ Germ free/Full body) | Kajaria / Somany/ RAK / CERA/ Johnson/ AGL/ Varmora<br><b>ORIENT (BELL), RIWASA TILE, QUOTONE, OASIS</b>   |
| 102. | Vacuum Dewatered Flooring   | Tremix / Sun Build / Avcon technics  |
| 103. | Veneered Particle Board   | Duro / Greenply / Century / Novapan / Action Tesa  |
| 104. | Water Proofing Materials  | BASF/ Fosroc / Sika / CICO / STP / Pidilite/ CHRYSO/ PENETRON/ Asian Paints / KRYTON/ XYPEX/ MYK Arment/ Berger/ MC Bauchemie/ Tikidan/ Ardex Endura/ Cera-Chem/ Sunanda Chemicals/ IWL<br><b>Dr. Fixit, Shivalik,koster,Huntsman.</b> |
| 105. | Water Proofing Compound ( Crystalline )                               | Xypex Construction Chemicals/ Kryton/ Penetron/ Pidilite/MYK Arment/ Burger/Asian Paints/Sunanda Chemicals<br><b>Grace, Fosroc, Sika, Chryso</b>   |
| 106. | Wooden Laminated Flooring   | Euro / Pergo/ Green Deco , Krono, Egger, Harro , Armstrong, Kaindl/ Action Tesa<br><b>TARKET</b>   |
| 107. | Auditorium Chairs   | Godrej /Indo/ Wipro/ Bonton /Durian<br><b>BP Ergo, Haworth, Steelcase, Geeken, Indo Innovation</b>   |



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| 108. | Expansion Joints          | Sanfield (India) Ltd., MIGUA, TRISTAR, Z-TECH<br><b>Hercules,</b>   |
| 109. | Raised/ False Flooring    | UNIFLOOR, UNITILE, CAMFLOR  |
| 110. | uPVC door & window system | Fenesta, NCL Veka, Rehaue, Aluplast / Deceunick / AMD Overseas/ Lingel/ CASSA/ Evolution/ Kommerling/ Duroplast/Aparna Venster<br><b>REHAN, , GREEN FENESTRATIONS,JANGID ENGINEERING WORKS,</b> |
| 111. | High Pressure Laminates   | Greenlam/ Merino/ Virgo<br><b>ARCHID, FUNDERMAX, TRESPA, VERSITO</b>  |

| <b>B. PLUMBING &amp; SANITARY WORKS</b> |  | <b>Approved Make</b>  |
|---|--|---|
| 1.                                      | Automatic variable temperature control / fixed temperature control faucets | Jaquar / AOS-Robo-U-Tec/ Parry / Angash / Euronics  |
| 2.                                      | Central Control  | Rain Bird, USA/Toro/Nelson,   |
| 3.                                      | Ball Cock  | Sant / L&T/Audco/GPA  |
| 4.                                      | Ball valves with floats  | Zoloto / Leader / Sant/ Audco/GPA/ Jayco<br><b>Hawa/ honeywell/ lehry, csa atena, esseti,</b>                   |
| 5.                                      | Butterfly valves   | GM / Uday / Parthiv / Zoloto<br><b>Audco/ advance/ lehry/ honeywell, sant, audco/ zoloto/ kirloskar</b>         |
| 6.                                      | C. I Pipes & Fittings  | Electrosteel/ NECO/ BIC / SKF/ Kapilansh/ RIF/ RPMF<br><b>lanco, kartar valve &amp; fitting, , ca pipe/ hif</b> |
| 7.                                      | Centrifugally Cast Iron Hubless Pipes & Fitting                            | NECO/BIC/SKF/Kapilansh/RPMF<br><b>/hepco, raj iron foundary agra</b>  |

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| 8.  | C.I Sluice Valve & Non Return Valve  | Kirloskar /Leader /Zoloto/ Audco/ Sant<br><b>/ advance/ lehry/ honeywell</b>  |
| 9.  | C.I Valves (Full way, Check and Globe Valves)  | Leader / Kirloskar / SKF / Zoloto / Sant / Castle / Kartar<br><b>hawa/ cim/ lehry/ advance/ audco/ I&amp;t</b>                    |
| 10. | C.I. Manhole Covers  | NECO/B.I.C./R.I.F/HEPCO/ SKF/ KAJECO/ RPMF.   |
| 11. | C.P. Fittings: Mixer / Bib Cock/Stop Cock/ Pillar taps/ Angle valve/ Valves Washers / Waste/ Urinal / Spreaders / Accessories etc. | Jaquar /Kohler/ Grohe/ Marc/ Kerovit/ Somany/ CERA/ ASIAN Parryware / Queo/ Hindware.<br><b>American Standard, /Duravit /Roca</b> |
| 12. | Chlorinator  | Thermax Ltd/ Watcon, Ion exchange/ Sigma DH Combine Inc./ Siemens/ Techcon/ Jesco / Prominent Heidelberg                          |
| 13. | Cockroach Trap   | Chilly/ Player/ Camry/ Viking<br><b>/cardin</b>   |
| 14. | Copper Pipe/Fittings (Capillary)   | Yorkshire Imperial, U.K./ Rajco Metal Works Mumbai / IBP Conex Ltd.   |
| 15. | Disc Filter  | Azud, Spain/ Amaid / Arkal,   |
| 16. | Drainage Pumps   | KSB/ Grundfos/ Kirloskar/ Crompton/ Wilo-Mather & Platt/DP/ITT  |
| 17. | Ductile Iron Fittings (IS:9523) / Ductile Iron Pipes (IS:8329)   | Electrosteel/Kesoram/Tisco/Jindal/HEPCO<br><b>/electrotheram</b>  |
| 18. | E.P.D.M Gaskets  | Anand Reddiplex / Enviro Seals / HANU   |
| 19. | Forged Steel Fittings & Flanges (For Welded joints)  | Rohini /Kanwal/ Vijay Cycle & Steel (VS)  |
| 20. | Geysers  | Spherehot / Racold / Usha /Bajaj/ Havells/AO Smith/ Orient/Crompton<br><b>Racold/venus/jaquar</b>                                 |
| 21. | Hand Drier   | Kopal / Utech Systems / Euronics Automat<br><b>toshi, Jaquar</b>  |
| 22. | HDPE Pipes / Moulded Fittings  | Emco /Polyefins/Pioneer Plyfab/ Jain Irrigation / Texmo/ Supreme/ Oriplast<br><b>finolex</b>                                      |
| 23. | HDPE Solution tank   | Watcon / Ion Exchange / Water Supply Specialist Pvt. Ltd.   |
| 24. | Inbuilt Drip Line  | Azud/ Rainbrid/ Netafim   |

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| 25. | Insulation of Hot water pipes  | Vidoflex insulation / Superion insulation Kaiflex – Kaimann/Armoflex/Thermaflex   |
| 26. | Liquid Level Controllers / Indicators  | Advance Auto / Sridhan International / Minilec / Radar / Femac / Switzer / 21 <sup>st</sup> Century<br><b>Auto pump, cirrus, engineering, technika, Pumptrol, pune techtrol, lehry</b>                                  |
| 27. | Liquid Soap Dispenser  | Euronics/Utec/Kopal/ ASIAN<br><b>/toshi /jaquar</b>   |
| 28. | MS Saddle with G.I. Riser  | Harvel/Alprene/Rain Bird  |
| 29. | PVC flushing cistern   | Commander / Parryware / Hindware/ Cera/ Kajaria Sanitary ware/ Somany/ ASIAN ./ Jaquar  |
| 30. | P.R.S. Dials   | Rain Bird/ Toro/ Nelson,  |
| 31. | P.T.M.T. Fitting   | Prince India / Symet/ Prayag/ Cera/ Polytuf   |
| 32. | Pipe coat material (pipe protection)   | RPG Raychem/ Pypkote/ Makphalt/ Tikidan<br><b>/ lwl</b>   |
| 33. | Pipe Fittings: G.I.  | RR/Unik/Zoloto/K.S./Sun/ Swastik/Jainsons /DRP<br><b>Kirti, cresent, bhart Forge, / avr/ sant/ hbi/ c-brand/ ics/</b>   |
| 34. | Pipe:- G.I.  | Jindal / Tata / Prakash Surya/ SAIL/ Swastik/ APL-Apollo/<br><b>bhushan power steel</b>   |
| 35. | Pipes & fitting: PVC for SWR Soil, Waste & Vent Pipes and fittings, Type B PVC Casing & Screen Pipes | Prince / Supreme / Finolex/ Truflo (Hindware)/ Texmo/ Astral  |
| 36. | Pipes & Fittings: CPVC   | Flowguard /Prince/ Astral/ Ashirvad/ AKG/Supreme / APL Apollo/ Birla HIL /Truflo (Hindware)/Texmo/ Finolex  |
| 37. | Pipes & fittings: UPVC   | Finolex / Prince / Supreme / AKG / Kasta / Vector / Astral/ Ashirvad/ Birla HIL/ Truflo (Hindware)/ Texmo   |
| 38. | Pipes & Gully Trap: Stone ware   | Perfect / S.K.F/ R.K/ Hind / Anand/ Burn  |
| 39. | Pipes and Accessories: PE-AL-PE  | Kitec/ Jindal/ Kissan/Vista   |
| 40. | Pipes: Copper  | Rajco Metal works, Mumbai / IBP Conex Ltd.  |
| 41. | Pipes: M.S.  | Jindal / Prakash – Surya /TATA /SAIL/APL-Apollo<br><b>Tata steel/ jindal hissar/sail/ prakash surya</b>   |
| 42. | Pipes: PP-R (PN – 16)  | Amitex Polymers Pvt. Ltd. / Prince/ Supreme   |
| 43. | Pipes: R.C.C   | Indian Hume Pipe / Pragati Concrete Udyog Daya/ KK / JSP/ MCP<br><b>pranali, southern Concrete, Ramnik/ bfsp/ jagdambey spun pipe/ gurkirpa spun pipes/ lakshmi/ sood &amp; sood / jain &amp; co./ kk/ usha/ diwan/</b> |

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|     |  | <b><i>spun pipe/</i></b>   |
| 44. | Plastic seat cover of W.C                            | Commander/Hindware / Parryware/CERA/ ASIAN   |
| 45. | Polyethylene Storage Tank                            | Sintex / Polycon/ Fusion/ Amitex/ Sheetal<br><b><i>supreme / polyplast</i></b>                           |
| 46. | PVC Floor trap                                       | Jay/ Saffron/ Platinum/ Khodiyar/ Supreme/ Finolex   |
| 47. | Pop up Connecting Assembly                           | Rain Bird/Dura/Lasco,  |
| 48. | Popup Spray Head                                     | Rain Bird/Toro, USA/Nelson,  |
| 49. | RQRC Hydrant   | Harvel/Alprene/Rain Bird, USA  |
| 50. | RQRC Key   | Harvel/ Aqua/ Drip& Drip   |
| 51. | Sensor Operated Auto Flushing System Urinals         | Jaquar / AOS-Robo/U-tec/Angash/Euronics/ ASIAN / Hindware/ Parryware                                     |
| 52. | SS Gratings/ Soap Dish/Towel Rail etc.               | Camry/Glacier/Gem/ Jaquar/ Grohe/ ASIAN/ JAYNA/NEER/NIRALI <b><i>/chilly/cardin</i></b>                  |
| 53. | Stainless Steel Sink                                 | Hindware / Neelkanth / Nirali / Jayna / Cera/ ASIAN .<br><b><i>/bluestar /Hafele</i></b>                 |
| 54. | Safety foot Steps                                    | MCP/ GP/ Surabh  |
| 55. | Valve Box  | Rain Bird, USA/Carson Brook, USA/Dura,   |
| 56. | Valve: Air Release                                   | Azud/ API/ Bermad/ BIR/ Kirloskar / Venus / Zoloto<br><b><i>/ sant/ watts/ studor/Giacomini/ drp</i></b> |
| 57. | Valve: Butterfly                                     | Zoloto/Audco/Sant/KSB/ Kirlosakar/Advance<br><b><i>/ lehry/ Honeywell/ drp</i></b>                       |
| 58. | Valve: Flush   | Gem/ Jaquar / Marc/ ASIAN .  |
| 59. | Valve: Mainline Isolation                            | Sant /Leader /Zoloto,  |
| 60. | Valve: Pressure Relief                               | Sant/Leader/ Zoloto / Audco<br><b><i>/ watts/ utam/ honeywell</i></b>                                    |
| 61. | Valve: Sluice / NRV                                  | Kirloskar/IVC/Kilburn /Zoloto/Castle/ Leader / L&T/ Audco/ Honeywell / RB / SANT/ AIP/ <b><i>drp</i></b> |
| 62. | Valve: Solenoid                                      | Rain Bird, USA/Toro/Nelson,  |
| 63. | Valves: Gunmetal / C.P brass angle                   | Zoloto / Leader / Kilburn / Sant / Kartar/ AIP/ Audco / Kirloskar/ Jaquar/ <b><i>Giacomini/ drp</i></b>  |
| 64. | VFD Pump   | Crompton/ Kirloskar/ KSB/ Grundfos/ Wilo -Mather & Platt / DP/ITT  |
| 65. | Vibration Eliminator Resisto-flex Pads & Connections | Relay Corpn./Kanwal/Dunlop/ Resistoflex/Easyflex<br><b><i>flexionics//industrial Corporation/</i></b>    |
| 66. | Vitreous China Sanitary wares &                      | Hindware / Parryware/ Cera / Kohler/ Kajaria Sanitary  |

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|-----|-----------------------------|---|
|     | White Glazed Fire Clay Sink | Ware/ Somany/ RAK/ ASIAN ./ Jaquar/ Queo<br><b>American Standard / duravit/ grohe/ / roca/ toto/ simpolo/</b>           |
| 67. | Water Cooler                | Blue Star/ Voltas/ Usha/ Godrej/ Aquaguard/ Ion-Exchange/ AO Smith  |
| 68. | Water Meter                 | Capstan / Kranti/ Anand/ Kant/ Aristo/ Dasmesh/ Chambal<br><b>Crescent/ prince/ fedrel/ nbeson/ thermatek/ insutite</b> |
| 69. | Water supply pumps          | KSB/ Grundfos/ Kirloskar/ Crompton/ Wilo-Mather & Platt/DP/ITT<br><b>/ebara</b>   |

**Note:-**

1. The contractor will use one of the approved makes as approved by the Engineer -in-charge.
2. In case of different quality / pattern of same make, the pattern/ quality shall be approved Engineer – in – charge.
3. This list of makes shall be read with the list of makes provided elsewhere in the Tender Documents. In case of variance, decision of the Engineer-in – Charge shall be final.
4. For materials/equipment/ to be used in items of work for which approved makes are not given herein or in the list of makes provided elsewhere in the Tender Documents, the makes of such materials /equipment shall be as decided by Engineer –in-charge.
5. If any major equipment is using a small component of make other than that given as a standard component with the equipment, the same shall be accepted subject to approval of Engineer – in-charge.
6. In case of non-availability of the brand specified in the contract, the contractor shall be allowed to use alternate equivalent brand of the material subject to submission of documentary evidence of non-availability of the specified brand. The necessary cost adjustments on account of above change shall be made for the material.

**List of Makes for E & M Works**

| <b>DRINKING WATER PUMPING SYSTEMS /WATER TREATMENT PLANT / REVERSE OSMOSIS ETC.</b> |  |  |
|---|--|--|
| S.No.   | Details of equipment/<br>material              | Make/Manufacturer  |
|   | Anti-Vibration Mounting & Flexible Connections | Dunlop/Flexionics/Kanwal/Industrial Corporation/ Resistoflex |
|   | Butterfly Valve                                | Zoloto/Audco/Kirloskar/AIP/Advance/ L&T<br>SANT/ DRP         |
|   | Cartridge Filter                               | Milton Roy/ Grundfos/ Big Blue                               |
|   | Centralized RO Plant                           | Ion Exchange/ Thermax/ Pentair/ Eureka Forbes                |
|   | Chain Pulley Block                             | Indef/ Ardee/ J.K. Morris                                    |
|   | Check Valve – Dual Plate                       | Advance/Honeywell/Audco/Zoloto/ L&T/ Castle<br>/SANT/ DRP    |
|   | Check Valve – Wafer Type                       | Advance/Danfoss/Zoloto/Honeywell                             |

|  |   |
|--|---|
| Conductivity Meter   | Fox/Rosemount/ Aster/Digital/ Honeywell/ Thermax/ Krohne                    |
| Couplings  | Lovejoy/Dunlop/Burgmann   |
| Dosing Pumps   | LMI/Pulser Feeder/Toschon/Grundfos/ Kirloskar                               |
| Drain Valve  | Leader / Kirloskar / SKF / Zoloto / Sant / Castle<br>AUDCO/ADVANCE / ANERGY |
| Electronic Flow Meter  | Krohne / Forbes Marshall/ Rockwin/ Cirrus India/<br>Honeywell/ Thermax      |
| Fastener   | Hilti/ Fischer / Wuerth/ Bosch/ 3M<br>/AXEL.                                |
| Filter   | Ion Exchange/ Thermax/ Pentair  |
| Flow Meter   | Anergy/Honeywell/Cirrus India/ Thermax/ Krohne/ Forbes<br>Marshall          |
| GI / MS Pipes  | TATA STEEL/JINDAL HISSAR/SAIL/PRAKASH SURYA                                 |
| GI Pipe fittings   | UNIK/ NEW/ZOLOTO /DRP   |
| GM / Forged Brass Ball<br>Valves   | Zoloto/ Honeywell/Castle/Audco/ L&T   |
| HDPE Tanks   | As per List of Approved Makes Civil & Plumbing /<br>SINTEX/AMITEX/SHEETAL   |
| High Pressure Pumps  | DP/Grundfos/ITT/Wilo-Mather Platt Kirloskar/ KSB<br>/EBARA                  |
| Hydro-pneumatic System   | Grundfoss / Kirloskar/ DP Holland / Wilo/ Xylem/ KSB<br>ITT /EBARA          |
| Level Controller & Indicator<br>(Water)  | L&T/ Auto Pump/Cirrus India/Teknika/<br>Techtrol/ Minilec                   |
| Mechanical Seal  | Eagle Burgmann/ John Crane/ Dunlop/ Leakpack/ Flow<br>Serve/ Sealmatic      |
| Non Return Valve   | Zoloto/ Honeywell/ L&T/ Castle/Sant / Leader/ Audco<br>/KITZ/ANERGY         |
| ORP (Oxidation reduction<br>potential) Meter   | Fox Scientific/ Rosemount-Emerson/ Rapid Control/<br>Maharaja / Valtronics  |
| Paints   | As per List of Approved Makes Civil & Plumbing                              |
| pH Meter   | Fox/ Rosemount/ Aster/ Digital  |
| Pipe Clamp & Supports  | Chilly/Euroclamp/Kanwal/ Grippl   |
| Portable RO Plant  | Bluestar/Usha/Eureka Forbes/ Kent/ Voltas/ AO Smith/<br>Thermax             |
| Pressure Gauge   | Fiebig/ Emerald/ H. Guru/ Baumer  |
| Pressure Switch  | Switzer/ Honeywell/ Indfoss   |
| Pressure Reducing Valve  | Leader/Kirloskar/ SKF/ Zolto/ Sant/Castle                                   |
| Raw Water Pump Set/<br>Treated Water pump set/<br>Drainage Pump Set or any<br>other type of pump sets. | DP/Grundfos/ITT/ Willo-Mather Platt/ KSB/ Kirloskar/<br>Xylem               |
| Resin  | Ion Exchange/Thermax/3M/Pentair   |
| RO Membrane with<br>Housing  | Dow/Hydranautics/Tricep/G.E/Mitsubishi                                      |
| Sluice Valves  | IVC/Kirloskar/ Zoloto/ Castle   |

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|---|--|--|
|   | Sodium Hypochlorite Dosing System                          | Asia LMI/ Grundfos/ Seiko/ E - Dose  |
|   | Softener Vessel  | Ion Exchange/ Thermax/ Pentair   |
|   | SS Pipes & Fittings  | SAIL/ Jindal/ Viega/ Sumitomo/ Apollo  |
|   | SS Strainers & Valves                                      | Audco/ Zoloto /Leader/Walson/ Normex/ Worth / Apollo   |
|   | Storm Water Drainage & Sewage Sump Pumps (Submersible)     | DP/ Xylem-ITT/ Wilo-Mather Platt / Kirloskar/ KSB  |
|   | Water Transfer Pumps                                       | DP/Grundfos/Xylem/ ITT/Willo-Mather Platt/ Kirloskar/ KSB  |
|   | Water Meter (Mechanical Type)                              | As per Plumbing make list  |
|   | Welding Rods   | Adorr/ Esab/ Advani/ Victor  |
|   | Y Strainer   | Emerald/Zoloto /Sant/ Castle/ Leader   |
| <b>HOT WATER GENERATOR SYSTEM</b>       |  | <b>Approved Make</b>   |
|   | Air release valve/ Insulation/ Thermometer/ Pressure Gauge | As per Approved makes for Plumbing/ HVAC Works/ Fire Fighting Works  |
|   | Ball valve /Check valve/ Y – Strainer/ GI/MS pipes         | As per Approved makes for Plumbing/ HVAC Works/ Fire Fighting Works  |
|   | Hot Water Generators                                       | Enmax/ Sunmax/ Goodsun / TATA Power Solar/ Thermax/ Rapid Control  |
|   | Recirculating Pumps  | Grundfos/ DP /Mather Platt – Wilo/KSB/ Kirloskar/ Xylem/ KSB/ ITT  |
| <b>SOLAR PV/ SOLAR HOT WATER SYSTEM</b> |  | <b>Approved Make</b>   |
|   | Solar PV System  | Tata BP Solar / Havells / Schneider/ Socomec/ Emmvee/ Thermax / Jackson Solar/ Adani Solar/ Intersola REIL/BEL/CEL/REC/SOLON/VIKRAM/ABB/MOSER BEAR/WIPRO/SCHNEIDER/GE SOLAR/MICROSON/TRINA JUNCTION BOX-VNT/SUN GARNER/OEM OF SPV MODULES SPV INVERTER-SUNGROW/DELTA/NEOWATT/ SMA/SCHNEIDER MODULE MOUNTING STRUCTURE-AS PER MNRE/MANUFACTURE'S STANDARD SOLAR CABLE XLPO INSULATED (DC)- RR KABEL / POLYCAB / HAVELLS / FINOLEX / LAPP / PARAGON (ELECTRON) |
|   | Solar Hot Water System                                     | Solahart / Sol Power/ Tata Power Solar/ Solimpeks/ Intersolar/ Greentek RACOLD/ ELECTROTHERM /RASHMI / PHOTON / POLYCAB/ JAIN IRRIGATION/ BOSCH/EMVEE SOLAR  |
|   | Butterfly Valve  | Audco/Danfoss/Honeywell/ Zoloto/ Castle/ L&T/ Castle   |
|   | Check Valve – Dual Plate                                   | Advance/Honeywell/Audco/Zoloto/ Castle/ L&T/ Castle  |
|   | Check Valve – Wafer Type                                   | Advance/Danfoss/Zoloto/Honeywell/ Castle/ L&T/ Castle  |
|   | CPVC pipes   | As per List of Approved Makes for Civil & Plumbing   |
|   | GI Pipes   |  |
|   | GM / Forged Brass Ball                                     | Danfoss/Honeywell/Zoloto   |

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|  | Valves   |  |
|  | Heat Exchanger   | GEA Eco flex/ Alfa Laval / Danfoss   |
|  | Hot Water Re-circulation or other Pumps                                  | DP – Holland/Grundfos /Xylem/ ITT/ Wilo – Mather Platt/ Kirloskar/ KSB   |
|  | HDPE Storage Tanks   | As per List of Approved Makes for Civil & Plumbing   |
|  | Insulation for Hot Water Pipes   | Armacell – Armaflex/Eurobatex – Union Foam/ K-Flex/ Thermaflex/ Aeroflex/ Supreme  |
|  | Level Controller & Indicator (Water)                                     | Auto Pump/Cirrus Engineering/Technika /Techtrol/ Minilec   |
|  | Pipe clamp & supports  | Chilly/ Euroclamp/ Kanwal  |
|  | Sluice Valves  | IVC/ Kirloskar/ Advance / zoloto/ Castle/ Audco  |
|  | Solenoid Valve   | Danfoss/ Avcon/ Honey well/ Emerson  |
|  | Water Meter  | As per List of Approved Makes for Civil & Plumbing   |
|  | Y-Strainer   | Leader/ Zoloto/ Audco/ Castle/ Emerald/ Rapid cool/ Advance  |
|  | Heat Pumps (Air to Water)  | Carrier/ Daikin/ Blue Box/ Suntec/ Emerson/ Climaveneta/ Intersolar  |
|  | <b>ELECTRICAL WORKS</b>  | <b>Approved make</b>   |
|  | 11 KV HT Panel/ RMU with 11kV Vacuum Circuit Breaker (VCB) / SF6 Breaker | L&T/ ABB / Schneider/ Siemens/ Eaton or their authorized System Integrator/ Channel Partner<br>ELECTRIC(PIX) /CROMPTON GREAVES/<br>KIRLOSKAR- (OEM ONLY) |
|  | 33 kV HT Panel/RMU with 33 kV Vacuum Circuit Breaker (VCB) / SF6 Breaker | L&T/ ABB / Schneider/ Siemens/ Eaton or their authorized System Integrator/ Channel Partner  |
|  | ACB (TP,4P) with variable microprocessor                                 | L&T (U-Power Omega)/ Siemens (3 WL)/ Schneider (NW) / ABB (Emax2)/ Legrand (DMX3)/ Eaton (IZMX Series)   |
|  | Automatic Transfer Switch (ATS)  | L&T/ ABB/ Siemens/ Schneider / Socomec/ Hager/ Legrand/ HPL  |
|  | Auto Changeover & Current Limiter (ACCL)                                 | Indo Asian/ Havells/ Salzer/ Elmeasure/ L&T/ ABB / Siemens/ Schneider/ Legrand / Hager/ Eaton/ HPL   |
|  | Alarm Annumciators/ Auxiliary relays compatible with PLC etc.            | Siemens/ L&T/ ABB/ Areva/ Schnieder/ Minilec   |
|  | Air Curtain  | Euronics/Almonard/ Mitsubishi/ VTS Wings   |
|  | Batteries  | Hitachi/Panasonic/ Yuasa/ Exide/ Amco/ Amaraja-Amaron/ Tata<br>GLOBAL YUWASA/ STANDARD /PRESTOLITE   |
|  | Battery Charger  | Amaraja/ Volstat/Chloride Power System/ Expo-Fyn/HBL /Sabnife/ Statcon/ Max Power (Mahamai)<br>AS PER MANUFACTURE SPECIFICATIONS                         |
|  | Boom Barrier   | FAAC/ Godrej Vigiguard/ Somfy/Gunnebo<br>KABA/MAGNETIC/SEAA/MAKIM  |
|  | Bus bar  | Jindal/ Hindalco/ Sterlite/ Valco<br>CENTURY   |



|  |   |
|--|---|
| Bus Ducts & Rising Mains (Sandwich Type) Bus Trunking, End Feed Unit, Tap-off box (plug-in type) | L&T/ Schneider/ C&S/ Godrej/ Legrand/ EAE /ABB/LEGRAND /SIEMENS/GE/ ADVANCE / ANANT POWERTECH   |
| Cable Jointing/ Termination Kit  | Raychem/ Xicon/ 3M  |
| Cable Trays & its accessories  | MEM/ BEC/ OBO Bettermann/ Airef/ AKG /Indiana/ Legrand/ RMCON/ Honeywell PILCO/STEALWAYS/ SLOTCO/   |
| Race ways / Floor trunking / wall channels   | Legrand/ Honeywell MK/ Schnieder/ AKG / OBO Bettermann  |
| Call Bell / Door Bell switches & Buzzers   | Havells/ Anchor/ Schneider/ ABB/ Siemens/ Indo Asian/ Panasonic   |
| Call Bell with Video Door Phone  | Honeywell/ Hikvision/ Godrej/ Panasonic/ Crabtree/ CP Plus/ Wipro   |
| Capacitor Banks  | L&T/ Siemens / Schneider/ ABB/ Ducati/ Neptune/ Meher/ EPCOS / VISHAY   |
| Ceiling /Exhaust/ Wall fans  | Crompton/ Usha/Orient/ Bajaj Electrical/ Havells/ Panasonic / KHAITAN / POLYCAB   |
| Coaxial Wires  | Finolex/ Delton/ Skytone/ L&T/ KEI/ Bonton/ Gloster/ Polycab/ Belden/ Legrand/ Havells/ Anchor  |
| Colour Monitor   | Samsung/ LG/ Sony/ Philips/ Panasonic DELL / HP   |
| Current Transformer/ Potential Transformer   | L&T/ Kappa/ AE / Meco/ Gilbert/ Maxwell / PRECISE/ C&S  |
| Cubicle Type Fuse Unit/ RMU  | Siemens/ L&T/ ABB/ Schneider/ Eaton   |
| Distribution Boards (DB)   | Hager/ Havells/ Legrand/ L&T/ABB/ HPL/ Schneider / Siemens/ Eaton/ Anchor/ Polycab/ C&S/ Indoasian /PANASONIC   |
| DG Set - Assembler   | Jakson & Company / Jakson Ltd/ Sterling Generators / Sudhir Gensets/ Powerica/ Kirloskar (KOEL authorized OEM) / TIPL (Gainwell) / Greaves Cotton/ Captiva Energy Solutions Pvt. Ltd. |
| DG Set - Alternator  | Stamford/ Leroy Somer/ Toyo Denki/ AVK-SEG/ Kirloskar (KOEL Green)/ Crompton Greaves /CATERPILLAR   |
| DG Set - Engine  | Cummins/ Mitsubishi/ Perkins/ Volvo/ Caterpillar/ Kirloskar (KOEL Green)/ Baudouin / Greaves Cotton MTU/ WARTSILA/VALVO PENTA   |
| DG Synchronizing Controller  | Woodward/ Dief/ Deep sea  |
| Door Frame Metal Detectors   | Metscan/ Trust Security System/ ID Tech Solutions/ Smith Detection/ Rapiscan  |
| DWC (Double Walled   | Duraline / Rex / Carlon/ Emtelle/ Astral/ Gemini/ Supreme/  |

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|  | Corrugated) Pipe  | Polypack/ Finolex / AKG / CPE  |
|  | Earthing System   | LPI/ Indelec/ APS/OBO Bettermann/ JMV  |
|  | Electrical Motors   | ABB/ Siemens/ Kirloskar/ Bharat Bijlee / Crompton Greaves  |
|  | Electric Vehicles Charging Stations   | ABB/ Siemens/ Schneider/ Tata Power/ P2 Power/ Eaton/ Panasonic/ Legrand/ Okaya/ Kazam/ Delta/ Gogoro  |
|  | Expansion Bellows for DG Exhaust Pipes  | Dunlop/ Easyflex/ Kanwal/ Resistoflex/ Dwren   |
|  | Fiber Optical Cable   | Sterlite/ Finolex/ Belden/ Delton/ Skytone/ Legrand/ RPG/ Corning/ R&M/ Commscope  |
|  | Fire Survival Cables  | Bonton/ Skytone/ Fusion Polymers/ KEI/ Havells/ Polycab / Wrexham/ Finolex/ RR Kable/ Lapp India   |
|  | Glands and Lugs   | Dowel/ Comet/ Gripwell/ Hex/ HMI/ Raychem/ Jainson/ Skytone<br>BRACO/ MULTI  |
|  | Hand Gloves & Rubber Mats   | Premier Polyfim Ltd/ Polyelectrosafe/ Challenger/ Electromat/ Safe Hold  |
|  | High Mast Poles   | Valmount/ Bajaj/ Transrail/ Salasar  |
|  | HRC Fuse  | L&T/ Siemens/ ABB/ Legrand/ Eaton Schnieder/ Hager   |
|  | HT Cables & LT Cables (Power & Control Cables, Solar Cables, Submersible flat cables) | Gloster/ Havells/ Nicco/ Finolex/ KEI/ Polycab/ Bonton/ Rallison/ RR Kable / UNIVERSAL/LAPP KABEL/GRANDLAY / AKG / ANCHOR/ FINOLEX/ PARMOUNT                   |
|  | Hybrid Capacitor Panel – IGBT Based   | P2 Power/ ABB/ Neptune/ L&T/ Siemens/ Schneider/ Legrand /ADVANCE PANELS   |
|  | Indicating Lamps  | AE/ Kaycee/ Vaishnav/ L&T/ Siemens/ Schnieder/ Teknik/ ABB/ Legrand/ Panasonic /BCH/GE/C&S   |
|  | Industrial Plug & Socket Outlets  | ABB/ L&T/ Legrand/ Siemens/ Hager/ Schnieder/ Neptune/ Eaton/ Phoenix  |
|  | Insulated Rubber Mat  | Premier Polyfilm Ltd/ Polyelectrosafe/ Challenger/ Electro Mat/ Safe Hold / Aeroflex JYOTI/DEEP JYOTI (ONLY ISI MARKED)  |
|  | Inverter  | Microtek / Luminous / Su-Kam/ Eaton  |
|  | Isolators   | Siemens/ L&T/ ABB/Socomec/ Schnieder   |
|  | Isolation Panels for Modular OT   | Pieco/ Schnieder/ Socomec/ ABB/ Siemens/ Hakerl  |
|  | LED Light Fixtures and Lamps  | Philips/ Wipro/ Havells/ Bajaj/ Panasonic/ Surya Roshni/ Lighting Technologies/ Trilux/ Crompton/ Halonix/ Orient Electric/ HPL/ Jaquar<br>OSRAM / INSTAPOWERR |
|  | LED Lighting for Facade   | Philips/ Wipro/ Trilux / Allurays/ RZB/ BEGA/ Havells/ Bajaj/ Surya Roshni / Lighting Technologies/ Crompton/ Halonix/ Orient Electric/ HPL/ Jaquar            |
|  | Lighting Automation & Control System  | Wipro/ Siemens/ Philips/ Schneider/ ABB/ L&T/ Lutron/ Crestron/ Legrand/ Havells/ Honeywell/ Crompton/   |

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|  |  | Halonix/ Orient Electric/ Trilux/ Panasonic/ Jaquar<br>BAJAJ/ OSRAM  |
|  | Lightening Protection System & Earthing System   | L&P ELECTRO/ LPI/ Indelec/ APS/OBO Bettermann/ Hakel/ JMV/ ABB/ Dehn<br>DEHN / FURSE   |
|  | LT Panels / DG Synchronizing Panels/ Capacitor Panels  | L&T/ ABB / Schneider/ Siemens/ Legrand/ Eaton or their authorized System Integrator/ Channel Partner<br><br>FOR TYPE TESTED ASSEMBLY (TTA), LT PANEL (OEM OR AUTHORIZED FRANCHISE ONLY).<br><br>SUB PANEL BOARDS/FEEDER PILLARS (OEM OR AUTHORIZED FRANCHISE ONLY)<br>ADVANCE PANELS/ ADLEC/ TRICOLITE/SIMON FABRICATOR JAMMU/ MILESTONE / ASPL(NOIDA) / L&T /PRISTINE/PRECISION |
|  | MCBs / RCCB/Isolators / RCBO / Change over switch/ Time Switch   | Hager/ Havells/ Legrand/ L&T/ Schneider/ ABB/ Siemens/ Eaton/ Anchor/ Polycab(Poly Shield) / HPL/ C&S/ Indoasian HONEYWELL (SENTRY)/ PANASONIC   |
|  | MCCB with Variable Microprocessor based (O/C, S/C, E/F) / Thermo magnetic releases   | L&T (D-Sine)/ Schneider (CVS)/ ABB (Tmax)/ Siemens (3VA)/ Legrand (DPX3)/ Eaton (NZM Series)   |
|  | Measuring Instruments (Analog Meter)   | L&T/ AE/ MECO/ Rishabh/ Schnieder/ Eaton   |
|  | Measuring Instruments (Digital Type) – Multifunction Meter (MFM)/ KWH Meter/ Voltmeter/ Ammeter/ Dual Source Energy Meter/ Powerline Transducers                       | L&T/ Ducati/ Conzerv/ Secure/ Siemens/ Schnieder/ ABB/ Eaton/ Socomec/ Elmeasure/ Minilec/ Rishabh/ Neptune / HPL<br>TRINITY/LEGRAND/ AE DIGITAL METER/KRYKARD/ ENERCON/AMTL.  |
|  | Modular Switches, Socket Outlets, USB Charger Sockets, Fan Regulators, Dimmers and moulded cover plates for switchboards having anti-bacterial/ anti-fungal properties | Havells (Crabtree-Murano/ ATHENA)/ Schnieder (Zencelo/ CLIPSAL X)/ Wipro (North West- Platia)/ ABB (Ivie) / Anchor (Roma Plus)/ Honeywell (Blenze Plus)/ Legrand (Myrius/ ARTEOR)/ Panasonic (Europa/ VISION)/ L&T (Englaze)/ Indoasian (Shynora)<br>MK (CITRIC)/POLYCAB (LEVANA)  |
|  | Motor Protection Circuit Breaker (MPCB)  | L&T/ Siemens/ ABB/ Schnieder/ Eaton/ Hager/ Legrand  |
|  | MS Conduit & Accessories   | BEC/ AKG/ Steel Kraft/ RMCON/ JPC Pipes/ Anchor /NIC/RMCON   |
|  | NIFPES (Nitrogen Injection Fire Prevention cum Extinguishing System)   | CTR/ Vendere Sales Services (I) Pvt. Ltd/ Tectonicus Services (India)Pvt. Ltd.   |
|  | Nurse Call System  | Schrack Seconet/ Honeywell/ ZKR/ Rauland-Borg  |

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|  | Occupancy Sensors   | Phillips/ Schneider/ Legrand/ Wipro/ L&T/ Havells/ ABB/ Siemens/ Panasonic/ Surya Roshni   |
|  | On Load Tap Charger   | CTR/ OLG/ EASUN MR   |
|  | Package/ Unitised Substation  | ABB/ Siemens/ Schnieder/ C&S / Ambit   |
|  | Push Buttons  | Siemens/ L&T/ ABB/ Schneider/ Teknik/ Legrand/ Eaton /BCH/GE/C&S   |
|  | PVC insulated FRLS – Copper, 1.1 KV grade flexible wires                              | Gloster/ Havells/ Batra Henlay/ KEI / Polycab / Finolex/ Rallison/ RR Kable/ Bonton/ NEC/ AKG/ Anchor / UNIVERSAL/LAPP KABEL/GRANDLAY / RALLISON / AKG / ANCHOR  |
|  | PVC Conduit, PVC Raceways, PVC Casing/capping, uPVC Wall Trunking & their accessories | Clipsal/ Polypack/ BEC/ Norpack/ JPC Pipes/ Hensel/ Honeywell/ OBO Bettermann/ Legrand/ Anchor AKG/PRECISION/ NORPACK/ POLY CAB  |
|  | Relays /Contactors/Timers/ Single Phase Preventer/ Starters                           | Siemens/ L&T/ Schneider/ ABB/ Legrand/ Eaton /GE /TEKNIC<br>STARTERS- L&T/SIEMENS/CROMPTON/GE/ABB/BCH  |
|  | Rotary Gear Pumps   | Rotodel/ Kirloskar/ KSB  |
|  | Selector Switch   | Siemens/ L&T/ Teknik/ Salzer/ ABB Schnieder/ Legrand/ Eaton<br>KAYCEE/ C&S   |
|  | Street Light Poles/ Post Top Lanterns/ Bollards/ Gate Lights with Light Fixtures      | Philips/ Wipro/ Havells/ Bajaj / Panasonic/ Surya Roshni / Lighting Technologies/ Crompton/ Orient Electric<br>OCTAGONAL STEEL POLE- /VALMONT/PARUTHI ENGINEERS PVT. LTD.CONICAL/DECORATIVE POLES/ VALMONT |
|  | Solar Street Light Poles with Fixtures & all accessories (All in One)                 | Philips/ Wipro/ Havells/ Bajaj / Panasonic/ Surya Roshni / Lighting Technologies/ Crompton/ Orient Electric  |
|  | Surge Protection Device (SPD) & Surge Arrester /Diverter, Surge Suppressor            | Tercel/ ABB/ Siemens/ Hager/ Eaton/ Phoenix/ Legrand/ L&T/Schneider/ OBO- Bettermann   |
|  | SCADA & BMS System  | Schneider/ L&T/ Honeywell / Siemens/ ABB/ Legrand/ Panasonic   |
|  | TV Splitter Box/ Tap-off  | Zinwell/ Novatron/ Catvision   |
|  | TV Socket Outlets   | Systemax/ Belden/ Simone/ Honeywell/ Legrand/ Havells/ Hager/ Panasonic/ ABB/ Schnieder/ Siemens/ R&M  |
|  | Terminal Block/ Connectors  | Dowells/ Elemex/ Wago/ Phoenix<br>Connectwell<br>BCH/INDUSTRIAL CONTROL/ L-MAK/ JAINSON/<br>SCHNEIDER/ L&T   |
|  | Transformer (Oil Type/ Dry Type)  | ABB/ Siemens/ Kirloskar/ Voltamp/ Schneider/ Crompton<br>BHARAT BIJLEE   |
|  | Trivector - Meter (Digital type)  | L&T/ Siemens/ Socomec/ Schnieder/ HPL/ ABB   |

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|  | Uninterruptible Power Supply (UPS) | Emerson (Vertiv)/ Schnieder (APC)/ Eaton/ Socomec/ Numeric (Legrand)/ Toshiba Mitsubishi (TMEIC)/ Riello |
|  | Variable Frequency Drive (VFD)     | L&T/ Siemens/ Danfoss/ ABB/ Schneider<br>ALLEN BREDLY/ABB  |

Note: Additional Makes for following items will be permissible for the projects under aegis of ID-South, HITES:

| Sr. | Equipment/ Material              | Make/ Manufacturer   |
|-----|----------------------------------|--|
| 1   | Package/ Unitized Substation     | Intrans/ Unipower/ Resitech  |
| 2   | Transformer (Oil Type/ Dry Type) | Universal/ Megawin/ Intrans/ KEL/ Resitech/<br>Unipower/ Esennar/ Emco |

**List of Approved Makes for 66/11 KV Substation**

| S. No | Equipment/ Material   | Approved Manufacturer Name  |
|-------|---|---|
| 1.    | 72.5 kV SF6 Circuit Breaker   | ABB/ Crompton Greaves/ Alstom/ Siemens/ Schnieder                 |
| 2.    | 66 kV Isolators   | Siemens/ ABB/GR Power/ CGL  |
| 3.    | 66 /11 kV Power Transformer with OLTC   | Crompton Greaves/ Schneider/ ABB/ Bharat Bijlee/ Siemens/ Voltamp |
| 4.    | 66 kV CT  | Mehru/ CGL/ Kappa/ Vishal   |
| 5.    | 66 kV PT  | Mehru/ CGL/ Kappa/ Vishal   |
| 6.    | 60 kV, 10 kA (Class III) Gapless Lightning Arrestor with surge counter & insulating base. | Oblum/ Elpro/ CGL/ Lamco  |
| 7.    | 66 kV Control relay panel   | ABB/ Schneider/ Siemens/ Crompton Greaves/ Alstom                 |
| 8.    | Insulators  | Aditya Birla/ Suvarna/ JSI/ IEC HV Insulators                     |
| 9.    | ACSR Conductor  | Sterlite/ Diamond/ Hindustan/ Mahavir Apar                        |
| 10.   | Clamp and Connectors  | Klemenn/ Rashtriya Udyog Ltd.                                     |

| <b>FIRE FIGHTING WORKS</b>                                      | <b>Approved Make</b>  |
|---|---|
| Air Release Valve/Air Cushion Tank                              | Zoloto/ Advance/ Leader/ Audco/ Castle Giacomini/ Sant/ DRP   |
| Alarm Valve & Hydraulic (Alarm motor with coupling)             | HD fire protect/Tyco/ Viking/ Newage Victaulic/Smith Copper/Anvil                                   |
| Ammeter/ Voltmeter/ PF/ kW/ Hz/ Meter /Energy Meter/ Multimeter | As per respective electrical make list  |
| Anchor Fastener   | HILTI / Fischer / Wuerth/ Bosch/ 3M   |
| Ball Valves   | L&T/ Audco /Zoloto/ Advance/Emerald/ KSB/ Sant/ Castle  |
| Battery   | Exide / AMCO /Amararaja/ Panasonic  |
| Butt welded fitting (UL Listed) & accessories                   | Bharat Forge/ VS Forge/True Forge / DRP-M/ Metline Industries/ United Forge Industries              |
| Butterfly Valves  | L&T/ Audco/ Zoloto / Advance/ KSB/ Castle   |
| Cable lugs and glands   | As per electrical make list   |
| Cables  | As per electrical make list   |
| Check Valve/Foot Valve/Sluice Valve/ NRV                        | L&T/Audco / Zoloto/ Advance/KSB/ Sant/ Leader/ Castle   |
| Control / Potential / Current Transformer                       | AE/L&T/Kappa  |
| Deluge valve/ Solenoid valve/ Spray nozzle                      | Victaulic/Smith Copper/Anvil  |
| Diesel Engine   | Cummins/ Mitsubishi/ Perkins/ Volvo/ Caterpillar/ Kirloskar (KOEL Green)/ Baudouin / Greaves Cotton |
| ELCB  | As per electrical make list   |

| <b>FIRE FIGHTING WORKS</b>   | <b>Approved Make</b>   |
|--|--|
| Epoxy Paint  | As per Civil Works make list   |
| Fire Buckets   | Safex/ Minimax/ Cease Fire/ Peter Autokits/ ASES / Padmini<br>Safegaurd/ Swastik   |
| Fire Stopper/ Sealant  | Hilti/ 3M/ OBO-Bettermann  |
| Fire Extinguishers   | Minimax / Newage/ Eversafe/ Tyco –Johnsons Control/ Ceasefire/ Exflame/Life Guard/ Safex/ Padmini/ Peter Autokits/ ASES<br>Superex |
| Fire Hydrant Valves/ Fire RRL Hose Pipes / Fire Hose Reels/ Fire Man's Axe/ Gun metal short branch pipe/ 2/ 3/4 FB inlet/ draw Out connection/Hose Box/ Hose reel drum /Nozzle/ blank Caps & Chains / Coupling | Ceasefire / Newage /Minimax/ HD/ Tyco/ Exflame / Padmini/ ASES<br>Safegaurd/Lifegaurd/ Swastik                                     |
| Fire Pumps   | Mather & Platt (WILO)/ Grundfoss/ KSB/ Kirloskar/ Xylem/ITT/ Armstrong Fluid Technology  |
| Electrical Motors  | ABB/ Siemens/ Kirloskar/ Crompton Greaves/ Bharat Bijlee<br>Grundfos/NGEF  |
| Flow Meter   | System Sensor/ Anergy/ Emerald/ Rapid Cool/ Omicron  |
| Flow Switch  | Potter / Rapid flow/ Danfoss/ Viking/ Belimo/ Honeywell/ Anergy/ Omicron   |
| Foot Valve (Cast Iron/ Gunmetal)   | Kirloskar / Zoloto/Advance/L&T/ Sant/ Leader / DRP   |
| Forged Steel Fitting & accessories   | Bharat Forge/ V.S. Forge/True Forge / DRP-M/ Metline Industries/ United Forge Industries   |
| GI Clamps  | Hilti/ Gripplle/ HIRA-Walraven/ Mupro/ OBO Bettermann  |
| GI / MS Pipes  | TATA/ Jindal/ SAIL/ Maharashtra Seamless Ltd   |
| Globe Valves - Gunmetal  | Audco / Zoloto/ Advance/ L&T/ Sant/ Leader   |
| Over Load Relays   | As per electrical make list  |
| Pipe coat material (pipe protection)   | Pypcoat / Makphalt / Safex   |
| Modular Pipe Supports, Brackets, Hanging System for HVAC, MEP, Plumbing & Roof Top Equipment   | Hilti/ Gripplle/ HIRA-Walraven/ Mupro/ Cooper Corporation<br>Chilly/ GMGR /CAMRY   |
| Power/ Auxiliary Contactors  | As per electrical make list  |
| Pressure Gauge   | Fiebig/ H. Guru/ HD/ BRC/ Warea  |
| Pressure Switch  | Indfoss/ Switzer/ Danfoss/ Honeywell   |
| Push Buttons/ Indicating Lamps LED   | As per electrical make list  |

| <b>FIRE FIGHTING WORKS</b>                                   | <b>Approved Make</b>  |
|--|---|
| Single Phase Preventer                                       | As per electrical make list   |
| Solenoid Valve/ Spray nozzle                                 | HD / Tyco/Danfoss/ Honeywell  |
| Structural Steel for Supports                                | As per Civil Works make list  |
| Sprinkler Heads (Sidewall/<br>Upright/ Pendant)              | Grinnel-Tyco / Viking / HD/ Victaulic / Monsher   |
| Steel flexible extension                                     | Eversafe / Newage/ Tyco/ Viking/ Victaulic  |
| Vibration Eliminator Mounting<br>Pads & Pipe Connections     | Resistoflex / Dwren / Kanwal/ HIRA-Walraven/<br>Dunlop/ Easyflex /<br>Ewren   |
| Weld Electrodes  | Advani/ ESAB/ Victor/ Adorr<br>Essar  |
| Pot Strainer   | Emerald/ VTM/ Rapid Cool/ Zoloto/ Castle  |
| Y- Strainer  | Zoloto/Audco/Emerald/Advance/Leader/ Castle   |
| Expansion Rubber Bellows                                     | Resistoflex/ Easyflex/ Kanwal/ Dunlop/ Dwren  |
| Gas Flooding Sytem for Fire<br>Suppression in Data/ LV Rooms | Tyco/Newage/Minimax/Viking/ Firetrex/ Firetrace/<br>Kidde/ Jactone/ Honeywell/ Siemens/ HD/ ASES<br>Pyroguard Engineers / Ceasefire /UTC / Safe fire/ Life<br>guard |
| Linear Pnuematic Heat<br>Detection Tube System for<br>Panels | Firetrex/ UTC/ Tracefire/ Jactone/ ASES/ Rotarex/<br>SVS Buildwell/ Firetrace/ Kidde/ Tyco/ Siemens/ HD   |
| Clean Agent Fire Extinguisher                                | Kanex/Tyco/Newage/SVS Buildwell/ Minimax/<br>Lifeguard/Ceasefire/ Kidde/ Siemens/ HD / ASES   |



| <b>FIRE ALARM SYSTEM</b> |   | <b>Approved Make</b>  |
|--------------------------|---|---|
|                          | Intelligent Addressable Fire Alarm System - Panel /Detectors/ Hooters/ Manual Call Point UL Listed/ Control Module/ Monitor Module/ Control Relay Module/ Short Ckt. Isolator/ Fire Annunciation Panel / Response Indicator | Honeywell/ Bosch/ Simplex / Siemens / Schrack- Seconet<br>GAMEWELL(USA) / Fenwell /<br>Detnov ( SPAIN ) /JOHNSON CONTROL/ |
|                          | Telephone Talkback for Fire Alarm System  | Honeywell/ Bosch/ Simplex / Siemens / Schrack- Seconet/ ASES/ CPS   |
|                          | Fire Survival Cables  | Bonton/ Skytone/ Fusion Polymers/ KEI/ Havells/ Polycab / Wrexham/ Finolex/ RR Kable / Lapp India<br>NO BURN / AVOCAB     |
|                          | Terminal Strips   | Dowell's/ Elemex/ Wago/ Phoenix<br>Connectwell  |
|                          | MS Conduits & accessories   | Same as respective electrical make list   |

| <b>LIFTS</b> |                   | <b>Approved Make</b>   |
|--------------|-------------------|--|
|              | Lifts             | OTIS/ Kone / Mitsubishi/ Schindler/ Johnson / Thyssenkrupp (TK Elevator) |
|              | Dumb Waiter Lifts | OTIS/ Kone/ Johnson/ Schindler/ Sigma/ East India                        |

|     | <b>LV System/ PA System/ CCTV System/ Access Control System/ Door Interlocking System/ MATV System/ Information Display System</b> | <b>Approved Make</b>  |
|-----|--|---|
|     | Door Controller, Card Reader, Biometric Reader, Access Control Server Software, Smart card   | Honeywell/Bosch/HID/Spectra/ Idemia-Morpho / Viridi/ Lenel/ Siemens<br>TOA SX2000   |
|     | Electro Magnetic Lock  | Cisa/ Faraday/Trimec/ Honeywell/ Bosch/ HID/Spectra/ Idemia-Morpho/ Viridi/ Lenel/ Dormakaba/ Siemens   |
| 4.  | CAT 6/6a Wire/Accessories – Jack Panel / Face Plate  | Belden/ Simone/ Panduit/ Commscope/ Cisco/ Legrand/TADIRAN/ Finolex/ Delton/ Skytone/ KEI/ Bonton/ R&M<br>CAT 6/6a Wire/Accessories -Mollex/ Digilink/ Systimax/ Polycab/Havells/Avaya / Anchor<br><br>Jack Panel / Face Plate- Huwawei/ Belden/ Panduit/ Commscope/ Simone |
| 5.  | CCTV Camera/ NVR/Central Monitoring Software / Other Items   | Honeywell / Pelco /Cisco /Bosch/ Axis/ Sony   |
| 6.  | CD / DVD Player  | Bosch/ Honeywell/ Bose / Sony/ LG Panasonic/ Samsung  |
| 7.  | Door Interlocking System   | NRH/ Eltech/ Avon   |
| 8.  | PA System, Amplifier, PA Speaker, Voice Controller, Paging Station, Microphone   | Bosch/ Honeywell/ Bose/ Beyerdynamic /Clear One /Clock Audio/ Sony/ AKG-Harman/ Shure/ Schrack (g+m)<br>Electrovoice , Beyer Dynamic, D&B Audio Technik, Martin Audio, TOA SX2000   |
| 9.  | RG-6, RG-11Wire/ Coaxial Cables  | Finolex/ Delton/ Skytone/ L&T/ KEI/ Bonton/ Gloster/ Polycab/ Belden/ Legrand/ Havells/ Commscope<br>Lappable   |
| 10. | Speaker Wire   | Bonton/Delton/Polycab/KEI/ Legrand / Kramer/ Belden/ Commscope<br>Klotz   |
| 11. | LED Video Wall/ Flat Panel Display   | LG/ Samsung/ Christie/ NEC/ Planar/ Sony/ Philips/ Panasonic  |

| <b>HVAC SYSTEM</b>   | <b>Approved Make</b>  |
|--|---|
| Adhesives for Insulation   | Pidilite/ Superlon / Armacell /FOSTER/HENKEL.   |
| Adjustable Frequency Drive/ Automatic AFD Bypass/ Pump Controller/ Differential Pressure Sensor/ Transmitter | Xylem-ITT/ Grundfos/Armstrong/ Anergy or as per OEM for Water Pumps T&A /FLOWCON / OVENTROP/ ANERGY                 |
| Air Cooled Package Units   | Voltas/ Bluestar/ Hitach/ Daikin/ Carrier   |
| Air Curtains   | Euronics/ Almonard/ Mitsubishi/ VTS Wings   |
| Air & Dirt Separator/ Dirt Separator   | Spirotech/ Optivent / Flamco/ Armstrong/ Anergy/ Emerald/ Calefi / Spirotherm                                       |
| Air Distribution (Ducting) - GI/GSS Sheets   | SAIL / TATA Steel/ Jindal   |
| Air Handling Units with Coils  | Zeco/ Edgetech/ VTS/ Waves/ Flaktwood/ Balance Air/ System Air Aermec   |
| Air Louvers – Fresh/ Exhaust   | Titus/ Trox/ Systemair/Caryaire/ Mapro/ Airflow   |
| Air Washer   | Zeco/ Waves/ Edgetech/ VTS/ Humidin systemaire /Ambassador /flaktwood/ casilica/humdin /brightflow.                 |
| Air Bi-polar Ionizers / Air Purification System/ Air Quality Monitor Instrument/ Air Ion Meter               | Plasma Air/ Aerisa/ Bentaxna/ RGF/ Global Plasma Solutions  |
| Aluminium Sheet for Ducts  | Jindal/ Hindalco/ Sterlite BALCO / NALCO  |
| Automatic Air Vent   | Anergy / Rapid Cool/Emerald/CIM/ Castle CALEFFI/SPIROTECH/OPTIVENT / RAPID CONTROL                                  |
| Axial Flow Fans  | Kruger / Systemair /Greenheck/ Wolter / Nicotra / Airflow / Maico Ventilation (Dynair) COMEFRI / NICOTRA / HUMIDIN/ |
| Balancing Valves (Water Duty)  | Advance / Audco/ L&T/ Honeywell/ Danfoss/ Belimo/ Castle JCI/ KITZ/ ANERGY / ZOLOTO                                 |
| Ball Valves (With & W/O Strainers)   | Audco /KSB/Advance/ L&T /Zoloto / Castle/ Danfoss AXIN/ADVANCE/L&T/JCI/CIM / ARCO /KITZ /                           |
| Butterfly Valves (Water Duty)  | Advance / Audco/ L&T/Zoloto/KSB/ Castle/ Danfoss JCI/ ANERGY / HONEYWELL/ KITZ                                      |
| Cable Lugs/Thimbles/Glands   | As per Approved Makes of Electrical Works   |
| Cable Tray   | As per Approved Makes of Electrical Works   |
| CAV Box/ VAV Box   | Trox/ System Air / Ruskin Titus /Honeywell / Johnson's Control/Belimo/ Danfoss/ L&T                                 |
| Centrifugal Fans/Fan   | Kruger / Greenheck /Comefri/ Wolter/ Nicotra/   |

|  |   |   |
|--|---|---|
|  | Section/Plug Fans   | Systemair/ Airflow/ Maico Ventilation (Dynair)<br>VTS/ HUMIDIN  |
|  | Check Valve/ Foot Valve/<br>Sluice Valve/ NRV                                   | Advance / Audco/ L&T/Zoloto/ KSB/ Sant/ Leader/<br>Castle<br>KITZ/ANERGY/   |
|  | Chillers  | Daikin / Carrier / Trane / York/ Dunham- Bush/<br>Voltas/ Blue Star   |
|  | Chilled Water Pump<br>(Primary/Secondary)/<br>Condenser/Hot Water Pumps<br>etc. | Armstrong / Grundfoss/ Xylem/ ITT/ KSB/ Kirloskar/<br>Wilo-Mather+Platt<br>YORK / TRANE / CARRIER / DAIKIN-MCQUAY/  |
|  | Chilled Water Cassette Unit   | Carrier/ Trane/ Daikin/ Johnson Controls<br>ZECO / EDGETECH / SYSTEMAIRE / FLAKTWOOD/<br>NUTECH/YORK/VTS/HUMIDIN/CASILICA/<br>SINKO/AERMEC                    |
|  | Control Cables  | As per Electrical Makes   |
|  | Cooling Tower   | Bell / Paharpur/ Flowtech/ Baltimore/ Mihir<br>ADVANCE / AIR COIL/MARLEY/EVAPCO   |
|  | CPRX Compound/ Tar felt   | Shalimar tar product / Asian / Pidilite   |
|  | Dehumidifiers   | Bryair/ Origin/ Condair/ Dehumidifier India   |
|  | Dry Scrubber / Wet Scrubber   | Rydair/ Trion/ Honeywell/ Waves/ Zeco/ Edgetech/<br>Espair  |
|  | Duct Dampers/ Grills/ Diffuser/<br>VCD/ Collar Damper etc.                      | Caryaire/Systemair/ Dynacraft /Airflow (Mapro)<br><br>CONAIRE/BRIGHTFLOW/RUSKIN – TITUS /<br>/ AIR-MASTER/COSMOS /  |
|  | Electric Motor  | ABB/ Siemens/ Crompton Greaves / Baldor/<br>Kirloskar/ Bharat Bijlee/ Marathon  |
|  | Electric Motor (Fire Rated)   | Marathon/ Havells/ Baldor / Rotomotive/ ABB/<br>Kirloskar   |
|  | Expansion Tank  | Xylem-ITT/ Armstrong/ Grundfos /Flamco/ Anergy  |
|  | Factory Fabricated Duct &<br>Flanges  | Rolastar / Zeco / Ductofab / Technofab/ GPS Spiro   |
|  | Fan Coil Units with Fans  | VTS/Flaktwood/Daikin/Carrier/Johnson Control/<br>Caryaire<br>ZECO / EDGETECH / SYSTEMAIRE / FLAKTWOOD/<br>NUTECH/YORK/HUMIDIN/CASILICA/TRANE/SINKO/A<br>ERMEC |
|  | Fasteners   | Hilti / Fischer / Wuerth/ Bosch/ 3M   |
|  | FCU Copper Connection Set/<br>FCU Link  | ATS/ Oventrop/ CSI/ Anergy<br>FCU Kit - Caleffi/ Oventrop/ CIM  |
|  | Filters - Pre/ Fine/ Hepa   | Thermadyne / Spectrum/ Camfil/ American Air Filter  |
|  | Fire Damper Actuator  | Belimo/ Siemens/ Danfoss/ Honeywell/ Johnson  |
|  | Fire Dampers / Smoke<br>Dampers   | Trox/ Greenheck/ Ruskin/ Titus/ Systemair/<br>Caryaire/ AirFlow   |

|  |   |   |
|--|---|---|
|  |   | AIR-MASTER/COSMOS / DYNACRAFT   |
|  | Flame Free Jointing of copper pipes   | Rapid Locking System/ Maxi Pro  |
|  | Flexible Duct Connection  | Airflow/Pyroguard / Rolastar/ UP Twiga  |
|  | Flexible Pipe Connection  | Resistoflex/ Easyflex/ Diamond/ Dunlop Kanwal   |
|  | FRP lining for condenser piping   | Owen-corning/UP Twiga/ Binani   |
|  | GI/ MS Piping (chilled/condenser/drain/hot)   | Jindal / Tata / SAIL/ Maharashtra Seamless Ltd  |
|  | Globe/ Gate Valve   | Audco / Advance / Danfoss/ L&T/ KSB/ Zoloto/ Castle / Axin                                |
|  | Heat Recovery Exchanger/ Ventilator/ Wheel  | Ostberg/ DRI / Flaktwoods/ Heatex/ BryAir   |
|  | Hot Water Generators  | KEPL / Rapid cool/ Emerald/ Enmax /Sandhu   |
|  | Humidifier  | KEPL / Rapid cool/ Emerald / Enmax  |
|  | Inline Fans   | Kruger / Nicotra/ Greenheck/ Ostberg/ Airflow /HUMIDIN /COMEFRI                           |
|  | Insulation Materials  | Approved Make   |
|  | a) Fiber Glass – Aluminium faced Insulation   | UP Twiga / Owens Corning/ Kimmco K-flex   |
|  | b) Polyurethane Foam (PUF) Insulation   | Styrene Packaging & Insulations/Lloyd Insulations/ Supreme                                |
|  | c) Nitrile Rubber Insulation with antimicrobial properties                            | K-Flex/ Superlon/Armacell/ Supreme/ Aeroflex/ Aerocell/ Aerofoam (Hira) ARMAFLEX / A-FLEX |
|  | d) XLPE Insulation  | Supreme/ Vidoflex/ Trocellene/ Aerofoam (Hira) Aeroflux                                   |
|  | e) Expanded Polystyrene Insulation  | Styrene Packing/Mettur/ Beardsell SHI / TOSHIBA/TROCELLIN/THERMOBREAK                     |
|  | Laminar Flow HEPA Tent  | Systemair/TROX/American Air Filter/ Conaire/ Thermadyne/ Airtech                          |
|  | Magnehelic Gauges   | Mitbraus Instruments/ Dwyer / Omicron   |
|  | Motorized Butterfly Valve   | Honeywell/Belimo/Danfoss/Siemens VICTAULIC/ ADVANCE / ANERGY / AUDCO / KITZ               |
|  | Modular Pipe Supports, Brackets, Hanging System for HVAC, Roof Top VRV/ VRF Equipment | Hilti/ Gripple/ HIRA-Walraven/ Mupro  |
|  | Paints  | As per Civil Works Makes  |
|  | Pre insulated Ducts   | Pal/Zeco/ ALP/ Kingspan/ Spiro / UP Twiga Asawa/ P3/ TD                                   |
|  | Pipe Clamps, Hangers, Suspension Supports etc   | Easyflex/Resistoflex/Diamond/ Hira-Walraven   |
|  | Pipe Supports-PUF   | Llyod insulation/ Melanpur/ Beardsell   |
|  | Power & Control Cables  | As per Electrical Makes List  |

|  |  |  |
|--|--|--|
|  | Pressure / Temperature Gauges  | H. Guru / Feibig / Warree/ H.D./ Omicron EMERALD/BRC/  |
|  | Propeller Fans   | Crompton/ Khaitan/ Alstom/ Bajaj/GE/ Havells/ Maico Ventilation (Dynair)/ Marathon                           |
|  | Pressure Independent Balancing & Control Valve – 2 Way   | Siemens/ Danfoss/Oventrop /Belimo/ Castle/ Anergy/ Honeywell/ Johnson Controls/ Advance OVENTROP             |
|  | Precision AC Units   | Schneider/ Vertive/ Stulz/ Carrier/ Daikin/ Blue Star/ Hitachi/ Mitsubishi                                   |
|  | Purge Valve/ Drain Valve   | Audco/ Advance / Anergy/ Zoloto/ Castle/ Advance   |
|  | PVC /uPVC Pipes  | Polypack/ Supreme/ Astral/ Finolex/ AKG  |
|  | Pot Strainer   | Emerald/ VTM/ Rapid Cool/ Castle/ Advance / SANT/SPURION/  |
|  | Red Oxide/ Zinc Chromate Primer  | As per Civil Works Makes   |
|  | Refrigerant Copper Pipes   | Mandev Tubes/Rajco Metal/Mehta Tubes (Max Flow)/ Kwalitiy Tubes (Raj State)                                  |
|  | Room Thermostat  | Honeywell/ Johnson/ Siemens/ Danfoss Schneider BELIMO/   |
|  | RP Tissue  | UP Twiga/ Styrene Packing/ National Industrial Co. OWENS CORNING/  |
|  | Split AC Units   | Toshiba/ Daikin/ Hitachi/ Carrier/ Voltas/ Blue Star/ Lloyd (Havells) Mitshubshi Electric/Ogeneral           |
|  | Starters/ Change over switch/ Push Buttons/ Relays/ Indication Lamps/ Rotary switches/ 1-phase preventor/ Soft starter/ MCB/ MCCB/ ACB/ Contactor etc. | As per respective Electrical Makes   |
|  | Strip Heater   | Das Pass/ Escorts/ KEPL  |
|  | Structural Steel for Supports  | As per Civil Works make list   |
|  | Thermostat / Humidistat  | Honeywell / Johnson / Siemens / Schneider/ Omicron DANFOSS /BELIMO/  |
|  | UV & Weather protective Coating  | Pidilite/ Foster/ Amicon   |
|  | UVGI System (Ultra-Violet Germicidal Irradiation System)   | Ruks/ Alfa UV/ Sterile Air/ American Ultra Violet/ Philips UV Air  |
|  | V-Belt   | Dunlop/ Fenner/ Hilton   |
|  | Vacuum Degasser  | Spirotech/ Optivent / Flamco/ Anergy/ Emerald/ Calefi COMFORT/SPIROTHERM/ RAPIDCOOL/ ALARCO/ CARRIER/WESSELS |
|  | Variable Frequency Drive   | Siemens/ Danfoss/ABB/ Schneider/ L&T   |
|  | VRV/ VRF System  | Mitsubishi Electric/ Daikin/ Toshiba/ Panasonic/   |

|  |   |  |
|--|---|--|
|  |   | Carrier/ Voltas/ Blue Star/ Hitachi<br>Samsung/ LG/  |
|  | Vibration Eliminator Mounting<br>Pads & Pipe Connectors | Resistoflex / Dwren / Kanwal/ Hira- Walraven/<br>Dunlop/ Easyflex<br>Anti Vibration Mountings- Getzner/Interlasp/ Kinetic<br>Noise Control |
|  | Water Flow Switch                                       | Honeywell/ Danfoss/ Belimo/ Emerald/ Rapid Cool /<br>Anergy/ Omicron   |
|  | Y- Strainer   | Zoloto/Audco /Emerald/ Rapid Cool/ Advance/<br>Castle<br>VICTAULIC/ SANT/SPURION   |



| IBMS SYSTEM |  | Approved Make   |
|-------------|--|---|
|             | IBMS System & Software/<br>Capacitive Touch Panel/ Direct<br>Digital Controller                                | Siemens (WinCC)/ Schneider (EcoStruxureTM)/ L&T<br>(iVisionmax)/ Honeywell (Experion PKS)/ ABB<br>(AbilityTM)/ Phoenix/ Johnson Controls<br>Ingersol Rand/Easyio/ Krypton Panasonic |
|             | Operator Workstation   | Dell/ Lenovo/ HP/ IBM<br>TOSHIBA/LENOVO/ Krypton Panasonic  |
|             | Printers/ Photocopy machine  | Canon/ Xerox/ HP/ Epson<br>/ Krypton Panasonic  |
|             | Network Switch   | Cisco/ HP/ Juniper/ Dell/ Ruckus<br>3-COM/ Krypton Panasonic  |
|             | Temperature Sensors &<br>Transmitters  | Greystone / Honeywell / Siemens / Schneider /<br>Danfoss/ L&T/ Omicron  |
|             | Outside Air Temperature +<br>Humidity Sensors  | Greystone / Honeywell / Siemens / Schneider /L&T/<br>Omicron  |
|             | Ultrasonic Water Flow Meter  | Kampstrup/Landis+Gyr/Shenitech/Siemens/<br>Honeywell/ Krohne/ Thermax/ Omicron  |
|             | Differential Pressure Switches<br>& Transmitters for Air/<br>Water/Filter status                               | Greystone / Honeywell / Siemens / Schneider /<br>L&T/Kele/ Danfoss/ ABB/ Omicron<br>Johnson Controls/ /ACI/Dwyer/Krypton Panasonic  |
|             | Water Flow Switch  | Greystone / Honeywell / Siemens / Schneider /<br>L&T/Weksler/ Danfoss/ Omicron<br>Johnson Controls//ACI/DwyerKrypton Panasonic  |
|             | Water Quality Sensors  | Honeywell / Siemens / Schneider / L&T/ Danfoss/<br>Omicron  |
|             | pH / TDS Analyser  | Hach/Omicron/ Forbes Marshall/ Thermax/ Krohne<br>Honeywell/ Greisinger/ Shenitech/Krypton Panasonic  |
|             | Air/ Water Sensors & Switches<br>/ Pressure<br>Transmitters/Differential<br>Pressure Switches &<br>Transmitter | Greystone / Honeywell / Siemens / Schneider /<br>Danfoss/ L&T / ABB/ Omicron<br>Johnson Controls/ ACI/Dwyer/Krypton Panasonic   |
|             | Colour Monitor   | LG/ Samsung/ Sony/ Phillips/ Panasonic<br>DELL (ULTRA SHARP)/ HP (PAVILION)/ ASUS//<br>Lenovo/ Krypton Panasonic  |
|             | Communication Cables / Signal<br>Cable   | Delton/Fusion Polymer/Skytone/Finolex/ Simone/<br>Commscope/ Bonton/ Polycab / KEI<br>Mollex/ Digilink/Systimax/Belden/LEGRAND/Havells/<br>KryptonPanasonic                         |
|             | Copper Conductor Control<br>Cable  | UNIVERSAL(SATNA)/KEI/RPG/FINOLEX/LAPP<br>CABLE/BELDEN/PIRALI/ Krypton Panasonic   |
|             | Current Relay  | Veris/Seto/Mamac/Omran/ABB/Omicron/Kele/Minil<br>ec/Sontay/ Krypton Panasonic   |
|             | Duct Mounted Temperature +<br>RH sensor/ Duct Temperature<br>Sensor  | Greystone / Honeywell / Siemens / Schneider /<br>Danfoss/ L&T/ Omicron<br>Johnson Controls/ Siemens/ ACI/Dwyer / BEPL/  |

|  |   |   |
|--|---|---|
|  |   | Sontay Sauter/Kele/ TAC/ Krypton Panasonic  |
|  | Level Switch / Level Transmitter            | Honeywell / Dwyer/ Radix/ Weksler/ L&T/ Minilec/ Omicron<br>Kele/Sontay/Sridhan/Veksler/ ACI/Dwyer /Filpro/Omicron/ Krypton Panasonic/Sontay/ Greystone/ Techtrol |
|  | Flow & BTU Meters & Transmitters            | Schenitech / Honeywell / Kampstrup/ Anergy/ Omicron<br>/ KryptonPanasonic   |
|  | GI Conduits                                 | Same as per Electrical make list  |
|  | LAN cables for BMS Network                  | Mollex/ Digilink/ Systimax/ Belden/LEGRAND/ Delton/Finolex/Polycab/ Bonton/AMP/Havells / AKG/ Krypton Panasonic   |
|  | MS Conduits & accessories                   | Same as per Electrical make list  |
|  | Sensor - CO <sub>2</sub> / CO / pH / TDS    | Honeywell / Hach / Greisinger/ Danfoss  |
|  | PVC Conduits                                | Polypack/ BEC/ AKG/ Polycab/ Krypton Panasonic  |
|  | Voltage / Current / Power Factor Transducer | L&T / Siemens / Schneider/ ABB/ Minilec<br>SETO Enercon/ SETCO/ Omicron/ Rishabh/ Situ/ Krypton Panasonic   |

| <b>SEWAGE/ EFFLUENT TREATMENT PLANT</b>         | <b>Approved Make</b>  |
|---|---|
| Air Blowers                                     | Beta/ Everest/ Kulkarni / TMVT  |
| Air Diffussion System                           | Airfin/Usha Ruba/Rehau  |
| Air Vent Valve                                  | Oven trop (Germany) / CIM / Rapid Control/ Castle                               |
| Anti Corrosive Tape for Pipe protection         | Pypcoat / Marphalt / Cotek/STP  |
| Ball Valve                                      | Zoloto/Honeywell/ RB/ Castle/ Audco   |
| Bar Screen                                      | KSP/AWMS/PAMM or equivalent   |
| Blowers   | Kay / Airvac /Everest   |
| Butterfly valves                                | Zoloto/Audco/Kirloskar/AIP/Advance/ Castle                                      |
| Centrifuge                                      | Apollo/United/B.A Engineering   |
| Check Valve – Dual Plate                        | Advance/Honeywell/Audco/Zoloto/ Castle  |
| Check Valve – Wafer Type                        | Advance/Danfoss/Zoloto/Honeywell/ Castle  |
| Chemical Cleaning Pump                          | WILO / DP/ Grundfos/ Xylem  |
| Chemical Cleaning Tank                          | Polycon / Sintex/ Vectus /Supreme   |
| Chemical Dosing system                          | Asia LMI/ Seiko/ E – Dose/ Grundfoss  |
| Dosing Pump                                     | Grundfos / Asia LMI / E-dose / Prominent  |
| Electrical Panel                                | As per electrical Make List   |
| Epoxy Paint & Paint                             | As per List of Approved Makes for Civil & Plumbing                              |
| F.R.P Vessel                                    | Pentair / Aventura / Thermax/ Ion Exchange                                      |
| Flow Meters & Flow Transmitters (Digital)       | Aster / VATS / Honeywell/ Krohne/ Forbes Marshall/ Thermax/ Omicron /Scientific |
| Flow Rota Meter for Suction Pump                | UKL / Aster /Scientific   |
| Foot Valve                                      | Kirloskar/ Kalpana / Leader/ BDK / Sant/ Zoloto/ Castle /Advance/DRP            |
| G.I. fittings (malleable cast iron)             | As per List of Approved Makes for Civil & Plumbing                              |
| G.I. Pipes/ M.S. Pipe                           |   |
| High Pressure Feed Pump                         | WILO / DP/Grundfos/ Xylem   |
| Level Controller/ Level Indicator/ Level Switch | Aster/Cirrus India/Rockwell Automation/ Minilec/ L&T/ Omicron MINILAC           |
| MBR Module                                      | GE/ Siemens/ Mitsubishi/ Ion Exchange/ Koch/ Thermax                            |
| MBR Permeate Suction Pump                       | Wilo / DP/Grundfos/ Xylem/ Kirloskar  |
| Media   | Ion Exchange/ Thermax/ Cooldeck/ Usha Ruba/ MM Aqua/ Pharmatech                 |
| Motor   | Siemens/ Crompton & Greaves/ ABB/ Kirloskar/ Bharat Bijlee                      |
| MSEP Vessel                                     | Ion Exchange/ Thermax or equivalent as per manufacturer's standard              |
| Multiport Valve                                 | Thermax/ Pentair/ ORG/ Astral/ Praher Aquafiltration                            |

|  |   |  |
|--|---|--|
|  | Non Return Valve  | Zoloto/Honeywell/ RB/ Castle/ Audco/ Danfoss   |
|  | PH Meter  | VATS / Hanna/Aster/Digital/ Honeywell/ Thermax/<br>Krohne/ Forbes Marshall/ Omicron  |
|  | Pipe clamp & supports   | Chilly/Euroclamp/Kanwal/ HIRA-Walraven   |
|  | PLC / HMI   | Schneider / Allenbradley /Mitsubishi/ Minilec/ ABB/<br>Siemens/ Schneider/ L&T   |
|  | Pressure Gauges   | Waree / H Guru / Fiebig/ HD/ Omicron<br>GLUCK  |
|  | Pressure Switch   | Danfoss / Indfoss / Switzer/ Omicron   |
|  | Pump Sets i/c Water transfer<br>and sludge disposal/ transfer<br>pump | WILO / DP/ Grundfos/ Xylem/ KSB/ Kirloskar<br>/CRI/TOSHIO  |
|  | Resin   | Thermax / Ion Exchange/ Auchtel  |
|  | Semi Auto Fine Screen   | Toro/ KSP / AWMS/ PAMM   |
|  | Sewage Feed pump/ Drainage<br>/ Submersible Pumps                     | WILO / DP/ Grundfos/ Xylem<br>KIRLOSKAR/ KSB/ CROMPTON/ TOSHIO   |
|  | Strainers   | Emerald / Zoloto / Maharaja/ Castle/ Audco/ L&T/<br>Sant/ Leader/ Rapid cool   |
|  | Transfer Pumps  | WILO / DP/Grundfos/ Xylem/ KSB/ Kirloskar  |
|  | Tube Settler/ Lamella plates  | Thermax/ Ion Exchange/ Sema  |
|  | UV Systems  | Alpha UV/ Creative UV/ Pentair/Eureka Forbes/<br>Philips/ Ruks   |
|  | Variable Frequency Drives   | Danfoss/Schneider/Siemens/ABB/ L&T<br>/Allen Bredly  |
|  | Vibration Eliminator / Anti-<br>Vibration Mounting pads               | Resistoflex / Kanwal /Banco/Dunlop/ Easyflex/ Hira-<br>Walraven<br>Vibration Eliminator/ Rubber<br>Bellows -/ D'wren<br>Anti- Vibration Mounting pads -Cori//Diamond Pipe<br>Support/Emerald |
|  | Water Meter   | As per Plumbing make list  |

| <b>IPABX/ EPABX &amp; TELEPHONE SYSTEMS</b> |  | <b>Approved Make</b>   |
|---|--|--|
|   | Telephone cable (2/4 /10 / 20/ 50/ 100 PAIR CABLES) / RJ -11 wires | Belden/ Simone/ Panduit/ Commscope/ Cisco/ Legrand/Tadiran/ Finolex/ Delton/ Skytone/ KEI/ Bonton/ Gloster/ Polycab/ Havells/ Molex / Digilink/ Systimax/ Belden/ Bonton / AKG |
|   | Digital/ANALOG PHONES/ Handsets/IP phones                          | Beetel /Panasonic /Siemens / Alcatel/ Cisco / Coral  |
|   | IPABX / EPABX System   | Alcatel/ Avaya/ Cisco/ Siemens/ Nortel/ Matrix/ Panasonic/ Coral / HP  |
|   | MDF/ IDF   | Krone/ TVS/ Finolex  |
|   | Telephone Tag Block/ Jack Panel/ Face Plate                        | Krone/ Phoenix/ Wago/ Belden/ Panduit/ Huwaei/ Legrand/ Commscope /Amp   |
|   | MS/ PVC Conduit  | Same as electrical make list   |

| <b>DATA NETWORKING &amp; WIFI SYSTEM</b> |  | <b>Approved Make</b>  |
|--|--|---|
|  | Active Components – Core and Edge Switch, Indoor/ Outdoor access Points, Wireless Controllers & all other active components  | Cisco/ Juniper/ HP/ Dell / Alcatel/ Ruckus/ Extreme 3-COM/ / Cambium  |
|  | Distribution rack and server rack  | Rittal/ Netrack/ Cisco/MTS/ APW/ Legrand - Valrack / Chief/ Middle Atlantica/ Schneider Poweride / Impulse / Cambium/ ORTRONICS / SIEMON  |
|  | Ethernet Switch / Indoor & Outdoor Wi-Fi device/ Trans-receivers   | Cisco/ Juniper/ HP/ Dell/ Alcatel/ Ruckus / Cambium   |
|  | Routers  | Alcatel/ Avaya/ Cisco/HP/ Juniper/ Ruckus / Cambium   |
|  | Server   | IBM / Dell/ HP/ Cisco/ Alcatel<br>Cambium   |
|  | Firewall   | Cisco/ Juniper/ HP/ Fortinet/ Palo Alto/ Check Point<br>Cambium   |
|  | Passive Components – Cat 6/Cat 6a/ Patch Panel/ Patch Cord/ Face Plates/ Information outlets/ Optical Fiber Cable/ Fiber patch cord/ Pigtails/ LIU/ Adapters/ Connectors | Belden/ Simone/ Panduit/ Commscope/ Cisco/ Legrand/ Delton/ Skytone/ Bonton/ R&M/ Molex/ Schneider<br>LEGRAND/ SYSTIMAX/BELDEN/ SIEMON/AMP/<br>SCHNEIDER Fiber Patch cord / Digital/ LIU/<br>Adapters/ Connectors-Elmex / Connectwell / Essen |

| <b>Audio Visual System &amp; Stage Lighting System for Auditorium &amp; Conference Rooms</b> |  | <b>Approved Make</b>  |
|--|--|---|
|  | Symmetrical Line Array Speakers, Flying Subwoofers, Loudspeakers, Power Amplifier, Digital Sound Processor, Digital Mixing Console, Microphone, Loudspeaker Cables | L-Acoustics/ Bose/ Martin-Audio/ Labgruppen/ Powersoft/ Harman/ d&b audiotechnik<br>JBL / Meyer sound / RCF 48 channel mixer with stage box-Digico/ Tamura / Soundcraft<br>Control Processor- Crestron / AMX / Keydigital |
|  | USB Player   | Sony/ Philips/ Samsung/ Bose  |
|  | Audio Conference System/ Delegate and chairman Microphones/ Wireless Handheld and Lapel Microphones/ Wired Handheld/ Gooseneck Microphone                          | Beyerdynamic/Clear One /Clock Audio/ Sony/ AKG-Harman<br>Sennheiser / Revolabs / Audio Technica   |
|  | Digital Signal Processor   | Bose / Symetrix / Bi-Amp<br>Crsetron / BSS / Polycom  |
|  | Audio Mixer  | Allen & Heath/ Behringer/ RCF   |
|  | Equipment Rack   | Rittal/ Netrack/ Cisco/MTS/APW/ Legrand - Valrack / Chief/ Middle Atlantica<br>APW President /  |
|  | PVC Conduits & Raceways  | AKG/BEC/ Hensal/ Clipsal/ Polypack/ Precision/ Norpack  |
|  | Lighting Controllers & LED Dimmable Lights   | Philips/ Wipro/ Havells / Lutron/Trilux/ ERCO/ Zumtobel   |
|  | LED Signage Board  | Wipro/ Philips/ Bajaj/Instapower/Decon/ Eaton<br>LG / Planer / Barco / Lifesize   |
|  | Video Projector  | Christie/ Sony/ Panasonic/ Philips/ Epson/ Barco/<br>Digital Projection   |
|  | Projection Screen  | Draper/ Da-Lite/ Grandview/ Harkness/ Suvira/<br>Stewart<br>Suvira / Liberty / Draper   |
|  | LED Display Monitors   | LG/ Sony/ Panasonic/ Samsung  |
|  | Video Wall/ Flat Panel Display   | Christie/ NEC/ Planar/ Sony/ Philips/ Panasonic/<br>Samsung/ LG<br>Delta / Barco / Decktronics  |
|  | Document Camera  | Lumens/ Elmo/ Wolf Vision/ Sony<br>/Lumens / Vaddio / Datavideo   |
|  | Video Conferencing System & Secondary Camera   | Sony/ Polycom/ Pelco/ Cisco/ Lumens   |
|  | HD PTZ Camera & Joystick   | Sony/ Panasonic/ Pelco/Cisco/Bosch/ Lumens<br>Sony / Datavideo / Aver   |
|  | Recorder/ Streamer   | Lumens/ Mediasite/ Mediapointe  |

|  |   |   |
|--|---|---|
|  |   | Sony / Datavideo / Aver / Lifesize  |
|  | Cable Manager/ HD BaseT Transmitters/ HD BaseT receivers/ Scaler Extender/ Modular Matrix Switcher/ Multi Format Presentation Switcher/ HDMI Switcher/ HDMI Distribution Amplifier/ HD BaseT Distribution Amplifier/ Control System/ Wireless/Wired Touch Panel with accessories/ Button Control Panel with Accessories | Kramer/ Extron/ Lightware<br>Dual channel and Quad channel amplifier- Crown / JBL / RCF / Powersoft<br><br>Video over IP Transmitter and Receiver/ Wireless Presenter / HDMI over HDBT Transmitter and Extender and Receiver/ 10 x 1 Digital media Switcher/ 10" Touch Panel with Power adaptor - Crestron / AMX / Keydigital |
|  | Optical Fibre Cable   | Extron/ Crestron/ Kramer/ Belden/ Legrand/ Havells/ Commscope   |
|  | Cat 6/6a Cable & Patch cords, connectors, adaptors  | Belden/ Simone/ Panduit/ Commscope/ Cisco/ Klotz / Crestron / AMX / Keydigital Legrand/Tadiran/ Crestron/ Molex   |
|  | Network switch & Wifi access points   | Netgear/ HPE/ Juniper/ Cisco/ Dell/ Alcatel/ Avaya Dlink  |
|  | HDMI / VGA Cable, Microphone cable, control cable, HDMI/ VGA patch cable, Speaker & Microphone cable  | Kramer/ Belden/ Klotz/ Extron/ Lightware/ Crestron/ Crystal<br>Speaker cable / Microphone cable-Klotz / Sommer / Gotham<br>HDMI, VGA cable- Klotz / Crestron / AMX / Keydigital   |
|  | Stage Lighting – Spot Light, Par Light, Flood Light, Dimmer Pack, Lighting Console, Splitter, Lamp prism with moving head   | Canara Lighting/ Effectron/ Stage Technologies/ Harman/ Philips/ ETC/ LEKSA/ Shenoy/ Lutron / ADB /   |
|  | Junction Box  | ABB/L&T/Havells/Schneider/Legrand/ Hager/ OBO Bettermann/ Siemens/ Neptune Seimens / Leksa Lighting   |
|  | Accessories for Lighting Fixtures like C-Clamp, Safety bond & Name plates etc   | Canara Lighting/Doughty/Manfrotto / Avenger/ Leksa Lighting   |
|  | Curtain Control Panels/ Remote Control/ Motorized Curtains/ Motorised Light Bars / Wings / Cyclorama frame  | Canara Lighting/ Effectron/ Stage Technologies/ Shenoy Lighting/ Waagner-Biro/ Leksa Lighting   |
|  | RGY Laser   | CT Lasers/ Canara Lighting/ Laser World   |
|  | Fog Machine & Metal Gobos   | Antari/ Canara Lighting/ Robe/ Effectron/ Stage Technologies  |
|  | Fire Retardant Curtain, Plastic cyclorama screen  | Ompile/ Raymond/ Mayur Comrade  |
|  | Lamps   | Osram/ Philips/ Wipro/ Bajaj/ Havells   |
|  | DMX Signal Cable for DMX Network  | Falcon/ Beldon/ Polycab/ Finolex/ Beldon/ Canara/ Leksa Lighting  |
|  | DMX Lighting Controller &   | Avolites/Lite-Puter/Zero 88/ Canara Lighting/ Leksa   |



|  |                         |  |
|--|-------------------------|--|
|  | DMX Splitter            | Lighting/<br>/ ETC / ADB / Elation   |
|  | Smart Podium            | Univeso / AHA / Tech Comm  |
|  | Interactive White Board | Promethean / HiteVision / Smart<br>interactive monitor- Wacom / Almo / IES |

| <b>Solid Waste Management System</b> |   | <b>Approved Make</b>  |
|--------------------------------------|---|---|
| 1.                                   | Sterilizer/ Autoclave for Bio Medical Waste   | Envicare Soln. Pvt. Ltd / Celitron / Ecodas / Cisa / Cecon Pollutech Systems / Excel Industries Ltd |
| 2.                                   | Organic Waste Converter   | Envicare Soln. Pvt. Ltd/ Excel Industries Ltd/ Cecon Pollutech Systems                              |
| <b>Mechanized Car Parking</b>        |   | <b>Approved Make</b>  |
| 1.                                   | Mechanized Car Parking  | RR Parkon/ Klaus/ Newturn/ Dantel   |
| <b>Note:</b>                         |   |   |
|                                      | The contractor will use one of the approved makes as mentioned above with prior approval in writing from Engineer-in-charge.  |   |
|                                      | In case of different quality / pattern of same make, the pattern/ quality shall be approved Engineer – in – charge.   |   |
|                                      | For materials/equipment to be used in items of work for which approved makes are not given herein above, the makes & models of such materials /equipment shall be as approved by Engineer –in-charge.   |   |
|                                      | If any major equipment is using a small component of make other than that given as a standard component with the equipment, the same shall be accepted subject to approval of Engineer –in-charge.  |   |
|                                      | In case of non-availability of the approved Make specified as above, alternate equivalent make of the item/ material may be used subject to submission of documentary evidence of non-availability of such specified make and prior approval of Engineer-In-Charge. |   |