



Gujarat University

TECHNICAL SPECIFICATIONS

PASSANGER LIFTS

Tender No: GU/ESTATE/QUA/2019-20/01

Tender Document

For

**CONSTRUCTION OF 2BHK OFFICERS RESIDENCE
AND 3 BHK TEACHERS RESIDENCE AT
GUJARAT UNIVERSITY**

TECHNICAL SPECIFICATIONS OF PASSENGER LIFTS

1.0 SCOPE OF WORK

These specifications cover the details of 5(five) nos. 8 persons/544 kgs. capacity Passenger lifts and 5 (five) nos. 1.5 MT capacity Goods Lifts including suitable Brake release tools (total 3 sets) to be designed supplied, inspection as may be necessary before despatch, delivery at site, installation, testing, commissioning and handing over to CDRI and the defects liability for a period of 1 year after completion of all works & handing over to client. Scope of work shall also include AMC (Annual maintenance contract) for 3 years after one year of defect liability period after handing over to client.

These specifications shall be read in conjunction with the General Conditions of Contract ,Additional Conditions of Contract.

2.0 GENERAL

The equipment and installation covered by these specifications shall conform to codes of practice in force and highest standards of workmanship and materials. This work shall be done in accordance with the provisions of the Local Lifts Authority rules and shall also conform to requirements of local municipal by laws, and subsequent provisions, as also any state or local Act in force and latest Indian Standard 14665 and all latest applicable BIS, NBC code and 'CPWD General Specifications for Electrical Works (Part III, Lifts & Escalators) 2003'.

The Entire electrical installation shall be done in accordance with the Indian Electricity Act 2003, Indian Electricity Rules 1956 as amended to-date. The Electrical wiring shall strictly comply with IS:732 and latest applicable BIS and NBC code. The electrical works shall also conform to CPWD General Specification for Electrical Work Part-I (Internal) 1994 and Part-II (External) 1994 as amended up to date.

The Contractor shall follow all Statutory Requirements as well as best trade practices in the manufacture & installation of lifts. The Contractor shall arrange to obtain the statutory approval of the Inspectorate of Lifts as may be required for commissioning of the lifts and handover for operation after satisfactory tests.

3.0 DRAWINGS

Before commencing work, the Contractor shall prepare and submit all drawings for individual lifts in required nos. necessary to show the general arrangement and details of lift installation, electrical etc. These drawings must be approved by the EPI/CDRI before installation and shall become part of the contract.

The Contractor shall, within 3(three) weeks of receipt of a Letter of award of contract, submit 4(four) copies of all working drawings showing pit, hoistway and machine room layouts clearly indicating and specifying all connected structural, electrical and architectural works including imposed structural static / dynamic loads (including breaking load on guides, reaction of buffers on lift pits, reaction on support points in machine room, lift well etc.) and electrical ratings including calculations for selection of kW rating of motor. Within 10 days of receipt of letter of award of contract, the Contractor shall obtain from the EPI/CDRI all the information he needs to prepare his drawings and shall have any interaction with the EPI/CDRI to finalise all parameters

and data for design. The Contractor will be responsible for any discrepancies, errors and omissions in the drawings or particulars submitted by him even if these have been approved by the EPI/CDRI. On approval of these drawings (within 2 weeks of submission of full documentation), the Contractor shall submit 8(eight) copies of approved working drawings incorporating corrections / comments, if any, and shall immediately commence work.

On completion of work, the contractor shall supply four sets of CD's and 8 (eight) copies of the detailed wiring diagram, 'As built' drawings and equipment operation & maintenance manuals and original certificates from 'Inspector of Lifts' for all the lifts. Further, a copy of such detailed diagram and a set of instructions for evacuation of passengers in case of breakdown of the lifts shall be framed and installed in the respective machine room by the Contractor.

The Contractor shall carry out all the work strictly in accordance with drawings, details and instructions of EPI/CDRI.

4.0 WORKS TO BE ARRANGED BY EPI/CDRI

The following items shall be provided to the Lift Contractor under instructions of the Department to suit the requirements of the lift Contractor.

- i. Hoistways, machine rooms and pits of specified dimensions (within normal building tolerances).
- ii. Floor, wall and ceiling finishes in hoistways, pits and machine rooms; including painting (except painting of equipment and materials supplied by lift Contractor) and waterproofing, as well as doors and windows in machine room.
- iii. Cables from main L.T. Panel Board through the hoistways terminating in and including individual Main Switches of required rating for 3 phase and single phase supply in Machine Rooms including necessary earthing.
- iv. Free 3 phase power supply for group testing and commissioning of lifts after erection is completed.
- v. Lighting installation within machine rooms as required by the lift Contractor including 1-phase main switch with ELCB at machine room.
- vi. The equipment shall be suitable to operate on 415 Volts 3 phase, 4 wires, 50 Hz. A.C. supply with a variation of $\pm 10\%$ in Volts and $\pm 5\%$ in frequency respectively. The supply for illumination and single phase equipment shall be 230 Volts A.C.
- vii. Lighting installation within hoistways and pits as required by the lift Contractor including 1-phase main switch at machine room.
- viii. Ventilation system of machine rooms with minimum 18" heavy duty exhaust fan in each machine room as per the requirement of NBC / BIS codes.
- ix. Providing of hoisting beam in the machine room for hoisting of equipment during erection and to facilitate maintenance in future.

5.0 LIFTS CONTRACTOR'S RESPONSIBILITIES: ANCILLARY WORKS

- i. All cabling, wiring and earthing from 3 - phase main DB in machine room to Lift Contractor's equipment.
- ii. All steel items i.e. machine beam/bases, pedestals/ bearing plate in the machine room, separators wherever required and buffer support channels, vertical iron ladder in lift and structural steel supports and brackets for the installation in etc., to suit the sizes of the hoistways.
- iii. Sill tracks including sill supports, supporting protection at all landings.
- iv. Screen guards, fascia plates and other protection for installation.
- v. To carry out minor civil work, such as chipping & making openings in slabs , grouting of foundation bolts in shaft, pit and machine room, modification and making rail bracket, hall buttons indicators and laying of sills in positions. Or any other work required for smooth operation/ commissioning of lifts. All chiselling and cutting of pockets and making good. (All cutting shall be as approved by EPI/CDRI).
- vi. Ensuring safety against accidents including barricading all openings and caution signs.
- vii. Scaffolding and other Tools & Tackles required for installation in the hoistway required for erection of lifts.
- viii. All other items necessary for satisfactory execution & completion of works, whether specified or not.
- ix. Power shall be provided at incoming of main DB for lifts. Main DB in the machine room shall be provided by the lift contractor. From main DB to lifts, cables shall be in the scope of lift contractor. However, lighting for machine room shall be done by others.
- x. Trap doors, floor gratings, steps / ladders and openings in machine rooms and ladders for pits as required by the lifts Contractor. Contractor shall furnish the details of these items in the layout drawing for lifts to submitted after award of the job.
- xi. Temporary power supply connection(s) for erection work shall be arranged by the lift Contractor.

6.0 SOUND REDUCTION

The Contractor shall provide necessary sound reduction materials, such as rubber pads/ anti vibration pads of proper density to effectively isolate the machine from the machine beams and/or flooring.

Noise level inside cars and in the machine room shall be maintained at minimum levels as laid down in the relevant codes and in any case not more than specified under PERFORMANCE PARAMETERS.

7.0 TRACTION MACHINE

The machine shall be worm geared traction type with motor (steel worm, bronze gears, steel sheave shaft & Ferro molybdenum sheave), electro-mechanical type of brake and driving sheave mounted in proper alignment on a single heavy cast iron base or steel bedplate.

The worm shaft shall be fitted with roller bearings to take end thrust. The sheave shaft shall also be fitted with roller bearings to ensure proper alignment. All shafts shall be provided with well-designed keys.

Rotating parts shall be statically and dynamically balanced.

The drive sheave shall be designed with machined V-grooves to ensure adequate traction with minimum wear on rope. All sheaves including deflector sheaves, where used, shall conform to I. S. 14665 (Part 4 section 3)

Adequate and dust – proof lubrication shall be provided for all bearings and worm gears.

The brake shall be suitably curved and provided with fire proof friction lining. The operation of brake shall be smooth, gradual and with minimum noise. The brake shall be designed to be of adequate size and strength to stop and hold the car at rest with rated load. The brake shall be capable of operation automatically by various safety devices, current failure and by the normal stopping of the car. The brake shall be released electrically. It shall also be possible to release the brake manually so as to move the lift car in short stops. Suitable Brake release tools (total 3 nos.) shall be supplied and stored in the machine rooms.

For manual operation of lifts, up & down direction of the movement of the car shall be clearly marked on the motor or traction machine. A warning plate in bold signal red colour to switch off the mains supply before releasing the brake and operating the wheel shall be prominently displayed.

8.0 HOIST MOTOR

The motor shall be suitable for 415 Volts +10% to –20%, 50 Hz. \pm 5%, 3 Phase A.C. Supply. The motor must be designed for arduous lift duty, rapid reversals and constantly repeated starts & stops as defined in the relevant codes of practice. All windings must be heavily insulated, adequately impregnated for tropical climate and mechanically strengthened and must be specifically designed to have a high starting torque and low starting current characteristics within the limits acceptable to electricity supply co. requirements and I.E. Rules. The motor shall be designed in such a way as to withstand occasional overloading above its rated capacity and shall have overload protection. The motor shall have good speed regulation under different conditions of load and shall be designed to give a noiseless and vibration-free operation. Insulation shall be class F.

9.0 MOTOR CONTROL AND DRIVE

The lift motor shall be controlled by a variable voltage variable frequency (V.V.V.F.) micro-processor control system which shall control and monitor every aspect of lift operation at all stages of the car motion cycle on real time basis.

The A.C. V.V.V.F. drive system shall control A.C. voltage and frequency concurrently with the hoist motor to regulate the lift's actual performance to match closely the ideal speed pattern, obtain maximum efficiency of operation and provide a very smooth ride.

Frequency shall range fully between zero and rated value.

The Controller shall be provided with a self diagnostic programme to keep downtime to a minimum possible.

The controller shall intelligently adjust door times in response to car calls, hall calls and "Door Open" button operation.

An Inspector's changeover test switch and set of test buttons shall be provided in the controller. Operation of the Inspector's changeover switch shall make both the car and landing buttons inoperative and permit the lift to be operated in either direction from machine room for test purposes by pressing corresponding test buttons in the controller. It shall not, however, interfere with the emergency stop switches inside the car or on the top of the car.

10.0 GUIDES AND FASTENINGS

- i. Guide-rails for car and counterweight shall consist of machined mild steel Tee sections, erected plumb, and securely fastened to the lift well framing by heavy steel brackets, suitably spaced, to limit deflection of guide rails to 3 mm under normal working conditions.
- ii. The guide-rails shall be of suitable section with ends tongued and grooved, forming matched joint and shall be connected with steel fish plates.
- iii. Guide-rails shall cover the full height of the hoistway and pit , such that It shall be not be possible for any of the car or counter weights shoes to run off the guides.
- iv. Guides shall be designed to withstand the action of safety gear when stopping a counter weight or fully loaded car.
- v. The max. deviation from true plumb and alignment of guide rails shall be 2 mm.
- vi. All support framing shall be rigid and shall be designed to restrict displacement of the point of support of brackets to 3 mm under normal working conditions.
- vii. The whole guide rail installation, including expansion joints, shall be designed for a smooth ride.
- viii. The guide-rails shall be protected during storage and installation with a rust inhibiting coating which shall be cleaned off on completion of installation.
- ix. Guide-shoes shall be adjustable type & mounted so as to provide continuous contact with guide rails under all conditions.

Guide shoes shall be provided at top and bottom of each side of car and counterweight and shall be designed for quiet operation.

Additional guide shoes shall be provided on each side of buffer frame in case of oil buffers.

Each lift shall be equipped with roller guides for up and down travel. There shall not be any metal-to-metal contact between Car and rail. Roller shall be mounted on ball bearings to provide quiet operation and excellent ride quality. (It is not required in case the design varies however the ride quality shall not be compromised for any other design).

11.0 SAFETY

In addition to other specifications, the lift shall be provided with safety devices as follows :-

- i. Against overload
- ii. Safety gear on car so that in the event of rope breaking or loosening, the car will be brought to rest immediately by means of grips on the guides.

The over speeding car shall be automatically brought to a gradual stop on guide rails and power supply to the hoist motor shall be switched off.
- iii. Over speed centrifugal governor operating the safety gear in case of over speeding of car in the down direction.
- iv. Car gate lock so that in the event of car gate being opened when passengers are in the car, the lift will be brought to rest.
- v. Overtravel limit switches at top and bottom limits of travel to disconnect the power supply and apply brakes to stop the car within a defined safe distance in case of overtravel in either direction
- vi. Ultimate terminal switches to stop the car automatically within top & bottom clearances independently of normal overtravel limit switches but with buffers operative.
- vii. Protective guards to counterweights in pit, rope sheaves and wherever required.
- viii. Toe guard apron to the car platform.

12.0 CAR

a. Cabin Size

The internal clear dimensions of the cabin shall not be less than those specified in IS 14665-Part I, NBC & CPWD General specifications for electric work (Lifts) . The car shall be so mounted on the frame that vibration and noise transmitted to the passengers inside is minimised.

b. Frame and Safety Device

The car frame shall consist of mild steel channel/structural steel top and bottom securely riveted or bolted and substantially reinforced and braced so as to relieve the car enclosure of all strains when the safety device comes into action due to overspeed or when the capacity loaded car is run on the buffer springs at normal speed.

The safety device mounted on the bottom members of the frame operated by a centrifugal speed governor shall be arranged to bring the car to a gradual stop on the guide rails in the event of excessive descending speed; and provision shall be made to shut off the power supply to the motor.

c. Buffers

Substantial spring buffers (2 Nos.) shall be furnished and installed in the pit under the car and counterweight. These buffers shall be mounted on RCC Pedestals in the pit. The car buffer spring must be of correct design to sustain the car with capacity load without damage should the car terminal limits become inoperative. The car buffers must be located symmetrically with reference to centre of car.

The Contractor may alternatively offer oil type buffers. The plunger shall be mild steel, designed for a very high factor of safety and accurately machined. A toughened rubber bumper shall be fitted to the plunger top to cushion the impact of steel buffer plates attached under the car and the counterweight. An oil gauge shall be provided to check the oil level.

d. Counterweight

The lift shall be suitably counter-balanced for smooth and economical operation. Cast iron weights shall be contained in a structural steel frame properly guided with suitable guide shoes (minimum 4 Nos). It shall be equal to the total weight of lift plus approx. 50% of the contract load.

Substantial expanded metal counter-weight screen guard shall be furnished and installed at the bottom of hoist way, as required by Lift Inspector.

e. Hoisting and Governor Ropes

Bright steel wire ropes with fibre cores suitable for Lift duty as per BIS Code shall be used for hoisting ropes.

Not less than 3 independent suspension ropes shall be provided and designed to share load equally by means of adjustable shackle rods with equalizer springs at each end of hoisting ropes.

Each rope shall have adequate section to provide a minimum factor of safety of 4 based on the max. force on the rope.

Governor ropes shall be similar to hoisting ropes. Their ends shall be securely attached to the car and to the safety gear. The governor ropes shall be tensioned by a weight loaded device in the pit.

The contractor shall submit the technical details and source of supply of ropes to the EPI as well as a certificate of performance of ropes from an approved test laboratory or Authority.

Compensation for travel shall be provided for all lifts having a travel of more than 30m.

f. Enclosure

The car enclosure shall be as specified in technical data sheet. The cabin floor, roof and walls shall be free of distortion and undue deflection as per IS 14665 – Part 4, Section 3.

g. Brakes

D.C. brakes will be spring-applied and electrically released. They shall be designed to provide smooth stops under variable loads.

h. Doors

Provision shall be made for vertical and horizontal fine adjustment of doors as per the specifications given in technical data sheet.

i. Door Operators

The door operators shall be VVVF inverter controlled heavy duty A. C. motor, allowing variable opening and closing speeds, and full synchronization of car and landing doors.

j. Travelling Cables

The traveling cables shall be multi-core with high conductivity stranded conductors specifically designed for lift duty. The cables shall be provided with retaining straps and individual cable clamps.

k. Emergency Lighting

A self-contained, non-maintained emergency light with a trickle boost charger shall be provided.

l. Intercom

An Intercom system shall be provided between the car, main landing, machine room and Fire Console room linked to EPABX located at Admn. Bldg.

m. Manual Cranking Facility

Manual cranking facility shall be provided in the machine room to facilitate evacuation of passengers in case of power failure. The manual mode shall be in addition to automatic car failure operation specified elsewhere.

n. Emergency Stop Switch

A stop switch in the machine room / top of car shall be provided for use by maintenance crew to cancel all car and landing calls for a particular lift.

o. Maintenance Switch

On operation of the maintenance switch located on top of the car by the maintenance crew, the car shall travel at slow speed not exceeding 0.85 m / sec by continuous operation of a button

p. Landing Door Interlocks

Electrical interlocks shall be provided to ensure that the car does not operate unless all doors are closed and unless the car reaches a landing zone.

q. Overload Indicator (Only in Passenger elevator)

An overload indicator with buzzer shall be provided in the cabin to indicate to the passengers that the car will not start as it is overloaded.

r. Other Features

All features specified in the BIS/NBC/CPWD and in the enclosed technical specifications shall be provided.

s. Lift for Disabled

All the Passengers lifts shall be suitable for use by disabled persons. The following additional facilities shall be provided in this lift:

- i. Full length handrails shall be provided on the rear and side wall panels.
- ii. The door closing time shall be set for min. 5 seconds and the door closing speed shall not exceed 0.25 m/sec.
- iii. The "door open" and "door closed" announcements shall be audibly made in the car.
- iv. Braille signs / buttons.
- v. AI based CCTV system for person counting connected to buzzer. As a stand-by support feature other than standard safety and overload feature of the lift.

t. Operating Panels, Buttons & Switches

Main and secondary car operating panels, buttons and switches shall be located on one of the two front wall panels next to the car door and as specified in the Schedule of lifts & as per approved G.A. drawings.

All buttons and switches shall be clearly legible with fade-proof text and figures, and shall be easily accessible, (especially for disabled persons in the lift designated for them).

13.0 ELECTRIC WIRING

Necessary insulated wiring to connect all parts of the equipment shall be furnished and installed. Insulated wiring shall be flame retardant and moisture resistant and

shall be run in G.S. conduits. All cables shall be flame – retardant with copper conductors.

Trailing cables shall be PVC sheathed copper conductor multi-core ribbon type designed for lift service and shall be flame retardant and moisture resistant. They shall be flexible and shall be suitably suspended to relieve strains on individual conductors. All copper conductors shall be of appropriate gauge copper to avoid excessive voltage drop. All wires, cables, conduits, metal boxes, fittings and earthing shall comply with statutory requirements and BIS specifications.

The controller unit comprising of the MCCB, 25KA, adjustable overload and phase reversal and phase failure protection, all the circuit elements, transformer, rectifier for D.C. control supply, inverter power pack, terminal blocks etc. shall be enclosed in an insect vermin proof, sheet steel floor or wall mounted cabinet with hinged doors at front or at both front and rear. Proper warning boards and danger plates shall be provided on both sides of the controller casing. Sheet steel used for controller cabinet shall not be less than 14 gauge and shall be properly braced, where necessary. Suitable gland plate shall be provided for cable entry. The battery for the charger unit shall be suitably placed in the machine room. Degree of protection of Enclosure shall be IP54. Enclosure shall have provision of earthing studs.

All sheet steel work shall be painted with two coats of synthetic enamel paint of suitable shade both inside and outside over two coats of zinc primer.

Apart from lift controller enclosure, 7 distribution boards (3 Main DB + 4 DB) are required as per BOQ. Cables to in-comer of these DB's shall be terminated by others, whereas outgoing cables for lift shall be in the scope of lift contractor. Contractor shall furnish the sizes of cables alongwith KW rating of motors.

14.0 PAINTING

All exposed metal work furnished in these specifications, except as otherwise specified, shall be given one shop coat of anti-corrosive primer after approved surface treatment of metal surfaces and two coats of approved enamel paint of approved shade. After installation of Lifts, a final Touch-up Coat of paint shall be applied.

15.0 WORKS TESTS

The following tests shall be carried out at Works. EPI shall be given notice of the time and procedure of the tests before they are carried out, and shall be given facilities for observing the tests at Works.

- a. High voltage works tests of equipment which is not already tested in accordance with appropriate IS codes.
- b. Buffer test.

16.0 TESTS ON COMPLETION

The following tests shall be carried out to the satisfaction of the EPI/CDRI.

- i. Insulation resistance and earth test for all electrical apparatus.
- ii. Continuous operation of the lift under full load conditions and simulated starts and stops (150 nos. per hour each) for one hour at the end of which time the service temperature of the motor and the operating coils shall be tested. This shall be as per B.I.S. specification.
- iii. The car shall be loaded until the weight on the rope is twice the combined weight of the car and the specified load. The load must be carried on for about 30 minutes, without any sign of weakness, temporary set or permanent elongation of the suspension rope strands.
- iv. The following items shall be tested :
 - a. Levelling accuracy at each landing in conditions of fully loaded and empty car.
 - b. No load current and voltage readings both on 'Up' and 'Down' Circuits.
 - c. Full load current and voltage readings both on 'Up' and 'Down' Circuits.
 - d. One and quarter load current and voltage readings both on 'Up and 'Down' Circuits.
 - e. Stalling current and voltage and time taken to operate overload.
 - f. Overload protection.
 - g. Gate sequence relays, if provided and installed.
 - h. Car and landing door interlocks.
 - i. Collective control and priority sequences, if installed.
 - j. Safety gear mechanism for car and counterweight with fully loaded car and also with only 68 kg load.
 - k. Speeds on Up and Down travel with full load, half load and empty car.
 - l. Door contacts.
 - m. Final terminal stopping device.
 - n. Normal terminal stopping device.
 - o. Car and counterweight buffers with contract load and contract speed.
 - p. Operation of controllers.
 - q. Manual operation of lift at mid-way travel.
 - r. Emergency operation.
- v. Tests on completion shall also be performed to the satisfaction of Inspector of Lifts and a certificate will be obtained from the 'Lift Inspector ' by the contractor.

17.0 STATUTORY APPROVALS

All statutory approvals from commencement to commissioning of lifts shall be obtained by the Contractor from the Inspector of Lifts and / or other authorities. However, the client will provide all necessary assistance for providing documents, drawings and certificates pertaining to other contractors, if required.

The contractor shall pay necessary fees in connection with the approval of installation of lifts.

18.0 FEATURES REQUIRED FOR VVVF LIFTS

(a) Group / Independent / Attendant Operation

It shall be possible to group specified cars in a group wherever required with dynamic disposition of cars as required by the traffic pattern. A smart car dispatching system with ring communication shall be provided for optimum passenger comfort and lift performance under all traffic conditions. Any defective car shall be automatically eliminated from the group.

Each car shall be provided with a keyswitch for independent operation housed in a service cabinet. In this mode, the lift shall respond only to car calls. Hall calls will not be registered.

It should be possible for an attendant to operate any car.

(b) **Fireman's Switch**

A fireman's toggle switch shall be provided in a break glass for the specified lift at ground floor to enable firemen to bring the lift non-stop to ground floor from any location and to cancel hall calls until the car is operated on attendant control.

(c) **Emergency Power Operation**

In case of power failure, standby power equipment shall enable lifts to reach a pre-determined floor, in a pre-determined sequence, and then permit operation of one or more lifts on emergency power.

A trickling battery shall be provided to supply power to light fixtures, fan, alarm and intercom.

(d) **Profile Generator**

A profile generator or similar device shall be provided to use the car at an optimum speed level and to improve levelling accuracy.

(e) **Predictive Car Selection**

Once a hall call is registered, a dynamic car algorithm shall transfer the call to an optimally selected car to provide the maximum traffic efficiency.

(f) **Home Landing Facility**

A car shall return to a pre-determined landing after the last call is answered.

(g) **Door Safety**

Multi-beam infrared / ultrasonic electronics curtains shall be provided to scan the doorway and reverse the door closing in case of any obstruction.

(h) **Double Door Operation**

If both up and down calls are registered at a hall which is the last registering hall in the direction of the car, the lift shall travel to that hall and open / close the doors. After this, the car shall reverse its travel and shall open / close the doors again unless no car calls are registered at that floor.

(i) **Nudging Door Operation**

When the doors remain open for more than a predetermined period, a buzzer shall sound and the door shall close automatically. The door sensing device shall be rendered inoperative but the Door Open button and the safety shoe shall remain operative

(j) **Selective floor Service**

Programming for selective floors services shall be software driven.

(k) **Manual Cranking & Slow speed Travel**

A manual cranking facility shall be provided.

Slow speed operation shall be possible from machine room and car top.

(l) **Auto Fan Off**

In case no calls are registered for a pre-set time, the cabin fan shall be automatically switched off.

(m) **Automatic Rescue Device**

In case of mains power failure and Lift control system failure, the Lift's own rechargeable and maintenance free battery power shall move the car to the nearest floor and the door shall open automatically for automatic rescue of passengers. A battery run-down indicator shall be provided.

19.0 PERFORMANCE PARAMETERS

The following parameters shall be achieved in the installation :

*	Levelling Accuracy	± 3 mm for 1.5 m/s speed ± 4 mm for 0.75 m/s speed
*	Jerk level	0.9 – 1.5 m/s ³
*	Noise level in car	58 dB
*	Noise level at 1 M in machine room	60 dB
*	Acceleration rate	0.6 – 1.0 m/s ² (adjustable)
*	Max. car vibration	20 milli gals.

20.0 SUBMITTALS 'ALONGWITH TENDER' AND 'POST AWARD'

(A) The following items are required to be submitted in duplicate **along with the Tender**.

- i. Catalogues with offered items highlighted.
- ii. List of imported components, if any.
- iii. Compliance Statement for guaranteed performance parameters given in Specification 19.0 above.
- iv. Confirmation that offer submitted meets the technical specifications & scope of work and there are no deviations and exclusions from NIT.
- v. The contractor shall specify in his offer the full capability of his system in this regard.

(B) The successful contractor, **after award of the contract**, shall furnish following technical particulars of the equipment/devices for the approval by CDRI/EPI.

- i) Single line/ schematic diagram of electronic control panel, lift & equipment etc.
- ii) Layout of Hoistway, Lift machine room, showing foundation details in the pit, machine room, electric control panel, Lift & equipment etc.
- iii) Earthing layout.
- iv) Inspection manual for equipment & accessories covered in the scope of supply (8 copies).
- v) Technical literature of operation, control and maintenance etc. (8 copies) along with CDS.
- vi) Schedule of scope of maintenance service during defect liability period and AMC.

The technical parameters furnished by the tenderer would be examined in detail during design submission stage. All improvements considered necessary to meet the tender Technical Specifications would have to be incorporated without any additional cost to EPI/CDRI with objective of providing high performance and safety Lifts.

21.0. MAINTENANCE DURING DEFECTS LIABILITY PERIOD

Comprehensive maintenance during Defects Liability Period inclusive of periodic servicing, prompt attention to client (CDRI) complaint, prompt rectification of all malfunctions and equipment failures, replacement of defective equipment / parts, replacement of light fittings, lubrication including lubricants, maintaining correct alignment and levelling of cars and ensuring smooth running, starts and stops etc. all complete to EPI/CDRI's satisfaction shall be done.

TECHNICAL QUESTIONERY

(This Technical Questionnaire should be filled in by the Tenderer for all items covered under Schedule "B" and must be submitted along with Tender Documents).

Sr.No	Items	Compliance of Bidder
1	2	3
[A] Machine FOR 1 MPS ONLY		
1	Drive Sheave Diameter	
2	Grooving Angle.	
3	Roping Arrangement	
4	Rope Diameter	
5	No. of Ropes	
[B] LIFT A. C. MOTOR :		
1	Make & Type	
2	Rated K.W.	
3	Rated H.P.	
4	Rated R.P.M.	
5	Full Load Running Current	
6	Insulation Class.	
[C] CONTROLLER		
1	Type of Contacts.	
2	Operating Voltage	
3	Make of Main Relays	
4	Type of Rectifier.	
5	Capacity of Main Contactor	
6	Make & Type of Over load	

7	Method of Reversal Relay Employed	
8	Capacity & Type of Selection Contactor	
9	Capacity & Type of Accel and Rated. Contactor	
[D] HOISTWAY ENTRANCE		
1	Material	
2	Gauge	
3	Size of Vision Panels	
4	Class Specification	
5	Type of Roller used for Hangers	
6	Materials of Rollers	
[E] RAILS		
1	Rail size : A. Car rails	
	B. Counter Weight	
2	Maximum Car Rail Deflection, under Normal Operation.	
3	Modules of Section.	
4	Moment of Inertia found Flanges.	
5	Radius of Gyration Around Flanges.	
[F] HOISTWAY ROPES		
1	Name of Manufacture.	
2	No. of Performed Strand.	
3	Wires per Strand.	
4	Lay	
5	Tensile Strength of Rope	
6	Safety Factor of Rope	
[G] BUFFERS		
1	Type of Car Buffers	

2	No. of Car Buffers	
3	Type of Counter Weight Buffers	
4	No. of Counter Weight Buffers	
5	Stroke of Car Buffers	
6	Stroke of Counter Weight Buffers.	
7	Average Retardation Speed Buffer at Rated Load	
8	Peak Retardation for all Buffers at Rated Load	
9	Duration of Peak Retardation at Rated Load	
[H] GEAR BOX		
1	Type	
2	Input Speed	
3	Out Put Speed	
4	Gear Ratio : 40 :	
5	Cyclic Duration Factor	
6	Capacity (i) Input H.P.	
7	Capacity (ii) Out Put Torque	
8	Type of Bearings	
9	Un – Balance Torque (Lp – in)	
[I] BRAKE		
1	Type	
2	Duty	
3	Size	
4	Brake Shoe	
5	Lining	
6	Torque T	
7	Type of winding	

8	Shape & Size of Shaft	
9	Operating Machanism	
[J] SAFETIES		
1	Furnish the List of Safeties Included.	
2	Passenger over load indicator	
3	The Equipment Offered Must Confirm to ISI Bombay	

I.S.I. FOR MATERIAL USED IN LIFT

1	Outline dimension	:	3534 : 1979 outline dimensions of electric lifts
2	Passenger & Goods Lifts	:	1860 : 1980 Code of Practice for installation, operation & maintenance of Passenger & Goods Lifts
3	Service Lifts	:	6620 : 1972 Code of Practice for Installation, operation & maintenance of Service Lifts.
4	Safety rules for passenger and Goods Lifts	:	4566:1980 Electric Passenger & Goods Lift. 6335 : 1971 Electric Service Lifts
5	Thimbles for Wire ropes	:	IS.2315 : 1978 Thimbles for wire ropes.
6	Grips for Wire	:	IS 2361 : 1994 Bulldog grips ropes
7	Steel Wire Ropes	:	IS 2365 : 1977 Steel Wire suspension ropes for lifts Elevators & Hoists.
8	Socket for wire ropes	:	IS 2485 : 1979 Prop. Purged Sockets for wire ropes for General Engineering purposes.
9	Worm gears	:	IS 3734 : 1983 Dimensions for Worm gearing.
10	Capping metal for wire ropes.	:	IS 3937 : 1974 Recommendations for Socketing of wire ropes.
11	Steel eyebolts	:	IS 4190 : 1984, Eyebolts with Collars

12	Lift Buffers	:	9803 : 1981 Buffers for Electric Passenger and Goods Lifts.
13	Lift Guide Rails and Guide Shoes	:	10191 : 1982 Car and Counter weight guide rails, guide rail supports and fastenings for lifts and 11615 : 1986 Car and counter weight guide shoes for electric passenger and goods lifts.
14	Lift Car Frame, Car Counter Weight and suspension.	:	11706 : 1986 General requirements for Car frame for electric passenger and goods lift.
15	Lift safety gears and Convensers	:	9878 : 1981 safety gears and Governors for electric passenger and goods lifts.
16	Lift retiring Cam	:	10448 : 1983 Retiring Cam for Passenger and Goods Lifts
17	Lift door & locking device and contacts	:	7759 : 1975 Lift door locking device & contacts IS 11633 : 1986 Lift Door
18	Lift Machine and breakers.	:	10913 : 1984 Breakers for Lift.
19	Electric traction Lifts.	:	
	a) Code of practice for installation, operation and maintenance	:	IS.14665 (Part.2 / Sec 1) 2000
	b)Electric traction safety rules	:	IS. 14665 (Part 3 / Sec. 1 & 2) 2000
	c)Components of lifts car frame, car counter weight and suspension	:	IS.14665 (Part.4/Sec.3) 2000
	d)Lift doors and locking devices and contacts.	:	IS.14665 (Part.4/Sec.5) 2000