LIFT SPECIFICATIONS

&

SELECTION OF MATERIAL

Subject: - Supply, installation, testing and commissioning of Fully Automatic Glass Elevator at Annabhau Sathe Auditorium,Byculla in E Ward.

Specifications for "Elevator /Lift"

Description :- Supply and installation ,testing & commissioning of "Fully Automatic Glass elevator" with machine room less (MRL) PM gearless machine, polyurethane coated flat steel belts, pulse monitoring device, overload indicator, voice synthesizer / car chime, auto fan cut off, speed limit (safety) switches, intercom, attendant service, nudging, infra red 2D curtains throughout the landing gate, all necessary accessories and as per the specification below approved by state PWD and MCGM. The lift shall consist of cage with toughened glass enclosed on two sides and SS finish for operating console .

Note :- This lift shall provided for senior citizen/ handicap persons in this auditorium ,hence all handicap person related government norms shall be fulfilled by the lift vendor. Also comply all safety /fire norms related to lift services.

The size of the shaft is as per the Architectural details.

1) **Brand** : OTIS/ Mitsubishi / Kone / Schindler/Thyssenkrup.
2) **Load :** 480kg.
3) **Speed :** 1 MPS.
4) **Rise :** 11.7 meters. (Some of the landings might be have unequal landings.)
5) **Stop and Openings :** As per Site 3/3
6) **Control :** AC VVVF (variable voltage variable frequency) with close loop.
7) **Power Supply :** 400 volts, 3 phase, 50 hz, alternating current.
8) **Operation :** Simplex full collective with/without attendant service.
9) **Machine :** PM synchronous gearless.
10) **Car size :** 1100 (width) x 1050 (depth) x 2700 (height).
11) **Hoist way size :** 1900mm x 1600mm (clear inside).
12) **Car enclosure :** 12mm Toughened glass enclosed on 2 sides with SS railing and SS hairline for operating console.
13) **Handrails :** Stainless steel in mirror Finish on three sides.
14) **False Ceiling :** CD 34 Powder painted .
15) **Flooring :** Granite 20mm thickness .
16) **Car entrance :** Protected by two speed SS framed 12 mm toughened glass door in hairline finish (for SS).
17) **Car opening :** 800mm x 2400mm.

18) **Door operation :** Automatic and multi ray electronic door detector system Signals:S60

1) Combined Luminous hall button with seven segment digital hall position indicator at all floors

2) Car operating panels with luminous floor buttons in car.

3) Seven segment digital car position indicators in car.

4) Battery operated alarm bell and Emergency light.

5) Firemen's switch at main lobby.

6) Overload warning device.

7) Automatic rescue device.

Notes: 1) Rate shall include minor/major civil work, scaffolding, electrical works, dismantling, PWD fees and related liasoning cost, steel structure items, etc
2) The quoted price shall be inclusive of all the taxes in GST and all other applicable taxes. This quotation shall not be subject to IEEMA price variation cost.
3) The contractor shall make necessary arrangements to provide suitable lockable weather proof storage space for the materials and shall also stack the existing dismantled material in a safe secure place for the disposal of the municipal authorities.
4) The contractor shall include in the quotation 36 months free maintenance which will be commenced from the date of completion of project.
5) The cost shall be inclusive of all preparatory work required by the lift vendor and no extra cost will be provided towards this item.
The rate shall include comprehensive maintenance of all equipments for 36 months by Vendor for Defect Liability Period of 36 Months.

Instructions to Lift vendor /contractor

1. Contractor shall visit the site to get information regarding site constraint if any.
2. *Bidder /Lift OEM shall submit feasibility report for lift installation as per site constraint & select suitable lift location as per user /client requirement.*
3. Contractor shall sole responsible to obtain all the NOC's of statutory bodies.
4. Location of installation of lift/elevator shall be jointly confirmed with user department.
5. Contractor shall take cognizance with Engineers In charge /PMC / structural engineers before starting the work.
6. Material shall be of 1st quality only. All civil / electrical / mechanical cost are included in cost. All electrical wiring, panels are included in lift vendor scope. Only input power supply DP mcb for lift power shall be provided.
7. Lift proposed from parking area i.e. basement +ground floor + first floor (B+G+F=3 Stop) If any stop reduced, then proportionate deduction in total cost as approved by BMC authority will be deducted from total quoted cost.

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1.0 GENERAL

The Standard Technical Specifications are to be read in conjunction with the Detailed Technical Specifications as the latter are intended to amplify the former; only those portions of the General Technical Specifications which apply to the actual project involved shall be pertinent.

Where Detailed Technical Specifications are at variance with General Technical Specifications, the former shall prevail as its contents relate directly to the specific project.

The specification is intended to cover the complete installation of the lift installation and its equipment. It is intended to outline the minimum equipment required, but does not necessarily cover all the details of the installation design and construction.

It is acknowledged that such details are recognized as being the exclusive responsibility of the lift contractor who is more familiar with the product offering intricacies and installation methodologies.

The contractor may not however deviate from the following which are detailed in the detailed specifications;

A) Load capacities,

B) Speeds,

C) Control systems,

D) Materials and finishes,

E) Performance

F) Installation criteria as may be applicable.

In all cases where a device or part of the equipment is referred to in the singular, it is intended that such reference shall apply to identical installations or devices which are required to complete the total installation.

For Example; where information on a singular lift is specified in a duplex pair, the specification shall apply equally to the duplicate lift unless otherwise stated.

Where the manufacturer's requirements or design parameters may be in conflict with this specification, this specification shall have precedence.

Note: The intention of this specification is to call for equipment that is currently available in the Indian market.

It is designed to establish the minimum requirements with regard to the end product from a selection of manufacturers and suppliers where their product offering can be evaluated against measurable criteria.

It is the intention that the successful contractor will be responsible for the complete scope of this tender. Where in these specifications it is provided for something to be done it shall be the responsibility of the Lift Contractor to do so. This applies to those scopes of works that may be required to be sub-contracted to other specialist contractors, such as shop fitting, minor building patch up works, painting and so forth. Such items are not to be omitted from the tender and are to form part of the contract sum unless the specifications expressly state that someone else is responsible for those items.

1.1 **COMPLIANCE WITH REGULATIONS & QUALIFICATIONS**

The installation shall be erected and carried out in compliance with:

a) All applicable Electric Lifts and Service Lifts as amended

b) The Local Municipal Bye-Laws and regulations as well as the regulations of the Local Supply Authority

c) National Building Regulations and Building Standards Act

d) The Local Fire Regulations

e) The Standard Regulations of any Government Department or Public Service company where applicable.

f) All applicable Code of Practice or Regulations for disabled.

Note: It is the duty of the Contractor to timeously inform the Consulting Engineer in writing whether by design or unintentionally there is any portion of this specification that does not fully comply with any applicable regulation. The Contractor shall provide proof that his product offering fully complies with all of the relevant statuary requirements.

i. In addition, the contractor shall issue all notices and pay all the required fees in respect of the installations to the Local Authorities, and shall exempt the Employer and Consulting Engineer from all losses, costs or expenditure which may arise as a result of the contractor's negligence to comply with the requirements of the regulations enumerated in above paragraph

ii. It shall be assumed that the Contractor is conversant with the abovementioned requirements. Should any requirement, bye-law or regulation, which contradicts the requirements of this document, apply or become applicable during erection of the installation, such requirement, bye-law or regulation shall overrule this document and the contractor shall immediately inform the Consulting Engineer of such a contradiction. Under no circumstances shall the contractor carry out any variations to the installation in terms of such contradictions without obtaining the written permission to do so from the consulting engineer.

iii. The Contractor shall furnish a document which gives a complete description of all equipment wherein the product proposed does not comply with the specification or information provided in this document, or is in conflict with the work of other trades as specified or shown in other Works Information. Failure for furnish such a document shall be interpreted to mean that the Contractor agrees to meet all requirements of the Specification.

iv. The Contractor may not offer alternative equipment and/or shaft and motor room designs in a covering letter, drawings or tender supplementary documentation, without making specific reference to such deviations.

v. It is expected that the Contractor will disclose any deviation from the specification and submit supporting documentation motivating the offer of alternatives. The Consulting Engineer reserves the right to include or disqualify the tender, should in his opinion the offering is not in the best interest of the Employer. This is expanded in the next section.

1.2 DEVIATIONS TO SPECIFICATIONS CRITERIA

Where the words for approval or approved are used and it is desired to substitute a different make or type of apparatus from that specified, all information pertinent to the adequacy and adaptability of the proposed equipment shall be submitted to the Consulting Engineer for approval prior to the equipment being ordered or released for manufacture.

Approvals for equipment specified or proposed substitutions shall not be given merely upon the submission of Manufacture's part names, detailed documentation together with motivation to accept the substitution shall be required.

Approvals for all equipment submitted as a substitution for that specified or shown on the drawings may be granted if such equipment meets the intended and anticipated requirements pertaining to performance, reliability, operation, space conditions, weight, and quality of equipment.

i. Deviations without written acceptance from the Consulting Engineer from the Scope of Works and Information shall not be accepted. The Contractor shall verify in the tender covering letter, that they have read and understand the content, meaning and intentions of the Tender Document and have tendered accordingly.

ii. Where technical specification cannot be met in terms of specific design requirements; substitution or alternative equipment will be considered with the provision that the proposed substituted equipment will not in any form or manner reduce the intended performance, operation, duty- rate, redundancy and reliability of equipment of the final installation. Deviation or substituted equipment not clearly shown and detailed

in a covering letter under the headings, 'DEVIATIONS' shall not be considered or accepted and could result in the disqualification of the tender.

iii. Tender supplementary documentation, brochures etc showing the technical details such as load, speed, dimension sizes, performance and operation of the equipment offered and Contractors conditions of Contract, shall only serve as an informative supportive documentation in terms of the equipment offered, program, organization and staff, and alternatives offered and shall not be considered an acceptable qualification in terms of the Detailed Specification. Equipment offered as substitution that does not comply with Item - 4.3.2 of this specification, whether or not shown in the supplementary document shall not be accepted.

iv. It is acknowledged that the lift technology is advancing with the introduction of new designs, equipment and components.

v. This specification provides for minimum technical requirements with respect to design, operation, reliability, performance and after service requirements. The Employer and Consulting Engineer reserve the right to reject in whole or part thereof any product offered that in their opinion does not comply with this specification. The following equipment components offered in terms of this specification shall be clearly detailed in the tender supplementary documentation and shall be confirmed by the Contractor as the most modern, latest, technically advanced and most reliable equipment available:

- Car and landing signals,
- Car and landing call button units,
- Door drive equipment,
- Door protection devices,
- Control equipment,
- Drive equipment,
- Intercom equipment.

vi. Approval for alternative equipment shall be by the Consulting Engineer in his capacity as the Employers representative. Contractors are welcome to seek approval for alternatives; however the Contractor shall be liable for all costs associated with providing alternative equipment that has not been duly authorized with any recourse back to the Employer or Consulting Engineer.

1.3 <u>ALTERNATIVES COSTS</u>

i. The Employer or Consulting Engineer may consider alternatives based on grounds of cost if alternatives do not negatively affect the specified performance levels, operation,

reliability, duty-rate, and product expectation. Without deviating from the Main Offer, Contractors' are to provide the following information for any alternative offered;

- Cost breakdown,
- Cost to fix local content,
- Forward cover as specified,
- Programme as specified,
- Statement of installation as specified,
- Maintenance cost as specified,
- Technical information and pamphlets as specified.

ii. Provide a deviation schedule and show all costs in the Contact Price Summary which can be found at the end of the document

iii. It is noted that all alternatives presented and accepted by the Employer and Consulting Engineer shall comply in full with the Conditions of contract as contained in this specification and shall not be limited to performance, operation, reliability, duty rate and quality of equipment.

1.4 DRIVE MACHINE

The main driving machine shall be gearless with a synchronous permanent-magnet motor. It shall be provided with a dual solenoid service and emergency brake of a disc or drum configuration. The machine must be of a design which can be mounted in the hoist way.

Bearings are to be liberally dimensioned and provided with automatic lubrication. Machine for all intents and purposes should be as maintenance free as is practically possible and comply fully with amended provisions of the applicable SANS code.

1.5 GEARING

If applicable;

The worm and its shaft shall be turned and machined from one piece of high quality steel. The worm wheel must be provided with a phosphor bronze rim with machined teeth. The worm wheel shaft shall run in sleeve bearings, while double thrust ball bearings must be provided to take up the axial thrust. Thrust bearings shall be removable without complete dismantling of the machine.

The gearing must be enclosed in a cast iron case, provided with automatic oil lubrication.

This case is to be equipped with lids for easy inspection of the gear, and provided with an oil level indicator as well as oil filling and draining openings.

As an alternative, the machinery may be supplied with roller bearings instead of sleeve bearings provided silent operation can be guaranteed.

1.6 VVVF DRIVE MOTOR

The main driving motor shall be VVVF closed loop AC driven specially designed to operate at low speed controlled by variable voltage combined with variable frequency. The main driving motor shall be compatible for Variable Voltage, Variable Frequency AC drive of

the squirrel cage multi-pole shunt wound type, specially designed for lift hoisting work, and so dimensioned, that no parts of the motor can become overheated under normal site and service conditions.

1.7 **DRIVE SHEAVE**

The drive must consist of a traction sheave in which the requisite number of grooves has been cut to suit the number and size of ropes used. This sheave is to be mounted on the same shaft as the worm wheel or drive machine, which ever is the case. The shaft shall have an outer bearing with automatic lubrication. The driving sheave shall be easily removable for renewal of the grooved rim.

1.8 **BRAKE**

The brake drum may be incorporated in the coupling between the worm shaft and the driving motor or for gearless applications as part of the sheave drive. The brake may be operated by a DC solenoid. The brake must be easily adjustable and one half of it must be capable of holding the car in case of failure of the other half. The brake arrangement must be so designed and installed that should the worm shaft shear, the brake will be prevent the traction sheave from turning.

1.9 **HAND TURNING GEAR**

Provision shall be made for a safe method of turning the machine by hand so that the lift car can be moved manually from the lift motor room or top floor landing to the nearest landing to facilitate evacuation of passengers.

1.10 **CONTROLLER**

The controlling mechanism for Motor Room Less type lift shall not be mounted on the main machinery but is to be assembled as part of the top floor landing door framework.

Contacts breaking heavy currents shall be provided with magnetic blow-outs or arc chutes. All contact surfaces shall be of silver, except those for heavy currents, where carbon to silver or carbon to copper surfaces may be used. Copper to copper contact will not be accepted.

Wearing parts must be easily renewable. If applicable, flexible connections must be used for all moving contacts and currents shall not be carried by springs or joints.

For the wiring of the controller, fire resistant cables are to be used.

The controller must incorporate all switchgear and relays necessary for the operation and protection of the lift, and must be so designed that it will automatically bring the car to rest in the event of any of the following occurrences:

i. Interruption of the power supply to the machinery or interruption of any one phase of the main supply.
ii. Operation of the governor due to over-speed condition.
iii. A reversal of power supply phase/s.

iv. Interruption of car door or landing door locks

v. Overload of drive motor

vi. Interruption of terminal limits

All terminals of the machinery and the control gear must be marked with a distinctive letter or number and corresponding markings shall appear on the engineering installation drawings.

1.11 OPERATION

The operation of the lift/s shall be Collective Simplex control and operation system whereby a common pushbutton control panel/s for the lift/s is provided on the landing at each floor level.

The landing panel shall be equipped with both UP and DOWN call buttons except on terminal floors where Single call buttons depicting the reversed direction of travel shall be installed.

Landing and car calls shall be continuously registered by the controller so that landing calls are allocated to both cars so as to avoid waiting time.

1.12 CAR CONTROL BUTTONS

The operating panel in each of the lift cars shall be equipped with the following controls:

vii. A number of pushbuttons corresponding to the number of floors served.

viii. A button clearly marked ALARM to sound a battery operated bell mounted on top of the lift car in a position indicated by the Consulting Engineer.

ix. A door OPEN and a door CLOSE button.

x. A key operated bypass switch to separate the controls of collective operation.

xi. A key operated switch for the car lighting.

xii. Switches to operate the lift car fan.

xiii. Any other pushbuttons which may be necessary should first be reviewed by the consulting engineer

xiv. Independent reservation key switch operation shall be provided in the car operating panel.

All these pushbuttons shall be micro touch sensitive type and shall blend with the overall design of the car interior as described and shall each be fitted with an LED indicator showing that the call has been registered.

A set of car control buttons termed “Car Top Station” for up and down operation of the car shall be fitted into a dustproof control box positioned above the roof of each of the car/s.

These controls shall override all other travel controls and assist in manually operating the car travel in the shaft for maintenance and inspection of the shaft.

A 15 Amp 3-pin switched industrial metal clad socket outlet as well as a bulk head light

fitting for 100 watt ES incandescent lamp and switch is to be provided above the platform adjacent to the controls.

Immobilizing switches located on the top of the lift car shall also be fitted for inspection purposes.

1.13 LANDING CONTROL BUTTONS

These pushbuttons shall be micro touch sensitive type to match other similar items of equipment and shall be mounted into a sheet metal front for flush mounting into the face-work of the piers between the lifts in the inline position. Each button shall be provided with an LED indicator showing that the call has been registered.

The lower and upper terminal stops shall only have one pushbutton each while the intermediary stops shall have an UP and DOWN pushbutton each with LED indicators.

On the Ground Floor a Fireman's control station with toggle switch recessed mounted behind a flush glass fronted box shall be installed in the lift lobby.

The face plates of all these landing control buttons shall be stainless steel "Brushed Satin" finish.

1.14 SIGNALS

The following signals and indicators shall be provided:

In the Car

(a) Illuminated travel direction indicators with arrows mounted on the car operating panel.

(b) An illuminated position indicator to be provided in each car to indicate the landing served.

(c) Signal to indicate that the lift is overloaded

(d) Signal to indicate that the lift is on reservation service

(e) Signal to indicate that lift is out of service

(f) Signal to indicate that Fireman's service has been activated and lift is returning to designated floor.

On Each Landing

(g) Illuminated direction of travel indicators with arrows each with electronic gongs to announce car arrival shall be fitted above each landing door of each lift.

(h) The micro pushbutton station/s.

(i) Each lift landing shall be provided with an illuminated multi-position indicator indicating the position of each car. These indicators shall be flush mounted above each landing door of each lift.

1.15 OPERATING INSTRUCTIONS

All operating instructions and engravings on the operating panel of each of the cars shall be in English/Marathi/Hindi

Alternatively:

Universal language pictograms may be used with English/Marathi only for the inscription plate.

1.16 **LIFT CARS**

Each of the lift cars shall conform to the following requirements:

Construction

GENERALLY

The body of the car shall be self-supporting and insulated against transmission of noise and tenderers shall submit various designs, brochures and illustrations as well as the required technical data on the lift car and alternatives which have been included in their tender.

Car Frame

The car frame shall consist of rolled steel sections, channel and angle folded and welded with substantial reinforcement and braced to prevent distortion and to relieve the car enclosure of all strains and unwanted movement during travel.

Platform

The platforms shall consist of plates of steel laid on framework with granite (floor finish) 20 mm thick.

Roof

The roof of each car shall be provided with a suitably constructed and reinforced platform above the ceiling to carry the weight of 3 men of an average weight per man of 75kg who shall be carrying out the maintenance and inspection work to the shaft.

Car Body

The car body shall be constructed from 14 gauge sheet metal panels with rubber insulation between the metal parts to ensure low vibration and limited noise transmission. For painted finishes, the panels must be thoroughly bonderised before painting and the outside of the car shall receive a coat of rust preventative paint. The interior finish and decor to the lift car shall be fitted to interior of the car body.

Observation lifts shall have minimum 8 mm laminated safety glass panels.

Ceiling and Lighting

Ceiling and Lighting final finishes shall be approved by the Architects. For tendering purposes the minimum standard shall be illuminated ceiling with insert diffuser panels or acrylic cylinders shall be provided to suit the interior decor of the car. The lighting within the car shall be fluorescent tubes with electronic ballast or down lighters to give a minimum of 50 Lux.

In the event of a mains failure an emergency battery powered light source will be provided that complies with the minimum standards stipulated in SANS codes.

Ventilation

A single speed fan shall be mounted above the lighting diffuser to give adequate ventilation controlled by a toggle switch mounted in the control panel in the wall of the car.

Control Panel

The car control panel shall form part of the car front or side wall and shall extend from the car floor kick-plate up to the ceiling.

The cover shall be movable or hinged for easy access to the controls and wiring and finished in stainless steel brushed satin finish.

The components of the control panel shall be:

(a) Digital car position indicator.

(b) Maker's nameplate inscribed with service instructions, nominal load, number of persons and official registration number.

(c) The operating section containing buttons for landings with LED indicating call registered, alarm button, touch buttons for door opening and closing, key switches as required, overload indicator etc.

(d) No smoking sign.

(e) A recessed Telephone cabinet to accommodate an intercom telephone handset or normal telephone hand set linked to the PABX system or security room. (this item should be confirmed in the detailed specification guide.

(f) For Hospital applications, a recessed box with a hinged door to accommodate emergency oxygen bottle.

Hand Rails

A handrail shall be provided, manufactured from stainless steel or aluminum in "Brushed Satin" finish and shall be fitted around all three sides of the lift cars. In the event of semi scenic cars being provided the handrail at the rear of the car shall be strengthened and securely fastened to the side and rear wall of the cars.

Kick Plate

A stainless steel kick plate at least 150mm high shall be fitted to extend around all three sides of the lift cars at floor level.

1.17 **CAR AND LANDING DOORS**

These doors shall be specified according to shaft requirements with finish to architect's requirements.

All doors are to be constructed of hollow metal adequately soundproof framework and suitably reinforced to ensure rigidity. The exterior finish to be laminated stainless steel with 8 mm laminated safety glass for the doors.

All car doors are to be power operated and provided with a mechanical attachment

which shall open and close car and landing doors simultaneously.

The doors shall be interlocked by electronic mechanical locks, so arranged that no landing door can be opened unless the car is opposite the landing and that the car cannot be started unless all doors are closed and latched.

The locks shall be substantially constructed, sufficiently strong to withstand the shock of the repeated opening and closing of doors. The locks and contacts shall be so enclosed as to prevent accidental contact by any person using or working the lift. When the car arrives at the landing, car and landing doors shall start opening while the car is leveling. When the lift button is initiated and the doors begin to close, it must be possible to quickly reverse and open doors.

The prevent injury to passengers, the leading edges of the car doors shall have a full curtain detector, so adjusted that when the closing door meets an obstruction it shall automatically re-open.

In the event of a power failure it must be possible to open car and landing doors from inside the car, provided it has stopped within a reasonable distance of a landing level, i.e. within the leveling zone. Door release keys for opening landing doors from the landing are to be provided to the client and the tenderer shall provide training in the use thereof.

1.18 **LANDING ENTRANCES**

At all landings served by all lifts, extended aluminum sills with anti-slip tread are to be provided. The sills must be securely fixed to the building construction and must line up with the final floor finish. Floor nibs for the attachment of sills will not be provided.

At each landing the entrances shall be provided with simple but robust stainless steel architraves finished in “Brushed Satin”.

1.19 **DOOR HANGERS AND TRACKS**

Each car and landing door must be equipped with suspension hangers and rollers running on suitable tracks. The rollers must be adjustable and shall be suitably protected against dust and dirt. The hangers must be easily accessible.

The hanger housing shall be of steel, suitable reinforced and shall be adequately supported and securely fixed in position.

1.20 **FASCIA PLATES**

Plates not less than 16 gauge, reinforced where necessary, shall be fitted on the inside of the shaft between all entrances, extending from the hanger housing to the sill above. The plates shall be at least 150mm wider than the shaft openings. The plates must be coated with rust-resisting paint.

1.21 **SAFETY DEVICE**

Each lift shall be provided with a safety device, fitted to the underside of the car, and

designed to bring the car gradually to a standstill without shock, when the speed in the downward direction becomes too great. Details of the type of "safety" offered must be given.

1.22 **GOVERNOR**

Each lift must be provided with a tension type governor, driven directly by an independent rope attached to the car, and adjusted to interrupt the motor supply when the car speed exceeds the normal speed by approximately 15% and to apply the safety device when the over-speed is approximately 25%.

1.23 **GUIDES**

The guides for each car and counterweight shall consist of planned steel tees with milled, tongued and grooved joints. Metal splice plates shall be at least 300mm long. The bases of each set of guides shall be bolted to horizontal steel channels fixed to the pit floor. Side counterweight arrangements shall have a dual purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.

1.24 **BUFFERS**

Two heavy spring or oil buffers or equivalent are to be provided for each car and for each counterweight.

The buffers shall be so adjusted that in case of over-travel no parts of the counterweight or car will touch the shaft ceiling, and that the retardation of the car does not exceed the limits laid down in the SABS 1545, EN81 or British Standards Safety Codes.

1.25 **COUNTERWEIGHTS**

Each counterweight shall consist of a structural steel frame, in which independent cast iron weights are to be assembled.

When lift shafts are above occupied floors, the counterweights are to be fitted with a safety device to prevent the counterweight falling freely.

Counterweight screen is to be provided in the pit and counterweight is to be painted chevron black & yellow.

1.26 **GUIDE SHOES**

The shoes shall be of the spring loaded type, provided with automatic oil feed lubrication.

The shoes shall have ample bearing surfaces, and shall be easily adjustable and removable for renewal.

1.27 **HOISTING ROPES**

The ropes shall be of the best quality steel wire rope available, and total the required number for the duty load of the lift. Ropes of 8/19 construction are preferred.

Rope equalizers are to be so designed that each rope can be individually adjusted. Equalizers reducing the suspension to a single bolt or shaft will not be acceptable.

Contractor shall state if other suspension technology is to be used and provide details for approval of the consulting engineer.

1.28 **LIMIT SWITCHES**

Each lift shall be equipped with limit switches which will automatically stop the car at the terminal landings independently of the operating controller.

In addition final shaft limits are to be provided which shall disconnect the drive motor supply in the event of a control malfunction.

1.29 **TRIP RECORDER**

A suitable trip recorder shall be provided for each lift.

1.30 **WIRING**

Except for the flexible cable for the connections from the side of the shafts to the lift cars, all other wiring is to be carried out in PVC conduiting, screwed tubing or in folded metal or PVC ducting. Should screwed conduit be used then a liberal number of inspection fittings must be provided and the tubing must be of such diameter that the wiring can easily be renewed.

Sheet metal ducting for the control circuits in the shafts and motor rooms is permissible provided this ducting complies with the requirements of the electrical code of practice.

Cable lugs shall be used for all stranded wires, and small wires shall be connected with suitable terminals.

All tubing and ironwork shall be thoroughly earthed in accordance with the regulations.

1.31 **PAINTING**

All ironwork and the floor of the lift machinery room & shaft, except contact surfaces of the guides shall be painted with two coats of best quality paint.

1.32 **TOOLS**

Only if applicable, these shall be in the motor rooms comprise of a complete set of large tools and special devices shall be provided mounted on a suitable tool board which is to be fixed to the motor room wall. Tenderers must state what tools will be provided.

1.33 **ESCALATORS**

NOT APPLICABLE

1.34 **TENDER DRAWINGS AND TECHNICAL INFORMATION REQUIRED**

Tenderers must submit with their tender, detailed drawings showing the proposed lift and/or escalator installation and the layout of the motor room.

A detailed description of the lift and escalator installation offered, and of the method of operation must be furnished.

In addition tenderers must complete the technical data schedules attached to this specification.

Failure to submit any of the required information may disqualify the tender.

1.35 ENGINEERING INSTALLATION DRAWINGS

The drawings listed below shall all be prepared by the Lift Contractor and shall consist of:

General Arrangement Drawings

General arrangement drawings of both the electrical and mechanical systems indicating all equipment, testing, inspection, instrumentation, position and all access requirements.

Three copies of each shall be submitted before construction is commenced, but at least four weeks after the tender has been awarded and the Lift Contractor appointed.

Detail Design Drawings

The following detail design drawings shall be prepared and three copies of each shall be submitted for approval before construction is commenced.

ELECTRICAL SYSTEMS

General Arrangement Drawings Schematic and Circuit Diagrams Interconnection Diagrams

MECHANICAL SYSTEMS

General Arrangement Drawings Load and Force Diagrams Structural Steel Support Drawings

Builder's Work Drawings

These shall be based on the general arrangement drawings and shall show all the work to be done by others (holes in concrete, pockets, frames masonry holes, bases etc. as well as sizes, capacities and position of service connections by others for these contract works).

Five copies of each shall be submitted for approval before these are forwarded to the Builder for construction purposes.

Shop Drawings

Shop drawings which are based on the general arrangement drawings showing in detail the construction and all parts of the works, methods of assembly, erection and construction, thickness and types of materials, finishes, details of supports and anchorage, points, connections, welds, fabrication, fastenings, gaskets, sealants, reinforcements and all other pertinent details.

Three copies of these drawings are to be forwarded to the consultants for record purposes.

Wiring Diagrams

Wiring diagrams shall be prepared by the Lift Contractor indicating schematic and circuit layouts for all the equipment. Motor kilowatt and ratings for all circuit breakers and protective device settings shall be stated.

Three copies of each of these diagrams shall be provided to the consulting engineers for record purposes and a further copy of each printed by a permanent process shall be mounted behind a glass fronted frame fastened in a prominent position to the wall inside the lift motor room.

As-Built Drawings

The Lift Contractor shall keep a drawing record of all the deviations during construction from the General Arrangement plans originally prepared and shall mark those onto a set of "AS-BUILT" drawings indicating the exact positions of such items as conduit cable and ducting routes, joints, draw boxes etc.

These drawings shall be neatly prepared on transparent plastic for permanent record and shall be handed over to the consulting engineers at the completion of the Works and shall form a portion of the relevant clause of the handing and taking over of the installation.

1.36 **OPERATING AND MAINTENANCE MANUALS**

The Lift Contractor shall prepare and supply three copies of the Operating and Maintenance Manuals specifically for this installation.

The manuals shall include the following information:

i. Detailed general arrangement and wiring diagrams as well as as-built drawings as described above.
ii. Schedule of recommended spare parts necessary for at least a two year period of operation.
iii. Schedules of manufacturer, address of local agent for each item of equipment and spare parts.
iv. Schedule of recommended lubricants.
v. A preventative maintenance programme for all equipment.
vi. A draft copy of the manual shall be submitted to the consulting engineers for approval before the final issue of the three copies of the Operating and Maintenance Manual.
vii. Copies of all applicable type test certificates
viii. Copy of Annexure A
ix. Copy of Annexure B
x. Copy of lift registration document
xi. Original rope certificate
xii. Contact details for emergency call outs
xiii. Maintenance and operating documentation of any auxiliary equipment installed

1.37 **MAINTENANCE TOOLS AND EQUIPMENT**

The Lift Contractor shall provide all tools and equipment necessary for the

proper and efficient execution of all construction and maintenance.

A complete set of all special tools required for the maintenance, operation and dismantling of all equipment shall be provided by the Lift Contractor. These items shall be neatly stored on a hanging tool rack fastened in a convenient position to the wall of the lift motor room.

Duplicate sets of keys to all doors fitted to control panels, instrument cabinets and locks shall be supplied by the Lift Contractor.

1.38 **SPARE PARTS**

The Lift Contractor shall include in his contract for the supply and provision of spare parts such as fuses, links, contacts, contactors, PC boards etc., and the like as are normally provided for maintenance of the equipment of the installation and the consulting engineers shall have the right to select such spare parts as deemed necessary for the proper care of the system. The lift contractor will provide guarantees that all parts will be available for a period of not less than 20 years.

1.39 **NOISE AND VIBRATION**

The equipment and plant provided shall be free from noise and vibration. If in the opinion of the consulting engineer any equipment, plant or apparatus operates with or transmits from it such noise and vibration to be objectionable then it will be necessary to rectify or replace such equipment or plant so that the service operates at conditions acceptable to the engineers.

The measures taken where necessary whether specifically stated in these documents or not to ensure quiet vibration free operation of the installation include for soundproofing of plant rooms, mounting of equipment on anti-vibration mountings, insertion of vibration isolators of the correct type, suspension of pipework, ducting and the like on suitable vibration excluding isolators so as to exclude the transmission of vibrations to the structure to which they are attached.

Remedial measures taken to achieve satisfactory noise and vibration levels shall be at no additional cost to the employer.

1.40 **NOTICES AND LABELS**

All notices and danger signs including prohibited, unauthorized entry, electric shock, procedure in case of fire, emergency telephone numbers etc., shall be provided by the Lift Contractor, securely fastened and displayed in prominent positions by him.

All manufacturers' nameplates shall remain intact and not removed from any plant or equipment. These nameplates shall have the ratings, type and model number as well as the manufacturer permanently embossed. The nameplates shall be securely fastened with screws or rivets to the main frames of the equipment.

The switchboards shall be fitted with clearly engraved labels identifying the

switchgear and panels mounted above and in front of each panel respectively.

The lettering shall be engraved onto white-black-white Traffolite. Embossed and glued labels provided with adhesive material for fastening is not accepted.

The wiring of all switchboards and control circuits shall be marked with numbered porcelain or other approved ferrules to facilitate circuit identification.

1.41 **RECORDS**

The Lift Contractor shall provide and keep permanently on site a lift operation record book, besides the Operating and Maintenance Manual previously described.

The lift record book shall clearly show all visits, repairs, services, overhaul, maintenance, lubrication and inspections carried out as well as such stoppages and the remedial measures taken to repair and avoid such occurrences from re-occurring.

This book shall be signed by authorized persons only and be available for inspection by all such persons at all times.

1.42 **DATA SHEET TO BE FILLED**

DATA SHEET FOR Fully Automatic Glass Elevator

Sr. No.	Description	Tenderer's Specifications
1	Make of the offered Lift	
2	Model of the Lift	
3	Load	
4	Speed	
5	Rise	
6	Stop and Openings	
7	Control	
8	Power Supply	
9	Operation	
10	Machine	
11	Car size	
12	Hoist way size	
13	Car enclosure	
14	Handrails	
15	False Ceiling	
16	Flooring	
17	Car entrance	
18	Car opening	
19	Door operation	

Tenderer's Signature & Seal