

**TENDER FOR ELEVATOR PART 1
COUNCIL FOR SOCIAL DEVELOPMENT
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PARTICULAR CONDITIONS OF CONTRACT

1. GENERAL STANDARDS

These standards are intended to describe a quality elevator & escalator system using all new equipment, parts, materials, components installation, and service techniques.

1.1 STANDARDS AND DESIGN CRITERIA

The following standards and design criteria are for the guidance of the elevator & escalator system tenderer in understanding features and facilities, and the quality of after sales services required for the Projects.

The contractor shall regard these standards and specifications describing a complete, functioning system with necessary intelligence, flexibility and riding comfort provided herein. Nothing in these specifications shall be taken to state or imply "work by others" except where specifically so mentioned. The tenderer shall, at the time of tender, clearly indicate features and facilities which he is unable to provide or modifications or any alternate system he wants to offer. Such features & facilities shall be clearly identified at the time of submitting his offer. The cost of such items for materials, equipment, and labour shall also be identified separately.

2. GOVERNING CODES AND PERMITS

2.1 CODE (IMPORTED EQUIPMENT)

Elevator equipment shall be furnished and installed in accordance with A.N.S.I. / A.S.M.E. A17.1/ CENEN 81-1 Japanese Codes including latest supplement. The Tenderer shall inform the owning Company of any intended or required departures from the code requirements described above.

No degradation of ANSI/ASME/CENEN 81-1 requirements is acceptable simply on the basis of the local code requirement. It is acceptable only when the ANSI/ASME/CENEN 81-1 code is in direct conflict with local code requirements and where the latter is more stringent than the former.

2.2 CODE (LOCAL EQUIPMENT)

Equipment shall comply with the following codes including latest modifications / additions / alterations, if any.

- a. Code of Practice for installation, operation and maintenance of electric and good lifts. IS: 14665: 2000
- b. List of Indian Standards mentioned in Appendix-III.
- c. List of Acts / Bye-Laws mentioned in Appendix-IV.

2.3 PERMITS AND INSPECTIONS

The elevator system tenderer shall obtain all permits/license at their cost and pay for any and all fees required for the inspection, approval and commissioning of the /installation and the license shall be in the name of "COUNCIL FOR SOCIAL DEVELOPMENT". All costs associated with obtaining necessary permits should be included in the price.

3. PROJECT EXECUTION AND MANAGEMENT

The Tenderer shall ensure that senior planning and erection personnel from its organization are assigned exclusively for this project. They shall have minimum 10 years of experience in this type of installation. The Tenderer shall appoint one erection engineer and one senior supervisor posted at site on full time basis.

For quality control and monitoring of workmanship, tenderer shall assign at least one full time engineer who would be exclusively responsible for ensuring strict quality control, adherence to specifications and ensuring top class workmanship for the installation. The tenderer shall arrange to have mechanized and modern facilities of transporting material to place of installation for speedy execution of work.

4. GUARANTEE, MAINTENANCE

4.1 GUARANTEE

The tenderer shall guarantee all equipment parts, materials and workmanship furnished for the installation. The elevator & escalator tenderer warrants to replace for a period of 12 months from the date of acceptance. All failed parts or parts exhibiting unusual wear and tear during guarantee period shall be replaced without any cost to the Owners, and such replacement shall be factory approved new, equal or better than original. All labour, tools, materials, transportation, insurance, etc. required in performance of guarantee work shall be at the elevator tenderer's expense.

4.2 MAINTENANCE

The tenderer shall maintain the elevator & escalator system in a first class and safe manner during guarantee period. Such maintenance shall be for the entire elevator system except when failure occurs due to work performed by others. Responsibility entails daily inspection by the supervisor / technician and unlimited call back service including nights, weekends and holidays.

The tenderer shall maintain the elevator system in a professional, first class manner and keep and maintain elevator motor room and equipment in a neat workman like order.

The tenderer shall anticipate demand on supplies and parts and keep an inventory of a reasonable number of spare parts, at their own cost, on site in a self-provided lockable metal cabinet.

8. **DEVIATIONS**

Tenderer shall stipulate the deviations, if any, from these Technical Specifications, and reason thereof

9. **STRUCTURAL REQUIREMENTS**

Tenderer shall clearly indicate the structural and electrical requirements for the installation of elevators. Machine room, shaft and pit shall be provided by the Owner through another agency. Other preparation work and all items of supply and installation in the hoistway shall be the responsibility of the tenderer.

10. **EXCLUSIONS**

Any items excluded from the offer, but functionally required, shall be clearly defined and listed by the tenderers, giving description of the items, quantity and estimated cost and the reason for excluding the items.

11. **TOOLS AND TACKLES**

All tools, tackles, supports, scaffolding and staging etc. required for erection and assembly of the equipment and installation covered by the contract shall be provided by the Tenderer himself. In addition, all other materials such as foundation bolts, nuts etc. required for the installation of the equipment shall also be provided by the tenderer at his cost.

12. **TESTING AND HANDING OVER**

- a. The Tenderer shall carry out test run of the installation in the presence of representatives of Owner/Service Consultant/Consultant, to establish satisfactory functioning of the installation.
- b. The Installations shall be handed over to the Project Manager / representative of the owner after satisfactory testing along with six sets of completion documents each consisting of:
 - i. Detailed equipment data and catalogues.
 - ii. Manufacturer's maintenance chart including check chart and Lubrication chart.
 - iii. Set of "AS INSTALLED DRAWINGS" showing layouts, equipment details, electrical power & control wiring diagrams etc.
 - iv. Test Certificates for major equipment.
 - v. Certificates of approval from Statutory and/or Local Authorities for the operating and maintenance of the installation and equipment, wherever such approval of certification is required. (Lift inspector's certificate/ license).
 - vi. Certificate from the Engineer that the tenderer has cleared the site of all debris and litter caused by him during the Construction.
- c. Submission of the above documents shall form a precondition for the final acceptance of the installation and final payment.

- d. Upon handing over, the Project Manager shall issue to the tenderer the necessary certificate of acceptance.

13. SAFETY PRECAUTIONS

- a. A competent and authorized supervisor/Erector shall be on the site whenever the tenderer's men are at work. The supervisor/Erector should ensure that all plant and machinery used on the site are rendered safe for working and meet with the Indian or International safety standards applicable for the use and operation of such machinery. The supervisor/Erector should also ensure that the workmen at site are made to use safety appliances such as safety belts, life lines, helmets etc.
- b. Smoking shall be altogether strictly prohibited in all areas of work as well as where combustible and inflammable goods/materials are stored or lying about.
- c. Any hot job such as welding, soldering, gas cutting shall not be carried out without the permission of the Engineer. Such jobs shall not be out where inflammable materials are stored or lying about.
- d. All electric connections shall be through adequately sized mechanically protected cables without any joints and with proper and adequate terminals boxes. All power supplies shall be through properly rated fuses with isolating devices. No such hot jobs shall be carried out on holidays and without the presence of the Tenderer's Supervisor and Owners permissions.
- e. It is entirely the responsibility of the Tenderer to practice the principles of 'SAFETY FIRST' during the entire tenure of work with adequate insurance covering injury or death to workmen, loss by theft or damage to materials and property and third party.
- f. The Tenderer should clear the site of all debris every day to avoid accidents. In case this is not done, the Owner may engage necessary labor to maintain the cleanliness of the premises and removal of debris and recover all or part of the expenditure so incurred from the Tenderer.
- g. Tenderer shall at his own cost ensure that all of his personnel, employees, work men and other associated persons working with him at site are adequately insured as per labour laws and statutory provisions. The Tenderer shall be responsible for all injuries/damages to men, materials and properties etc. which may arise from the operations or negligence of himself and/or his sub tenderers and indemnify the Owner for all such expenses which shall be solely to tenderer's own account.
- h. Tenderer shall at his own cost, provide and maintain a full-fledged first-aid-box to give immediate medical aid to the workers / supervisory staff, in case of emergencies.
- i. The tenderer shall carry out the work strictly as per the safety aspects and procedures outlined in Appendix -V.

14. STORAGE AT SITE

The tenderer shall have to make his own arrangement For accommodation of staff, safecustody of materials, etc. No storage space shall be provided at site.

15. **TAXES & DUTIES**

The rates quoted should be inclusive of all costs stating clearly the taxes, duties etc. as applicable.

16. **ESCALATION**

The prices quoted shall remain firm and free from any variations/fluctuations till the completion of the works and no escalation on any account shall be payable.

17. **UPTIME GUARANTEE**

The tenderer shall guarantee for the installed system an uptime of 98%. In case of shortfall in any month during the defects liability period, the defects liability period shall get extended by a month for every month having shortfall.

18. **WORK BY OTHER AGENCIES**

The following associated civil and electrical work is being carried out by Owner through other Agencies:

- a. **Hoist-Way:** Hoist way shall be made properly framed and enclosed, including a pit of proper depth with drainage provision and water proofing. The hoistway and pitwalls shall be duly treated and painted. Support for buffer spring by M.S. channel shall also be provided.
Smooth, vertical & painted/whitewash hoistway shall be provided by the civil tenderer.
- c. **Hoistway Guard:** Provision shall be made during construction for proper guarding and protection of hoistway and temporary barricading of hoistway en-trances to be done by the tenderer.
- d. **Power and Light:** Power /light shall be provided :-
 - i. Power in the machine room for the lift machine with one isolating switch including independent earthing.
 - ii. Proper lighting and air conditioning of machine room.
 - iii. Lighting of the lift shaft (Bulk head at every floor level, power point (16 A) at every floor and in the lift pit.

19. **MISCELLANEOUS**

The following shall be in the scope of the elevator tenderer and it shall be his responsibility to arrange the items in order to complete the installation.

- a. M S Scaffolding
- b. All minor builder works such as chipping of surfaces, cutting and finishing of walls/floors/partitions etc shall be responsibility of elevator tenderer.

- c. All steel items included except architraves foundation & support and lifting hook in the machine room
- d. Stainless Steel Jamb Panel & sill Angles.

20. QUALITY ASSURANCE PROGRAM & TEST PROCEDURE FOR ACCEPTANCE

Following test procedures shall be carried out prior to acceptance of elevator system.

- a. Test to determine that the insulation resistance between power and control lines and earth is as per specified IS codes.
- b. Test to determine that the earthing of all conduit, switch, casings and similar metal works is continuous and of low resistance.
- c. Test to determine that the motor, brake, control equipment and door locking devices and limit switches function correctly.
- d. Brake to be tested to check whether it can sustained a car at rest with 25% of contract load.
- e. Test to determine that the lift car raises and lowers rated load.
- f. Test to determine that the lift car achieves the contract speed.
- g. Test to determine that the safety gear stops the lift with the rated load.
- h. Test for rated power against actual power consumption under full load.
- i. Check for current drawn by each elevator during starting and full load operation.
- j. Sound level check for motors.
- k. Visual inspection for all components.

Besides the above, tenderer shall submit his standard quality assurance program and test acceptance procedures for reference of Project Manager / Services Consultant.

21. MAINTENANCE

Tenderer may be required to carry out all inclusive maintenance of the entire system for a period of four years beyond the defects liability period.

a. Scope

The AMC shall cover all the items installed by the Tenderer including consumable like gaskets, rings, broken / damaged parts, etc.

b. Routine Preventive Maintenance Schedule to be submitted

- i. Schedule to cover manufacturer's recommendation and/or common engineering practice (for all plant and machinery under contract).

- ii. Plant and machinery history card giving full details of equipment and frequency of checks and overhaul.
- iii. Monthly status report.
- c. Uptime during maintenance contract
 - i. 98% uptime of all systems under contract.
 - ii. Up time shall be assessed every month and in case of shortfall during any month the contract shall be extended by a month.
 - iii. There shall be no reimbursement for the extended period.
 - iv. Break-downs shall be attended to within ten hours of reporting.
 - v. Spare motor assembly to be made available within seven calendar days in case of total breakdown/burnout.
- d. Manpower
 - i. Adequate number of persons to the satisfaction of the Owner's site representative shall be provided including relievers.
 - ii. Statutory requirements of EPF, ESIC and other applicable labour legislations to be complied with; and monthly certification to that effect to be submitted.
 - iii. Duty allocation and Roaster control shall be tenderer's responsibility.
 - iv. No overtime shall be payable by Owner for any reason whatsoever.
- e. Shut Downs
 - i. Routine shut downs shall be permitted in consultation with Owner.
 - ii. Tenderer shall be at liberty to carry out routine maintenance as and when required but with prior permission of the Owner.
- f. Payment Terms
 - i. Quarterly payment at the beginning of each quarter on pro-rata basis.

22. INSPECTION AND TESTING

The Owner shall carry out inspection and testing at manufacturer's works for item elevators for this contract. No equipment shall be delivered without prior written confirmation from Project Manager.

Tests at site of completed works shall demonstrate the following, among other things.

That the equipment installed complies with specification in all respects and is of the correct rating for the duty and site conditions.

That all items operate efficiently and quietly to meet the specified requirements.

That all electrical circuits are correctly protected and that protective devices are properly coordinated.

The tenderer shall provide all necessary instruments and labour for testing, shall make adequate records of test procedures and readings, shall repeat any tests requested by the Project Manager and shall provide test certificate signed by a properly authorized person. Such test shall be conducted on all materials and equipment and tests on completed work as called for by the Project Manager at tenderer's expenses unless otherwise called for.

If it is proved that the installation or part thereof is not satisfactorily carried out, then the tenderer shall be liable for the rectification and retesting of the same as called for by the Project Manager whose decision as to what constitutes a satisfactory test shall be final.

The above general requirements as to testing shall be read in conjunction with any particular requirements specified elsewhere.

APPENDIX - I

LIST OF DRAWINGS

| S. NO. | DRAWING NO. | DRAWING TITLE |
|--------|-------------|---------------|
|--------|-------------|---------------|

No drawings are being issued with this tender.

APPENDIX – II

LIST OF INDIAN STANDARDS

| | | |
|-----|--|--|
| 1. | Code of Practice for installation, operation and maintenance of electric & goods lifts. | IS-14665 (Part 2) Sec-1 : 2000 |
| 2. | Code of practice for installation, operation and maintenance of electric service lift. | IS-14665 (Part 2) Sec-2 : 2000 |
| 3. | Safety Rules Section-1 and Good Fits. | IS-14665 (Part 3) Sec-1 : 2000 |
| 4. | Safety Rules Section-2 – Service Lifts | IS-14665 (Part 3) Sec-2 : 2000 |
| 5. | Outline dimension for electric lifts. | IS-14665 (Part-1) : 2000 |
| 6. | Inspection Manual for Electric Lifts | IS-14665 (Part 5) : 1999 |
| 7. | Electric Traction Lifts – Components | IS-14665 (Part 4) Sec-1 to 9 : 2001 |
| 8. | Specification for lifts cables. | IS-4289 (Part-1) : 1984 Reaffirmed 1991 |
| 9. | Specification for hot rolled and slit steel tee bars. | IS-1173-1978 Reaffirmed 1987 |
| 10. | Method of loading rating of worm gear. | IS-7443-1974 Reaffirmed 1991 |
| 11. | Code of practice for selection of standard worm and helical gear box. | IS-7403-1974 Reaffirmed 1991 |
| 12. | Isometrics screw threads. | IS-4218-(Part-II)1976 Reaffirmed 1996 |
| 13. | Degree of protection provided by enclosure for low voltage switchgear and control gear. | IS-2147-1962 |
| 14. | Classification of insulating materials for electrical machinery and apparatus in relation to their thermal stability in service. | IS-1271-1985 Reaffirmed 1990 |
| 15. | Code of practice for earthing. | IS-3043-1987 |
| 16. | Electrical installation Fire Safety of Building. | IS-1646-1997 |
| 17. | PVC insulated electric cable for working voltage upto and including 1100 volts. | IS-694-1990 |
| 18. | Code of practice for electrical wiring and installation | IS-732-1989 |
| 19. | PVC insulated (Heavy Duty) electric cables for working voltage upto and including 1100 volts. | IS-1554-1988 (Part-1) |
| 20. | Flexible steel conduits for electrical wiring | IS-3480-1966 |

| | | |
|-----|---|-----------------------|
| 21. | Accessories for rigidsteel conduit for electrical wiring | IS-3837-1976 |
| 22. | Boxes for the enclosure of electrical accessories | IS-5133-1969 (Part 1) |
| 23. | Guide for safety procedures and practices in electrical work. | IS-5216-1982 (Part-1) |
| 24. | Marking and arrangement of bus bars | IS-5578 & 11353-1985 |
| 25. | Conductors for insulated electric cables and flexible cords | IS-8130-1984 |
| 26. | Factory built assemblies of switchgear and control gear for voltages upto and including 1000 V AC and 1200 VDC. | IS-8623-1977 (Part-1) |
| 27. | Miniature Circuit Breakers | IS-8828-1996 |
| 28. | Rigid steel conduits for electrical wiring (Second revisions) | IS-9537-1981 |
| 29. | Methods of test for cables | IS-10810-1998 |
| 30. | Earth Leakage Circuit Breakers. | IS-12640-1988 |
| 31. | Moulded Case Circuit Breakers | IS-13947-1993 |
| 32. | General requirement for switchgear and control gear for voltage not exceeding 1000 volts. | IS-13947-1993 |
| 33. | Nomenclature of floor &storey | IS-2332-1972 |
| 34. | Inspection Manual | IS-14671-1999 |

A P P E N D I X – I I I

LIST OF ACT / BYE-LAWS

The lift installations shall also be governed by the following Acts/Bye-laws/Codes as amended upto date in addition to the codes specified in the tender:

1. National Building Code of India –2005
2. ECBC – 2007.
3. Indian Electricity Act - 2003
4. Indian Electricity Rule - 1956
5. Local Lift Act
6. Building Bye-Laws
7. Local Fire Prevention and Fire Safety Rule

A P P E N D I X – I V

SAFETY ASPECTS & PROCEDURES

1. Since lift installation consists of a number of electrical and mechanical components having linear / rotary motions, utmost caution should be exercised while working and all safety precautions shall be rigorously followed.
2. Only authorized persons shall be allowed to work on lift installations and officer (s) empowered for such authorization shall keep proper record thereof during the tests; inspection and maintenance except where necessary.
3. If during erection any safety or protection device is inoperative, special care must be taken to avoid accidents on this account
4. Wherever possible, the lifts (in use) adjacent to the one under erection / test / repair shall be shut down. Otherwise caution shall be exercised so that accidental contact of his body is avoided from the adjoining lift / lifts by suitable partition barriers.
5. Supply at main incoming iron clad switch or circuit breaker shall be switched off before examining any part of the equipment. Whether during periodical inspection, or while carrying out any work on the equipment (including using the winding handle at times of mains failures) unless power is particularly required for particular operation or tests on the lifts. The fuse grip of main switch shall be removed and kept under the safe custody.
6. Whenever the car needs to be moved by use of winding handle in the machine room;
 - a. Power at incoming shall be switched off before applying the handle.
 - b. Power shall be restored only after this handle is removed from winding shaft and brakes are applied.
7. The landing and car buttons shall be kept out of circuit by switching on the 'Maintenance Switch' located on the top of the lift car during maintenance operators. Whenever maintenance switch is not provided emergency stop switch inside car and or attendant control switch should be used.
8. Before carrying out any repair work it shall be ensured that none of the electro-mechanical door locks are short circuited either from the controller or at the landings.
9. As a general precaution, fascia plate between the door header and the corresponding upper landing sill on each floor must be provided.

APPENDIX – VI
TECHNICAL DATA SHEET FOR ELEVATOR SYSTEM

| S. No. | Description | Passenger Elevator (P1) |
|--------|--|--|
| 1 | Type of Elevator | Passenger Lift |
| 2 | Operation | Simplex |
| 3 | Control | ACVVVF |
| 4 | Operation W / Wo Attendant | W / WO |
| 5 | Capacity | - |
| | a. Rated Load (Only Live Load) (Excluding Dead Load) | 6 person |
| | b. Additional Weight of Material for Interior of the Car | - |
| | c. No. of Persons | 6 |
| 6 | Machine | PMS type Gearless machine |
| 7 | Speed (Mps) Rated | 1.00 |
| 8 | Travel | G, F, S, Terrace |
| 9 | Rise In Meters (Approx) | 14.5mtr |
| 10 | Stops and Openings | |
| | a. No. of Stops | 4 |
| | b. No. of Openings(variable & programmable for not stopping at few levels) | 4 |
| | c. Same Side | 4 |
| | d. Opposite Side | - |
| 11 | Car size in (mm) (inside dimensions) to be Confirmed by Vendor | 900 x 1100 |
| 12 | Available Hoist way size (mm) (W X D) (Inside Dimensions) | 1550 X 1600 |
| 13 | Door Operation | Automatic with ACVVVF Motor Door operator with electronic/ infrared sensor door detector |
| 14 | Car entrance (mm) to be confirmed by Vendor | 700 x 2000 (2SP) |
| 15 | Height of Lift Car | 2200 mm |
| 16 | Machine Room (Required) | Machine Room Less |
| 17 | Pit depth available | 1600 mm |
| 18 | Overhead available (to be confirmed by vendor) | 4500 mm |
| 19 | Noise Level in Cabin (Running Car) | 55 dB (A) |
| 20 | Car Enclosure/ Finishes | SS Hairline |

| S. No. | Description | Passenger Elevator (P1) |
|--------|---|---|
| 21 | Door Finish | SS Hairline |
| 22 | Flooring | PVC |
| 23 | Cooling In Elevator | Blower mounted on roof with two side ducts. |
| 24 | Signals | |
| | a. Micro Motion Hall Button With LCD/LED Display | Yes |
| | b. LCD/LED in the car where it shall act as per assignment, indicator, car position & direction indicator | Yes |
| | c. LCD/LED Hall Position Indicators at all Floors | Yes |
| | d. Battery Operated Alarm Bell, Emergency Light& Fan | Yes |
| | e. Overload Warning Indicator In Car | Yes |
| | f. 3 Way Intercom | Yes |
| | g. Fireman's Switch On Ground Floor | Yes |
| | h. ARD/ Emergency Landing with battery back up | Yes |
| | i. Music System (Cable To Be Provided upto Machine room) | Yes |
| | j. Car Ceiling | SS |
| | k. Lighting | LED |
| | l. Door Protective Device | Yes |
| | m. Bumpers To Protect Against Service Trolley | Yes |
| | n. Emergency Public Address System | Yes |
| | o. Motor Rating (HP/ kW) | Must be clearly identified by Bidders |
| | p. No. Of Starts/ Hour Withstand | Must be clearly identified by Bidders |
| | q. Infra-red screen for car door (Minimum 94 criss-cross beams) | Yes |
| | r. Overload Holding Stop | Yes |
| | s. Overload By Pass | Yes |
| | t. Spring/Oil Buffers | Yes |
| | u. Finishing At Landing Doors | Glass style door with brush gold finish |
| | v. Adjustable door open time | Yes |

| S. No. | Description | Passenger Elevator (P1) |
|--------|--|-------------------------|
| | w. Anti-nuisance (empty car) | Yes |
| | x. Anti-nuisance (car call cancellation at direction reversal) | Yes |

| | | |
|-----|---|--|
| | y. Blower fan in car for ventilation | Yes |
| | z. Braille on push buttons | Yes |
| 25. | Access Control System | |
| 26. | Provision of the CCTV inside the Car to be provided with full cabling and accessories | Yes |
| 27. | Natural mirror in car | Yes |
| 28. | Handrail | SS |
| 29. | Car operating panel | Full height - flush mounted |
| 30. | Landing operating panel | Individual landing operating panel for each elevator |
| 31. | Automatic operation for car fan | Yes |
| 32. | Car call cancellation by double pressing floor button in car operation panel | Yes |
| 33. | Door open and door close buttons in car operating panel | Yes |
| 34. | Door closing retries | Yes |
| 35. | Door nudging | Yes |
| 36. | Home landing | Yes |
| 37. | Infra-red screen for car door (Minimum 94 criss-cross beams) | Yes |
| 38. | Jammed landing operating panel call button by-pass | Yes |
| 39. | Motor overheat protection | Yes |
| 40. | Overload function with audio-visual indication in car operating panel | Yes |
| 41. | Phase failure and phase reversal protection | Yes |
| 42. | Automatic rescue device in case of power failure | Yes |
| 43. | Attendant control | Yes |
| 44. | Car arrival chime on car top | Yes |
| 45. | Display type in COP | Vendor to confirm |
| 46. | Display type in landing operating panel on all floors | Vendor to confirm |
| 47. | Fireman switch for one lift in a group on Ground floor | Yes |
| 48. | Parking operation (key switch in landing operating panel) on main floor | Yes |
| 49. | Voice announcement unit in English language in car | Yes |
| 50. | Anti microbial cladding on switches | Yes |
| 51. | Ultra Violet light inside the elevator to kill the virus | Yes |

Notes:

1. Vendor shall comply all guidelines related with Elevators and no deviation shall be allowed.

- 2. Traffic analysis shall be conducted by the vendor and shall be submitted along with the offer for confirming the size & speed of the lift.*

TECHNICAL SPECIFICATIONS

A. ELEVATORS

1. GENERAL

Elevators shall include all elements conforming to specifications or as amended herein. Elevators covered by this specification shall be provided, installed, tested, commissioned, certified and approved as per statutory requirements by Lift Inspectorate.

Notes:

- a. *One Fireman's switch at ground floor for each bank of elevators shall be provided.*
- b. *Emergency light of adequate illumination level shall be provided in all lift cars. It shall be operated by self-contained nickel cadmium batteries completed with self-maintained trickle charger. The battery shall be able to maintain the full illumination continuously for a period not less than two hours.*
- c. *Provision of additional weight for interior finishes shall be kept for passenger elevator. In case interior finishing materials in cab exceeds this provision, then the elevator contractor shall clearly identify the loss of carrying capacity, if any. Recess in platform of 25 mm shall be provided in floor for receiving stone flooring in the passenger elevator.*
- d. *All elevators shall be hooked to the Building Management System (BMS) including all necessary cabling, software and hardware. Elevator supplier shall co-ordinate with BMS vendor for the software compatibility between BMS & elevators system.*
- e. *Provision shall be provided to install speakers in all the elevators.*

For Machine Room Less Type elevators AC induction or P.M.S.M. ACV3F gearless traction type motor with brake, drive sheave, and deflector sheave mounted in proper alignment on a common, isolated machine support frame shall be provided at the top of the hoist way or mounted on the back of the guide rail at the top landing.

The motor shall be reversible type particularly designed for elevator service with high starting torque and low starting current. Sound reducing material shall be installed under machine. Hoist machine mounted direct drive shall be provided with digital, closed-loop velocity encoder.

Ladders and platforms with handrails and toe boards for overhead sheave access within the bounds of the machine room. Headroom available is limited to 4000mm only.

2.2. EMERGENCY CRANKING

The hoisting machines shall be provided with a set of special tools including a hand crank to allow release of hoist brake and provide for manual movement of the car in case of emergency. These tools shall be hung up on a tool board fitted to a wall in the elevator machine room, with instructions for their use clearly written on the board both in English and the local language. The elevator system supplier shall qualify his bid with respect to manual cranking. An automatic switch shall be provided to

interrupt power to the elevator mains. Upon withdrawal of crank and manual resetting of power monitor switch, power shall be restored.

2.3 SPEED GOVERNOR

The car safety shall be operated by a mechanical centrifugal type car & counterweight driven speed governor located in the machine room at the top of the hoist way. The governor shall actuate a switch when excessive descending speed occurs, disconnecting power to the hoist motor and applying the brake prior to deployment of the safeties.

- 2.4 Power Conversion and Regulation Units for direct-current power for the operation of hoist machine brake, door operator, dispatch processor, signal fixtures, etc., solid-state, alternating current, variable voltage \ variable frequency (ACV3F), I.G.B.T converter/inverter drives \ controllers

Units shall be design to limit current, suppress noise, and prevent transient voltage feedback into building power supply, suppress solid-state converter noises, radio frequency interference, and eliminate regenerative transients induced into the mainline feeders or the building standby power generator.

Units shall be internal heat sink cooling fans as required,

- 2.5 Direct drive, solid-state, digital type encoder shall be provider to update car position at each floor and automatically restore the same after power loss.

Note:

All Elevator equipment including their supports and fastenings to building, shall be from the building structure minimize objectionable noise and vibration transmission to car, building structure, or adjacent occupied areas of building:

Noise level relating to Elevator equipment operation in machine room shall not exceed 70 dBA@ 1 mtr

3. **ELEVATOR MATERIALS**

Elevator way materials shall be non-flammable except traveling cable which shall be flame resistant. All other electrical cables shall also be flame resistant and housed in metal conduit or other metal enclosures.

3.1 **GUIDE RAILS**

Steel guide rails shall be installed to guide the car and counterweight, erected plumb and securely fastened to the building structure, fitted to ensure smooth joints. The guide rail shall be minimum 16 mm, tongued and grooved type. All insert plates & their positions & fixing to be provided by Elevator Contractor.

3.2 **BUFFERS**

Oil or spring type buffers shall be provided in the pit in compliance with ANSI/ASME/CENEN-81 or local code if more stringent. Clearance from underside of car resting on a fully compressed buffer shall be not less than 1.20m. Buffer shall be

designed for design speed + 15%. The oil buffers shall be self-resetting type and shall be provided with means for determining the oil level.

Switch shall be provided on buffer to limit car speed if buffer is compressed. Ladder(s) and platform(s) shall be provided buffer access

3.3 CAR

A car-frame fabricated from formed or structural steel members shall be provided with adequate bracing to support the platform and car enclosures. The car safety shall be integral with car-frame or shall be mounted on the bottom members of the car-frame, and shall be of the flexible guide clamp type designed to stop and hold a fully loaded car which exceeds descending speed. Safeties shall conform to ANSI/ASME/CENEN-81 or local codes if more stringent.

The car platform shall be of Aluminium/ Stainless steel plate as asked for in the Annexure I & II. The entire platform shall rest on rubber pads, so designed to form an isolating cushion between the car and car frame. Platform deflection shall be limited to maximum 3 mm under maximum normal operating conditions.

Recess in platform of 20 - 25 mm shall be provided in floor for receiving granite \ marble flooring in the passenger elevator as specified in the Datasheet

In case of freight or service elevators, the platform shall be provided with slip resistant 6 mm thick vandal proof Aluminium/Stainless Steel chequered plate flooring. The platform shall be arranged to accommodate one piece load of mechanical / electrical equipment, etc.

Rubber encased coil spring tension adjusted roller guides shall be provided for passenger elevators with speed of 1.75 mps or greater, mounted on top and bottom of the car frame, and on top and bottom of the counterweight frame to engage their respective guide rails. Service elevators and low speed elevators can have sliding guides on car and counterweights.

3.4 CAR TOP STATION

A car top operating station shall comprise of key operated switch and constant pressure up/down buttons which shall be provided on each elevator. Car shall respond to up/down command at inspection speed. The elevator contractor shall provide electrical fixture of 36 watt enclosed fluorescent or enclosed 2 x 18 Watt compact fluorescent switched from car top station.

3.5 COUNTERWEIGHT

A structural steel frame with cast iron or steel plate filler weights shall be furnished to provide proper counterbalance for smooth operation.

3.6 COUNTERWEIGHT GUARD

A metal counterweight guard shall be furnished and installed at the bottom of the hoist way, and shall wrap around counterweight rails for a height of no less than 1.80 m in order to protect accidental contact.

3.7 SHEAVES

Sheaves shall be machined grooves, balanced and shall maintain cable / sheave ratio well within requirements. Lubrication points shall be extended to a location that is easily accessible. No deflector sheaves to protrude into hoist way.

3.8 HOIST & GOVERNER ROPES

Hoist ropes shall be traction steel of size, construction and number to insure proper operation of the elevator and give satisfactory and safety assurance. Governor ropes shall be steel or to suit manufacturer's specifications.

All ropes shall consist of at least eight strands wound about a hemp core center. All ropes shall conform to ANSI/ASME/EN-81 or more governing codes or regulations. The minimum factor of safety for ropes shall be 10.

3.9 COMPENSATING ROPE

Compensating ropes shall be furnished and installed for all elevators with speed over 2.0 m/sec, and travel in excess of 30 m, to compensate for the shifting weight of the hoist ropes. A device shall be provided to tie the car and counterweight together to limit the jump of the car or counterweight. Compensating chain where provided shall be enclosed in a plastic flame resistant jacket to minimize noise.

3.10 ELEVATOR OPERATING DEVICES

Redundant series wired terminal stopping devices shall be provided to slow down and stop the car automatically at the terminal landings. Resetting a tripped device shall be done manually only.

3.11 PIT SWITCH

An emergency stop switch shall be located in the pit which when operated shall stop the car regardless of position in the hoistway.

3.12 TRAVELING CABLES

Travelling cable shall be secured to the cars underside. Cable shall be clear of all obstructions while car is in motion. Rubbing or chafing of cables against hoistway or equipment within hoist way to be avoided.

Lighting & power cable shall be with Fire retardant outer sheath.

Shielded wires and cables shall be provided for music, car access control, phone, TV, etc. Twisted type, 4 pair 14/0076 music cables and 4 pair 0.5 dia. Cat 3 cable for communication system shall be used. Travelling cables shall be flexible and suspended to relieve strain on individual conductors. A minimum of 10% spare conductors shall be provided in travelling cable.

3.13 WIRING

All wiring and electrical interconnections shall comply with governing codes. Wiring shall 1100 volt grade LHZS type and shall run in metal conduit, tubing or approved electrical raceways. Travelling cables shall be flexible and suspended to relieve strain on individual conductors. A minimum of 10% spare conductors shall be provided in travelling cable.

4. ELEVATOR ENTRANCES & CAR DOOR

All landing hoist way entrance door shall have center opening horizontal sliding type doors unless otherwise specified suitable for a clear opening as indicated in Technical Data for each type of elevator and shall include flush doors of hollow metal construction, extruded aluminium sill with anti-slip grooving and hanger supports and hanger cover shall be provided. Exposed surfaces of doors and frames shall be finished as directed by the Interior Designer.

Sheave type two-point suspension ball bearing door hangers and tracks shall be furnished for each hoist way opening. Sheaves shall not be less than 58 mm diameter and adjustable ball bearing rollers shall take the up thrust of the doors.

Elevator Entrances to have minimum two-Hour Fire Protection. Complete entrances bearing fire labels from a nationally recognized testing laboratory approved within the governing jurisdiction.

Car doors shall, unless specifically stated, be center parting, automatic power operated, variable frequency door operator or PWM DC door operator and electronic door detector. Infrared light beams shall be provided to act as a safety curtain across the door entrance to monitor the door closing. Only the door at the landing where the car is stopping shall be opened.

Car doors shall be hung plumb and even, to within 1 mm. with minimum number of 4 gibbs per leaf. Floor gibbs shall be well fitted so as to prevent popping noise as a car passes structural members, or car in motion in a shared shaft, etc. Hoistway doors shall be hung plumb and show a maximum of 6 mm joint at sides, top and bottom and 2 mm at centre joint. Narrow door frame or jamb panel shall be supplied by elevator contractor. A soft chime shall ring prior to doors closing and opening.

Frames: 14-gauge hollow metal at all floors.

Door Panels: 16-gauge steel, sandwich construction without binder angles. Leading edges of center-opening doors shall be provided with rubber astragals. Each car & hoistway door leaf shall be fitted with minimum of two (2) gibs per panel, one at leading and one at trailing edge with gibs in the sill groove entire length of door travel. Sight Guards: 14-gauge, same material and finish as hoist way entrance door panels. Construct without sharp edges.

Sills: Extruded aluminum

Sill Supports: Structural or formed steel shall be designed to support door sill based upon car loading classification.

Upon the car reaching landing in response to a hall or car call, a soft chime in the car shall sound. Door opening shall commence when the car is 25 mm from the leveling. Door open period shall be adjustable to within a range of + 1 second. Door-open-period on all floors except lobby floor shall be shortened to the extent that door closure will commence 2 seconds (field adjustable) following the sensor beam interruption by the last boarding or disembarking passenger. This period shall be adjustable to 1.5 seconds \pm 1.0 seconds. Normal door-open-period at lobby floor shall be monitored by the car's CPU. Door closure shall override "door-open-period" where car loading has reached by pass limit, or when another car approaches the lobby floor.

An approved positive interlock shall be provided for each hoistway entrance which shall prevent operation of the elevator unless all doors for that elevator are secured and shall maintain the doors in their closed position while the elevator is away from the landing. Emergency access to the hoistway as required by governing codes shall be provided.

4.1 CAR AND HOISTWAY DOOR OPERATOR

For each elevator door, an electric VVVF door operator or PWM DC door operator shall be furnished to simultaneously open the car and hoist way doors when the car is at a landing. The doors shall be closed simultaneously by motor power. Emergency key provision shall be made to open doors at all landing from outside of the hoist way.

In the event of interruption of electric power or failure of the door operator, it shall not be possible to open the car door manually from within the car.

An electric contact for the car door shall be provided which shall prevent elevator movement away from the landing unless the door is in the closed position. Each hoist way door shall be equipped with a positive electromechanical interlock and auxiliary door closing device so that the elevator can be operated only after the interlock circuit is established.

The doors shall open automatically while the car is leveling at the respective landing. The doors shall automatically close after a predetermined time interval has elapsed, but the momentary pressure of the "door open" button provided in the car shall reverse the motion and reopen the doors and reset the time interval unless overridden by the electronic door monitor. Door operation shall be consistent, smooth and quiet at all floors, regardless of door weight or varying air pressure.

4.2 DOOR CONTROL DEVICE

2D \ 3D , as specified in the technical datasheet, Infra-red door detector with minimum 150 cross beams with LEDs on edges & with variable timing shall be installed on each elevator with full screen infrared matrix or multiple beams extending vertically along leading edge of each door panel to full height of door above finished floor

This device shall prevent doors from closing and reverse doors at normal opening speed if beams are obstructed while doors are closing, except during nudging operation. In event of device failure, provide for automatic shutdown of car at floor level with doors open.

After beams of door control device are obstructed for a predetermined time interval (minimum 20.0 - 25.0 seconds), warning signal shall sound and doors shall attempt to close with a maximum of 1 kgm kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.

When beams are interrupted during initial door opening door shall be hold open for minimum of 3.0 seconds. When beams are interrupted after the initial 3.0 second hold open time, reduce time doors remain open to an adjustable time of approximately 1.0 - 1.5 seconds after beams are reestablished.

5. VOLTAGE FLUCTUATIONS

Vendor shall provide inbuilt auto voltage regulator with the Elevator power panel.

All electrical equipment supplied by the Elevator contractor shall withstand an incoming supply voltage fluctuation of +10% - 10% & Frequency fluctuations of + 3% to - 3%.

6. OVER-LOAD FEATURE

Elevators shall be fitted with the load weighing feature to illuminate "Over-Load" and defeat the car's operating circuits when car load reaches 110% or more of rated load. Car platform may require stiffening to minimize margin of error resulting from excessive deflection. Overload feature and / or circuit defeat for elevators shall conform to governing code.

Elevator system shall have provision to bypass all calls after 80 % loading

7. AUTOMATIC SELF-LEVELING

The elevator shall be provided with automatic self-leveling feature that shall bring the elevator car level to within ± 3 mm of the landing floor regardless of load or direction of travel. The automatic self-leveling feature shall compensate for over travel and rope stretch.

8. CAR SPEED

Car speed shall be based on the travel distance and number of floors. This has been specified in Annexure I & II.

9. **ACCELERATION / DECELERATION**

Acceleration / Deceleration shall be linear and smooth. Stops shall be without cable oscillations. Acceleration & Deceleration shall be site adjustable.

10. **NOISE LEVELS**

Noise from moving equipment including door operation, car motion, fan, etc. shall not intrude into adjoining spaces by more than 20 dB and adjoining occupied areas by not more than 10 dB. (All octave bands).

Noise level inside the car shall not exceed 50 dB. without car cabin fan running.

Noise level inside the car shall not exceed 55 dB. in case of door opening / closing. The noise level shall be measured at 'Zero Activity'.

11. **LATERAL QUAKING & VERTICAL VIBRATIONS**

Lateral quaking and vertical vibrations should not exceed 20 gal and 85 dB respectively. Contractor to demonstrate these parameters at site with performance analyzer.

12. **CAR POSITION INDICATOR (PASSENGER CARS)**

Scrolling alpha numeric car position indicator shall be installed above each operating panel. The position of the car in the hoist way shall be shown by illuminating the corresponding landing at which the car is stopped or passing.

13. **LIGHTING**

Elevator shall be provided with emergency lighting & alarm bell in each cab through car mounted dry cell rechargeable battery with minimum 5 years life expectancy & solid-state battery charger, necessary changeover relays. Location of light fixture to be coordinated with architects \ Interior Designer. Light output shall be minimum 50 LUX at floor level.

14. **HALL BUTTONS (ALL CARS)**

For elevators hall buttons shall be provided at each terminal landing. A single micro movement push button shall be provided at top most and the lowest floor landing, two micro movement buttons on a single plate shall be provided at each intermediate floor. When a hall call is registered by momentary pressure on a landing button, that button shall become illuminated and remain illuminated until the call is answered.

15. **CALL BUTTON**

Selection for call button for passenger car shall be as per Architect selection. Service/Freight elevator call buttons shall be as per manufacturer's standard product. The catalogues of the buttons offered shall be submitted along with the tenders.

16. **FIXTURE FINISHES**

The metal faceplates of the signal and operating fixtures in the cars and at the landings, along with the metal accessories in the cars, shall be hair line stainless steel or as selected by the Architect. Push button fixtures at the landings shall be of design approved by the Architect. All fixtures, form and finishes, etc. shall be subject to the Architect's and interior designer's approval.

17. **AUTOMATIC ELEVATOR RETRIEVAL SYSTEM (FIRE PHASE- I)**

All elevators shall be equipped with automatic elevator retrieval system which shall, upon signal from the central fire alarm system or manually operated key switch, cause all elevators to be dispatched automatically to the ground floor. Elevators shall, open their doors and remain at the ground floor. All floor and car buttons shall be rendered ineffective until the system is manually reset. A smoke detector shall be placed in close proximity to each elevator bank on the ground floor. If this device senses smoke, system shall land elevators at a pre-selected, alternate, landing floor. A key operated switch shall be provided at the ground floor to activate and reset the retrieval system manually. System shall be on line with NBC 2005 recommendations.

18. **INSPECTION OPERATION – ALL ELEVATORS**

A switch shall be provided in the car to permit operation of the elevator from top of the car for inspection purposes, with car and hall buttons inoperative. Car shall travel at inspection speed not exceeding 0.5 m/sec. Motion of car shall require constant pressure to directional button.

19. **INDEPENDENT SERVICE (ALL CARS)**

A key operated switch shall be provided in the car operating station which, when actuated, shall disconnect the elevator from the hall buttons and permit operation from the car buttons only.

20. **CAR OPERATING PANEL**

The car operating panel shall contain a bank of micro movement illuminated buttons marked to correspond to the landings serviced. Faceplate shall be constructed of stainless steel, satin finish or TOUCH SCREEN wherever specified.

It shall include floor buttons, alarm button, door open button, door close button and emergency push-to-call button. Plates shall be configured as per local building code accessibility standards including Braille.

Operating controls shall be within 900 mm to 1200mm above the car floor .

The emergency alarm button shall be connected to the 12 volt rechargeable battery circuit. A locked compartment integral with operating panel shall contain :

- a. Auto/manual/inspection key operated switch.
- b. Up/down button.
- c. Fan switches
- d. Synthesized voice announcements

On sounding of general fire alarm, the elevator shall if in motion, express to the ground floor. If stopped, the elevator shall open its doors and remain there until reset.

Emergency talk-back system shall be provided, installed in integral cabinet and connected to the EPABX by the low tension contractor.

All Passenger Elevators of 13 passenger capacity and above shall be provided with 2 Nos. Car operating panels and freight elevator with 1 No. Car Operating Panel.

Elevator vendor shall provide COP design to architect for review and coordination with Elevator cab finishes.

For elevators with destination control, the COP shall be provided in the locked box which can be used only in case of emergency.

21. ELEVATOR CONTROL PANEL (ECP)

ECP shall be vertical, totally enclosed cubicle constructed of sheet steel with hinged doors on the front and screwed panels or hinged doors on the back, giving easy access to all components inside the controller. The cubicle enclosure shall be minimum of IP 22. Panel ventilating fans shall be provided to maintain components temperature within limits.

It will have a microprocessor with solid state switching devices sequenced and interlocked. It will have monitoring points for Elevator position & Emergency Stop. ECP should be located such that it can be easily accessed from the last landing and shall be key locked and vandal proof.

It will provide protection but not restricted to the following:

- a. No-voltage or sustained under voltage
- b. Over current in any component
- c. Phase reversal of the power supply
- d. Over load
- e. Single phasing

ECP shall be arranged to cut-off the power supply, apply the brake and bring the car to rest at the nearest landing in the event any of the above failures occur. Same should happen, in the event of a signal from the Fire Alarm Control Panel.

22. AUTOMATIC LOAD BYPASS

Transducers in the car platform shall monitor passenger load which shall override "pre-programmed door open period" and dispatch the loaded car from the low terminal. The load weighing device shall also function in the same manner on all intermediate and top floors and in addition shall express to the next car call and ignore all hall calls. Hall calls which are bypassed shall not be canceled. The automatic load bypass device shall be field adjusted for 50% - 75% of rated load.

22.1 ONE CAR SIMPLEX (SERVICE)

- a. Operation shall be automatic by means of the car and landing buttons. Stops registered by the momentary actuation of the car or landing buttons shall be made in order in which the landings are reached in each direction of travel after the buttons have been actuated. All stops shall be subject to the

respective car or landing button being actuated sufficiently in advance of the arrival of the car at that landing to enable the stop to be made. The direction of travel for an idle car shall be established by the first car or hall button actuated.

- b. "UP" landing calls shall be answered while the car is travelling in the up direction and "DOWN" landing calls shall be answered while the car is travelling down. The car shall reverse after the uppermost or lowermost car or landing call has been answered, and proceeds to answer calls and landing calls registered in the opposite direction
- c. If a car without registered car calls arrives at a floor where both up and down hall calls have registered, it shall initially respond to the hall call in the direction that the car was travelling. If no car call or hall call is registered for further travel in that direction, the car shall close its doors and immediately reopen them in response to the hall call in the opposite direction. Direction lanterns shall indicate the changed direction and initiate gong when the doors reopen.

22.2 COLLECTIVE SELECTIVE GROUP CONTROL FOR PASSENGER ELEVATORS

- a. The elevator system shall have UP and DOWN buttons at each landing to select the desired direction of travel. The microprocessor-based controller to memorize all car and landing calls, and the system shall answer all registered calls sequentially & preferably in the current direction of movement.
- a. Each of the landing call shall be automatically allocated to the best placed (nearest car travelling in the same direction). Control to be designed such that cars are effectively spaced to give even service.
- c. Optimized response to hall calls shall be achieved by computing a relative system response (RSR) time for each registered hall call. The computation of each car's RSR time to a call shall be based on, but not limited to, such relevant factors as distance, service to previously assigned car and hall calls, car load, direction, door and car motion status, and coincidence of car and hall calls. The car with the least RSR shall have such a call assigned to it.
- d. RSR computations for each hall call shall be repeated several times a second and the hall call assignment might be changed if a more suitable car is found available.
- e. All cars to be parked at ground floor when there are no unanswered calls.
- f. A car arriving at a floor to park shall not open its doors. Cars shall open their doors only when stopping in response to a car or hall call.
- g. If for any reason the doors are prevented from closing and the car is unable to respond to a call, it shall lose its assignment and the call shall be transferred to the other car.
- h. When a car is filled to a predetermined load setting, it shall no longer stop for hall calls. Any registered hall call shall remain registered for the next elevator to respond.

- j. When the independent service switch in the car operation station is actuated, that elevator shall be disconnected from the hall button riser/s and operate independently from car buttons only.

22.3 FLEXIBLE CALL DESTINATION/ DESTINATION CONTROLLER

This system shall provide means for passengers to register their floor destination in elevator lobby and receive visual car assignment prior to entering a car. System shall assign cars, floor destinations, and passengers to cars based upon the varying traffic demands of the up-peak period.

An intelligent destination elevator control system to be provided to stream line the efficiency and control of destination elevators. The system to be monitor a building's population and predicts elevator traffic conditions. The system may monitor attributes of the destination elevators. Based on the monitored data, the system to be generate a data structure that renders time-tables and target elevator service quality parameters that to control the destination elevators. A time-table and target elevator service quality parameters may be selected to control destination elevators according to one or more customer selectable mode of operation parameters. The data structure may be processed to control UP and/or DOWN transportation capacities of the destination elevators while satisfying the one or more customer selectable mode of operation parameters.

23. EXPANDED LOBBY ZONE ARRANGEMENT FOR HEAVY DOWN PERIOD

The group supervisory control system shall be arranged to include a number of consecutive floors above the main floor as part of the lowest zone. Upon completion of travel within the expanded lobby zone, the car assigned to that zone shall return to a pre-designated floor.

23.1 CAR TO LOBBY OPERATION

Provide a key operated switch for each elevator at the main floor which, when actuated, shall cause the corresponding elevator to make a trip to the lobby as soon as the car is available for response to the special call.

23.2 NEXT CAR UP

"Next Car Up" shall be indicated by flashing of lantern for the car so designated at the lobby. Other cars shall remain parked with doors closed until each car, in turn, is assigned as "Next Car Up".

24. DESPATCH SYSTEM

The dispatch system shall be microprocessor based. The system's main computer shall communicate with each car's computer. Microprocessor shall be intelligent in that it learns traffic patterns and applies best solution to each traffic condition, as determined by shortest predictable response. The CPU shall monitor demand on the system and shall execute the most economical assignment of cars.

25. EARTHING

All conducting parts of the elevators / panels etc., power & lighting in the shaft shall be earthed properly as per codes to ensure safe operation

26. **BUILDING AUTOMATION SYSTEM REQUIREMENTS**

The Elevator Panel should have the following Provisions

- a. It shall be able to accept signal from the Fire Alarm Panel in case of fire and automatically ground the elevator to the designated floors (Default or alternate) on receipt of this signal.
- b. Potential free contact to indicate elevator trip status.
- c. Potential free contact to indicate elevator alarm status.
- d. Potential free contact to indicate Emergency Activation Switch status.
- e. It shall be able to accept signal from central monitoring panel & display movement of all elevator cars

FAS contractor shall provide necessary cabling up to Elevator Panel and termination shall be done by Elevator contractor.

Software Interface

The Elevator microprocessor panel should be compatible with BAS and should be able to communicate with the BAS in any of the following standard protocol like MODBUS, LONWORKS, BACNET etc. In case of multiple Elevators having individual microprocessor panels it should be possible to network all microprocessors panels and be connected to a master controller. BAS communication cable can be integrated directly to the master controller or in case master controller is not available it should be possible to integrate each Microprocessor controller to the BAS system. It should be possible to monitor the following data points through software integration.

- a. Elevator car position.
- b. Fire Emergency signal monitoring.
- c. Elevator Attendant Mode.
- d. Elevator Alarm Mode.

In case of fire it should be possible to control the life through software interface. All necessary hardware including interface card and accessories necessary for integration with the BAS system has to be provided by BAS contractor.

27. COVID – 19 SAFETY PRECAUTIONS

Anti Microbial Cladding:

Anti Microbial copper has a killing effect for both bacteria & virus. It is a metallic sticker on top of the current buttons, same size. It is 0.035mm metallic sticker with adhesive backing.

Ultra Violet Lamp:

254 nm UV light belongs to UV-C Ultraviolet Light & it has the best sterilization & ozone free. UV ray can kill the various microorganism, including bacteria propagule, spores, mycobacterium, viruses etc.

28. ADDITIONAL INFORMATION

Tenderer shall enclose with their offer the following additional information:

- a. List of installation of 1.5 mps & above installation completed by the tenderer during the last 5 years.
- b. Details of "In-House" facilities for testing and inspection of elevator materials.
- c. Details of service facilities in India in the respective project location.
- d. Confirm that elevator may be operated on DG sets and provide power characteristic to design the generator capacity.

Tenderers shall submit details / samples / photographs / catalogues for following. These shall be relevant to the project and the contractor shall indicate which of these are being offered in the bid.

- a. Hall Lantern
- b. Car Operating Panel.
- c. Hall Buttons
- d. Group Indication panel.
- e. Option for stainless steel finishes