PASSENGER ELEVATOR

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Engineering Department

WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

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TECHNICAL SPECIFICATION FOR PASSENGER ELEVATOR

1. SCOPE:

This specification covers design, engineering, manufacture, testing at manufacturer's works before dispatch, supply and delivery of 6 Passengers capacity (408 Kg) Elevator with all equipment and the accessories for the duty and services as specified herein and as required for safe and trouble free operation.

2. STANDARD:

a)	IS 14665 (Part-1): 2000	Electric Traction Lifts; Part-1 Guidelines for outline Dimensions of passenger,goods, service & hospital lifts
b)	IS 14665 (Part-2/Sec 1 &2): 2000	Electric Traction Lifts; Part-2 Code of Practice for installation operation and maintenance Section-1 Passenger and Goods Lifts Section-2 Service Lifts
c)	IS 14665 (Part-3/Sec 1 &2): 2000	Electric Traction Lifts; Part-3 safety Rules Section-1 Passenger and Goods Lifts Section-2 Service Lifts
d)	IS 14665 (Part-4/Sec 1 to 9): 2001	Electric Traction Lifts; Part-4 Components
e)	IS 14665 (Part-5): 1999	Electric Traction Lifts; Part-5 Inspection Manual
f)	Indian Electricity Rule	Latest Edition
g)	Indian Electricity Act	Latest Edition
h)	National Building Code	Latest Edition

Any other codes/standards, regulations, laws, bye-laws guiding the lift installation and constructional features shall also be considered by the contractor.

The Installation shall be carried out in conformity with the local (State of West Bengal) Lift act and rules.

3. DEVIATIONS:

Normally the offer should be as per Technical Specification without any deviation. But any deviation felt necessary to improve performance, efficiency and utility of equipment must be mentioned in the 'Deviation Schedule' with reasons duly supported by documentary evidences and advantages of such

deviation. Such deviation suggested may or may not be accepted. But deviations not mentioned in 'Deviation Schedule' will not be considered afterwards.

4. Elevator Equipment & Drive Machinery:

i. **Electric Supply:** The entire lift equipment should be suitable for operation at three phases, 415V±10%, 50 Hz ±3% A.C. electric supply. The supply for illumination and signaling equipment shall be 230V, 1-Ph A.C.

ii. **Gearless machine:** The gearless machine shall consist of a motor, traction sheave and break-drum or brake disc completely aligned on a single shaft. Gearless machine shall be equipped with VVVF drive.

iii. **Sheaves:** Sheaves and pulleys shall be of hard alloy, cast iron, SG iron or steel and free from cracks, sand holes and others defects. They shall have machined rope grooves. The traction sheave shall be grooved to produce proper traction and shall be of sufficient dimension to provide for wear in the groove. The deflector sheave shall be grooved so as to provide a smooth bed for the rope. The deflector or secondary sheave assemblies where used shall be mounted in proper alignment with the traction sheave. Such deflector sheaves shall have grooves larger than rope diameter as specified in clause 8 of IS:14665 (Part-4/Sec-3): 2001. Wherever necessary suitable protective guards may be provided.

iv. **Shaft Keys:** Shafts which support sheaves, coupling and other members which transmit torque shall be provided with tight fittings keys of sufficient strength and quality.

v. **Brake:** Braking of the lift will be done by electronically varying the voltage and the frequency of motor feeding current (variable Voltage and Variable frequency control) i.e., VVVF control. The electromagnetic holding brake will be applied only after the lift has come to a standstill. The lift drive machinery shall be provided with an electromagnetic brake or motor operated brake normally applied by means of springs in compression when the operating device is in off position. The brake shall be suitably curved over the brake drum or brake disc 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 sufficient size and strength to stop and hold the car at rest with rated load. The brake should be capable of operation automatically by the various safety devices, Current failure and by the normal stopping. The brake shall be released electrically. In addition to release electrically, it shall also be possible to release the brake manually. Such releases requiring the permanent application of manual force so as to move the lift car in short stops. For this purpose, suitable brake release equipment wherever necessary shall be supplied with each installation.

vi. **Provision of switch in controller for manual operation:** Manual switch shall be provided in the controller. At times of lift stoppage due to any reasons, it shall be possible to move the lift car to the nearest landing by pushing switch button manually.

vii. **Bearings:** The bearings and lubricant reservoirs shall be dust tight and shall incorporate effective seals to prevent leakage. The outer end of the bearings shall be closed with a removable oil tight plate. Thrust bearing shall be of the ball or roller type and shall have two sets of balls or rollers arranged to minimize backlash for efficient working.

5. Guide Rails

Guide rails shall be in accordance with clause 3 of IS: 14665 (Part-4/Sec-2)-2001. Only machined guide rails shall be permitted for cars for passenger lifts. Formed sheet metal rails shall be used up to speeds of 1.75 mps for counter weight applications. The guide rails shall be continuous throughout the entire travel and shall withstand without any deformation the action of safety gear with a fully loaded car.

Generally, the guide rails shall be supported by brackets secured to the hoist-way frame at each floor. The rails shall be securely fastened to the brackets or other supports by approved heavy rail clamps. All necessary guide rails packing or additional supports shall be provided to prevent guide rail deflection and stresses exceeding the prescribed limits. The stresses on the guide rail due to the horizontal forces imposed on it during loading, unloading and running calculated without impact, shall not exceed 1100 kg/sq. cm based upon the class of loading and the deflection shall not exceed 5mm. The guide rail brackets their fastenings and supports shall be capable of resisting the horizontal forces mentioned above, with the total deflection at the point of support not in excess of 3mm.

The expansion joints in the guide rails shall be so designed as to avoid jerks in the lift car. Machined guide rails shall have finished surfaces which shall be coated with corrosion preventive compound which shall be maintained till the commissioning of the installation. Before the car is placed in operation, the preventive coating shall be removed and the guide rails thoroughly cleaned and smoothened

6. Elevator Car

i. **Car Frame:** The car frame shall be in accordance with clause–4 of IS 14665(Part-4/Sec-3):2001 made of sheet steel or rigid construction to withstand without permanent deformation the operation of safety gear. The car shall be so mounted on the frame that vibration and noise transmitted to the passengers inside is minimized.

ii. **Car Platform:** The car platform shall be of framed construction and designed on the basis of rated load evenly distributed. The dimensions shall conform to IS: 14665 (part-1)- 2000.

iii. **Car body:** The car shall be enclosed on all sides by a Stainless Steel hair line finish enclosure. The enclosure including the door shall withstand without deformation a thrust of 35kg applied normally at any point and as per IS 14665 (Part 4/ Sec 3)-2001. Lift car door shall have a fire resistance rating of One hour & Certification shall be provided from reputed laboratory.

iv. **Grounding switch (ES):** The Grounding switch at ground floor level, shall be provided to enable the fire service to ground the lift.

v. **Car Roof:** The roof of the car shall be solid type capable of supporting a weight of at least 140 kg and as per IS 14665 (Part-4/Sec-3): 2001.

vi. **Car Apron, Landing Thresholds and Sills:** An apron shall be fitted to the car platform such that no dangerous gap exists at any time when the landing door is opening. Thresholds and sill plates shall be provided at the landings also. The distance between landing sill and the sill on car platform shall not be more than 30mm.

vii. **Communication System:** The emergency signal with re- chargeable batteries as source of supply shall be made in the lift cars. The device used for emergency signals should incorporate a feature that gives immediate feedback to the car passengers that the device has worked properly and the signal has been passed on to the intended agency. This shall be achieved by pressing of button from control room which shall give audio signal to the passengers in the car.

viii. **Emergency Power Supply for lift car:** This shall include suitable secondary battery with trickle/ boost charge arrangement and inverter power pack with necessary contactors for supplying the light fixtures in the lift car, the same battery shall also feed the alarm bell and communication equipment. This battery backup shall function minimum for 90 minutes in case of power failure.

ix. **Ratings and Instructions:** Inside the lift car, the lift supplier shall provide a stainless steel metallic plate indicating the rated load and detailed instructions for the passengers. This shall be mounted at a suitable place.

x. **Elevator Car Interior:** The car interior shall be provided with energy efficient decorative lamps for sufficient lighting. Car floor shall be provided with 12mm thick granite flooring. The car operating panel shall be duly finished to match the car interior décor and shall contain all the devices as may be specified depending upon the type of operation required. In addition separate illuminated panel for indicating the floor and direction is to be provided. All switches shall be fade proof and the devices shall be of suitable quality.

The car operating panel and interior cabin shall contain the following:

a. A series of push buttons numbered to correspond to the landing served which will light up while in service.

b. An emergency “stop button”.

c. An emergency call button connected to a bell to serve as an emergency signal.

d. An alarm buzzer.

e. A non-stop priority control button.

f. A door open & close button.

g. A blower switch.

h. Overload indicator with audiovisual type.

i. Intercom system built into the panel.

j. Auto-emergency light.

k. Audio speaker with built-in music system.

l. Ventilation by noise less Blower as a Fan built in ceiling panel.

m. V3F door drive with Single light-ray with photo-electric cells across the car entrance.

n. A Mechanical Clutch / Electronic switch (Located inside controller) for passengers trapped between doors.

o. Door reversal feature in case of obstruction of doors.

7. Car and landing entrances:

i. The car and landing doors shall be of flush type sheet steel only for power operation. Power operated car and landing doors shall be so designed as not to injure any person during their closure by means of provision of multi ray electronic door detector which shall cause the doors to reopen. It shall be possible on power failure, to open them from the car side. All the openings for lifts shall be minimum 2100 mm clear in height. The door opening and closing shall be accomplished smoothly and quickly without undue noise, vibration and shock.

ii. The car door shall be centre opening horizontal sliding stainless steel hairline finish.

iii. An ‘UP’ button and a ‘DOWN’ button at each intermediate landing and a single push button at each terminal landing shall be provided to call the lift car in a particular landing for traveling in desired direction. The push buttons shall have call registration lights and

shall illuminate when a button is momentarily pressed to indicate that the call is registered and the direction of the call is registered. The button shall remain illuminated until the call is answered. The top covers landing button boards shall be of stainless steel.

iv. The time of an automatically closing door should be minimum 5 seconds and the closing speed should not exceed 0.25 M/Sec.

v. Each landing door shall be complete with locks, headers, sills, frames, rims; hanger supports with cover plates, fascia plates etc. The finished work shall be strong, rigid and neat in appearance. The opening for the landing gates or doors shall not be wider than that of the lift car.

vi. All the lift car landings shall be well lit to an illumination level of 150 lux and shall be free from obstructions. The control for landing lights and the sign lights shall be tamper proof.

vii. Lift shall be incorporated with suitable floor leveling device. Level device for automatic leveling with accuracy of ±3mm. shall be incorporated.

viii. The counter weight for lift cars shall be in accordance with clause 6 of IS 14665 (Part-4/Sec3):2001 and shall be designed to balance the weight of empty lift car plus approximately 50 per cent of the rated load.

8. Guide Shoes

Two numbers of guide shoes at the top and two numbers at the bottom shall be provided on the lift car and counter-weight. Guide shoes shall be provided with adjustable mountings & shall be rigidly secured in accurate alignment at the top and bottom on each side of the car sling and counter weight frame construction.

9. Lift Ropes

Round strand steel wires ropes having a tensile strength not less than 12.5 tonne/cm2 and of good flexibility shall be used for lift. Lubrications between the strands shall be achieved by providing impregnated hemp core. The lift ropes shall conform to IS: 14665 (Part–4/Sec.–8)–2001 and the minimum factor of safety shall be considered as 10. The minimum diameter of rope for cars and counter weight of passenger Lift shall be 8 mm.

The contractor must indicate the number and size of lift ropes and governor ropes proposed to be used, their origin, type, ultimate strength and factor of safety. They should furnish certificate of ropes issued by competent authority.

10. Safety Equipment:

i. Every lift installation shall necessarily be provided with the safety features in accordance with IS 14665(Part-4/Sec-4):2001.

ii. The car safety shall be operated by speed governor located overhead and driven by governor rope suitably connected to the car and mounted on its own pulleys. Governor for car safety gears shall be adjusted to actuate the safety gear.

iii. The governor shall be of "V" groove wheel design and only wheel is stopped to actuate the car safety upon a pre-determined over speed downward without damaging the rope.

iv. The governor, rope and sheave shall be so located so as to minimize danger of accidental injury to the equipment.

v. Terminal Limit Switches shall stop the car automatically at terminal floors within the top and bottom permissible over travel.

vi. Suitable buffers shall be installed to stop the car and counter weight at the extreme limits of travels. When the lift car rests on fully compressed buffers, there shall be at least 60 cm clearance between the lowest point in its car frame and any obstruction in the pit exclusive of buffers and their supports. Similarly when the lift car cross head is 60 cm from the nearest obstruction above it no projection on the car shall strike any part of the overhead structure. ***The contractor must indicate the name of buffer manufacturers, buffer stroke and certified maximum loads.***

vii. Electro – mechanical door lock shall be provided for all the landing doors and they shall be such that the doors cannot open unless the car is at rest at the particular landing. It shall not be possible to move the car unless all the landing doors and the car door are closed and locked.

11. Lift Operation:

Automatic operation by means of one button in the car for each landing level served and by up - and - down buttons at the landings, wherein all stops registered by the momentary actuation of the car made as defined under non-selective Automatic Operation but where in the stops registered by the momentary actuation of the landing buttons are made in the order in which the landings are reached in each direction of travel (irrespective of the sequence in which the buttons have been actuated). With this type of operation, all "up" landing calls are answered when the car is traveling in the up direction and all "down" landing calls are answered when the car is traveling in the down direction, except in the case of the uppermost or lowermost calls which are answered as soon as they are reached in-respective of the direction of travel of the car.

12. Controlling Equipment:

i. The movement of the car shall be electrically controlled by means of a controller located in the machine room.

ii. The control circuit shall be designed to the type of lift specified for safety operation. It shall not be possible to start the car unless all the car and landing doors locked. The circuit shall have independent fuse protection for fault and over loads and be arranged so that earth fault or an open circuit shall not create unsafe condition.

iii. All wiring for external control circuits shall be brought to a terminal board with means of identification of each wire.

iv. On top of the Lift car an emergency stop switch shall be provided for use by maintenance personnel. Stop switch shall be provided in the machine room. Operation of these switches/ button shall cancel all the registered calls and landing calls for the particular lift.

v. Fireman switch with glass to break for access shall be provided at ground or main floor for all the Lifts. The operation of this switch shall isolate/ or cancel all calls to all the Lifts and the lift will stop at the next nearest landing if traveling upward. The doors will not open at this landing and the lifts will start traveling to ground floor. If these were already traveling down, they will go straight to ground floor direct without stopping en route.

13. Control Wiring and Panel:

i. Power wiring between controller and main board controller to various landings shall be done in heavy gauge conduit or metal duct & shall conform to I.E Rules 1956.

ii. Control cable carrying DC and power cable carrying AC shall not be run in the same conduit or metal duct and they shall be laid as per I.E. Rules. Metal duct with removable inspection cover shall be preferred.

iii. At least 5 unconnected spare wires shall be available out of all the lines to be provided in the wiring harness from the midway junction box to the machine room.

iv. All relays shall be suitable for lift service and shall in operate adequate contact wipe for reliable operation. Relays shall operate satisfactorily "Between" 80 percent to 110 percent of their voltage.

v. All cables shall be with copper conductors and flame retardant or PVC insulated of appropriate size. Ferrules shall be slipped at the ends of all cables as per standard control wiring practice. All terminal blocks shall be suitable marked.

vi. Metal frames and all metal work of the lift controller frame etc. shall be earthed with double earth leads taken to the earth bar.

vii. The controller unit shall comprising of the main circuit breaker, adjustable overload, phase reversal and phase failure protection. All the circuit elements, transformer, rectifier for DC control supply, inverter power pack, terminal blocks etc. shall be enclosed in an insect proof, sheet steel cabinet with hinged doors at front or at both front and rear. Sheet steel used for controller cabinet shall not be less than 16 gauge (1.6 mm) 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. 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.

viii. Each lift shall be provided with one control panel. Control lift panel shall have MCCBs of adequate rating to receive owners 415V, 50Hz, 3-ph, 4 wire A.C. power supply and if required 240 V AC single phase supply also.

a) Control panel shall be provided with ammeter, voltmeter and selector switches on incoming side.
b) The panel shall be complete with Thyristors, tachogenerators, transducers with fuses, over load relays, single phasing preventor, phase reversal protection relay, timer, relay, auxiliary relay, push button, pilot lamp, control components etc.

c) Power contactors for A.C. circuit shall be triple pole electromagnetic A.C. 4 duty with minimum 2 NO. + 2 NC auxiliary contacts and for DC circuit there shall be of double pole electric type DC 3 duly with 2 NO. + 2 NC auxiliary contacts.
d) Electronic components contact system shall be free from false alarm operation due to vibration and mechanical shocks. All electrical contacts shall be of silver or other similar cadmium metallic alloy, and shall be capable of withstanding 10,000 operations.
e) Electronic car facilities shall be of modular design using electronic printed circuit boards to facilitate easy replacement of faulty circuit with spare cards.
f) Electronic components and cards shall be compatible and suitable for conditioned environment for satisfactory operation. All components shall be clearly and unambiguously marked for proper identification to facilitate maintenance.
g) Ready accessible and clearly marked test points shall be provided in all important modules and circuits.
h) Heat dissipation components shall not be mounted on PCBs to avoid damage to PCBs and loosening of soldered connection due to heat.

14. Automatic Rescue Device (ARD):

i. ARD should move the Lift to the nearest landing in case of power failure during normal operation of Lift.

ii. ARD should monitor the normal power supply in the main controller and shall activate rescue operation within 10 seconds of normal power supply failure. It should bring the elevator to the nearest floor at a slower speed than the normal run. While proceeding to the nearest floor the elevator will detect the zone and stop. After the elevator has stopped, it automatically opens the doors and parks with door open. After the operation is completed by the ARD the elevator is automatically switched over to normal operation as soon as normal power supply resumes.

iii. In case the normal supply resumes during ARD in operation the elevator will continue to run in ARD mode until it reaches the nearest landing and the doors are fully opened. It normal power supply resumes when the elevator is at the landing, it will automatically be switched to normal power operation.

iv. All the lift safeties shall remain active during the ARD mode of operation.

v. The battery capacity should be adequate so as to operate the ARD at least seven times a day provided in duration between usages is at least 30 minutes.

15. TESTING

I. Test at Site

a) Levelling Test:

Accuracy of the floor leveling shall be tested with the lift empty & fully loaded.

The lift shall be run to each floor while traveling both in upward and downward directions and the actual distance of car floor above/below landing floor shall be measured. In each case there shall not be any appreciable difference in the these measurements for leveling at the floors when the car is empty and when it is fully loaded.

b) Safety Gear tests:

Instantaneous safety gear controlled by a governor should be tested with contract load and a contract speed, the governor being operated by hand. Two tests should be made, however, with wedge clamp or flexible clamp safeties, one with contract load in the car and the other with 68 kg (equivalent to one person) in the car. The stopping distance obtained should be compared with the specified figures and the guides, car platform, and safety gear should be carefully examined afterwards for signs of permanent distortion.

Counterweight safety gear should be tripped by the counter weight governor and the stopping distance noted. In this case, however the governor tripping speed should exceed that of the car safety governor but by no more than 10 percent.

During the safety gear tests, car speed (from the governor or the main sheave) should be determined of the instant or tripping speed with that stated in IS. The Governor jaws and rope should be examined for any unique wear.

c) Contract Speed:

This should be measured with contact load in the car, with half load with no load, and should not vary from the contract speed by more than 10 percent. The convenient method is by counting the number of revolutions, made by the sheave or drum in a known time. Chalk mark on the sheave or drum and a stop switch will facilitate timing but care must be exercised to ensure that no acceleration or retardation periods are included. If the roping is 2 to 1 the sheave speed is twice the car speed. Alternatively, the speed can be measured by a tachometer applied directly to shaft immediately below the sheave.

d) Lift Balance:

After the above test, some of the weight shall be removed until the remaining weights represent the figures specified by the tendered. With this condition car at half way travel the effort required to move the lift car in either direction with the help of winding wheel shall be as nearly as can be judged by the same.

e) Car and Landing Doors Interlocks:

The lift shall not move with any door open. The car door relay contact and the retiring release cam must be tested. The workings of the door operation and the safety edges and light equipment if any provided shall also be examined.

f) Controllers:

The operation of the contactors and the interlocks shall be examined and it shall be ascertained whether all the requirements have been met.

g) Normal Terminal Stopping Switches:

These shall be tested by letting the car run to each terminal landing in turn, first with no load and then with contract load by taking measurements, top and bottom over travels can be ascertained.

h) Final Terminal Stopping Switches:

The normal terminal stopping switches shall be disconnected for this test. It shall be ensured that these switches operate before the buffers are engaged.

i) Insulation Resistance:

This shall be measured (after removing the electronic PCB's and their connection) between power and control lines and earth and shall not be less than 5 mega-ohms when measured with D.C. voltage of 500 volts. The test shall be carried out with contactors so connected together as to ensure that all parts of e very circuit re simultaneously tested.

j) Earthing: All conduits, switches, casing and similar metal work shall have earthing continuity.

k) Ropes: The size, number construction and fastenings of the ropes should be carefully examined.

l) Buffers:

The car should be run on to its buffers at contract speed and with contract load in the car to test whether there is any permanents distortion of the car or buffers. The counter weight buffers should be tested similarly.

II. Tests at Manufacturer's work:

a) High Voltage Test:

The dielectric of electrical apparatus (excluding motors, generators and instruments which are tested in accordance with the appropriate Indian Standards wherever they exist) shall be capable of withstanding a test voltage of ten times the working voltage with a maximum of 2000 volts when applied.

i) Between the live parts and case of frame with all circuits completed.

ii) Between main terminals or equivalent parts with all circuits open, and

iii) Between any live parts of independent circuits.

Note: Owning to the impracticability of applying tests (ii), (iii) mentioned above on controllers and similar apparatus after controller wining has been completed, these tests may be made at convenient stages of manufacture.

Method of Applying High Voltage: The test shall be made with alternating voltage of any convenient frequency, preferably between 49 and 60 cycles per second. The test voltage shall be of approximately sine wave form and during the application of voltage with peak value, as would be determined by spark gap by oscillography or by any other approved method shall not be more than 1.45 times the RMS value. The RMS values of the applied voltage shall be measured by means of a volt meter used with a suitably calibrated the applied voltage shall be measured by means of a Voltmeter used in connection with a special calibrated voltmeter winding or testing transformer by any other suitable voltmeter connected to the output side of the testing transformer.

Duration of High Voltage Test: The test shall be commenced at a voltage of about one third of test voltage which shall be increased to the full test voltage as rapidly as is consistent with the value being indicated by the measuring instrument. The full test voltage shall be maintained for one minute. At the end of this period, the test voltage shall be rapidly diminished to one third of its full value before switching off. The oil buffers are examined after the above tests have been made to determine if there has been any oil leakage or distortion and to ensure that buffers return to their normal positions.

b) Buffer Test: A copy of the test report shall be intimated after testing at works.

III. Performance Test:

This test if meant for passenger lift and is conducted to watch the performance of lift installation in terms of passenger handling capacity and waiting interval as obtained at site vis-a-vis design, data and conducted as below:

i) Waiting interval (T)-This can be worked out by taking the average of several round trip times as observed physically and then dividing it by the number of lifts in that bank.

ii) Handling capacity H= (300 x Q x 100) / (T x P)

Where,

H=Handling capacity as the percentage of the peak population handled during 5 minutes.

P= Total population to be handled during peak morning period. (It is related to the area for which particular bank of lifts serves).

Q= Average number of passenger carried in a car. T= Waiting interval.

Service Temperature Test:

A continuous run of one hour should be made with number of starts and stops to reproduce as nearly as practical the anticipate duty in service. (The standard duty cycle is for 90 to 180 starts per hour). It is very difficult in practice to carry out test with alternate starts at full load and no load and it is necessary therefore to simulate these cycles. A suitable test for all motors except squirrel cage motors is to run the car up from the bottom landing with contract load and stop at each floor. From the top floor a non-stop run is made to the lowest floor and the upward journey with stop is then repeated. The time intervals between stops and starts at the floors should be uniform and such as to give about 150 starts in one hour. At the end of this run the temperatures of the armatures and fields of the motor and generator are recorded. The temperature rise should, not exceed 55 deg. C or 75 deg. C for classes A or B insulation respectively.

IV. TESTING EXPENSES:

The entire cost of testing for the acceptance and routine tests specified herein shall be treated as included in the quoted price.

16. CONTRACT DOCUMENT:

The Contractor shall submit six (6) copies of the following to the Chief Engineer (Engineering) for approval :

Guaranteed technical particulars along with leaflets/ catalogues.

The complete test reports of all tests (including Type Test) as stipulated in the relevant IS/IEC.

TECHNICAL PARTICULARS

LOAD – KGS	408 KGS (06 PERSONS)
SPEED – MPS	1.5 METER PER SECOND
TRAVEL	STARTS FROM GROUND FLOOR TO TOP FLOOR ;
STOPS & OPENINGS	AT ALL FLOORS (ALL OPENING ON THE SAME SIDE)
POWER SUPPLY	415 ±10% V, 50 ±3% HZ, 3 PHASE, AC-MOTOR-AC; TEFC; 120 STARTS PER HOUR ;WINDING INSULATION: ALL INSULATED WINDING SHALL BE OF COPPER; ALL MOTORS SHALL HAVE CLASS-F INSULATION BUT LIMITED TO CLASS-B TEMPERATURE RISE.
CONTROL	A.C. VARIABLE VOTAGE VARIABLE FREQUENCY (WITH CLOSED LOOP)
LIFT MACHINE	MACHINE ROOM LESS/ GEAR LESS WITH INTEGRAL DRIVE SHEAVE & BRAKE DISC
CAR SIZE (W X D) MM	TO SUIT WITH HOIST WAY SIZE CLEAR HEIGHT BELOW FALSE CEILING-**2300MM**
CAR ENCLOSURE	CONSTRUCTED OUT OF STAINLESS STEEL IN HAIR LINE FINISH
HAND RAILS	ROUND SHAPED STAINLESS STEEL HANDRAIL- ON 3 SIDES
FALSE CEILING	STAINLESS STEEL- IN HAIR LINE FINISH
FLOORING	GRANITE FLOORING – 20 MM THICK
CAR & HOISTWAY ENTRANCE	STAINLESS STEEL IN HAIR LINE FINISH AUTOMATIC SLIDING DOOR, CENTRE OPENING. CLEAR OPENING ABOUT 8**00MM X 2100** MM HIGH **LAND DOOR MATERIAL SHALL BE FIRE RETARDANT FOR ONE HOUR**
DOOR OPERATION	AUTOMATIC V3F DOOR OPERATION & ELECTRONIC DOOR PROTECTION DEVICE (CLOSED LOOP).

SIGNALS DETAILS	1.	HALL BUTTON WITH DOT MATRIX HALL POSITION INDICATOR AND SCROLLING TYPE DIRECTION ARROWS AT ALL FLOORS.
	2.	CAR OPERATION PANEL WITH MICRO STROKE (LUMINIOUS TYPE) PUSH BUTTONS WITH DOT MATRIX CAR POSITION INDICATOR, CAR DIRECTION INDICATOR.
	3.	BATTERY OPERATED ALARM BELL AND EMERGENCY LIGHT
	4.	FIREMAN'S SWITCH AT MAIN LOBBY & OVER LOAD WARNING INDICATOR
	5.	VOICE SYNTHESIZER & CAR CHIME & INTERCOMMUNICATION SYSTEM
FACE PLATE FINISH	STAINLESS STEEL	
EMERGENCY RESCUE DEVISE	EMERGENCY RESCUE DEVICE (THE EMERGENCY BATTERY DRIVE UNIT-WITH RECHARGEABLE BATTERY): IN THE EVENT OF POWER FAILURE, THE LIFT SHALL COME TO THE NEAREST LANDING AUTOMATICALLY AND INDIVIDUALLY FOR EACH LIFT.	
MANUAL SWITCH	MANUAL SWITCH SHALL BE PROVIDED IN CONTROLLER LOCATED ON TOP FLOOR NEARER TO LANDING DOOR TO OPERATE THE LIFT MANUALLY.	