











ESCALATORS

PROJECT SPECIFICATION



-  Altivate
Commercial Passenger Lifts
-  Altivate Home
Domestic Passenger Lifts
-  Altivate Interior
Lift Interiors
-  Altivate Renew
Lift Modernisation
-  Altivate Rise
Goods Only / Service Lifts
-  Altivate Mobility
Wheelchair / Access Lifts
-  Altivate Move
Escalators / Moving Walks
-  Altivate Park
Car Stackers
-  Altivate Design
Design / Consult
-  Altivate Action
Service / Repair / Maintain

Concept to Completion
Flexibility in Design & Personalised Service

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PROJECT DESCRIPTION

Provide an overview of the project and the escalator equipment required.

This work includes the design, supply, delivery, installation, testing, commissioning and maintenance during the contract period of:

Building name

- ⊕ One single escalator (numbered ???)

GENERAL REQUIREMENTS

MANUFACTURER

The equipment shall be an Altivate Move escalator/s, manufacturer shall be City Lifts, or an approved equivalent that can meet the performance and quality requirements of the technical specification. Alternative manufacturers will be assessed according to the following criteria:

- ⊕ Performance.
- ⊕ Quality.
- ⊕ Years of presence in Australia.
- ⊕ Experience with projects of a similar size and nature.
- ⊕ Product warranties.
- ⊕ After sales service and support capability.
- ⊕ Availability of spare parts.

PERFORMANCE

The alternative must meet or exceed the performance parameters of the specified herein.

QUALITY

The alternative must be of equal or better quality to that specified herein with respect of materials, methods of fabrication, compliance with codes and standards, etc.

PRESENCE IN AUSTRALIA

The alternatives must be sourced from manufacturers that are a registered Australian company which will be responsible for guaranteeing all product performance and quality warranties.

PROJECT EXPERIENCE

The contractor shall be able to demonstrate that the proposed alternatives have been successfully employed in projects of a similar size and nature to this project.

PRODUCT WARRANTIES

The proposed alternatives shall be provided with equipment warranties at least equal to that of the specified herein, but in no case less than 12 months.

AFTER SALES SERVICE AND SUPPORT CAPABILITY

The contractor shall provide documentary evidence that the alternatives are supported by an organisation which can provide a level of after sales service and support equivalent to what is specified herein.

AVAILABILITY OF SPARE PARTS

The contractor shall provide documentary evidence that the alternatives are supported by an organisation which holds a level of spare parts equivalent to the nominated equipment.

REGULATIONS

AS1170.4 Structural Design Actions – Earthquake Actions in Australia

AS1657 Fixed platforms, walkways, stairways and ladders – Design, construction and installation

AS1735 Lifts, Escalators and moving walks

AS1735.5 Escalators and Moving Walks

AS4836 Safe working on or near low-voltage electrical installations and equipment

AS/NZ 3000 Wiring Rules

EN115–2 Safety of escalators and moving walks – Rules for the improvement of safety of existing escalators and moving walks

EN13015 Maintenance for Lifts and escalators – Rules for Maintenance instructions

AS/NZS ISO 31000 Risk management

ISO14798 Lifts (elevators), escalators and moving walks – Risk assessment and reduction methodology

ISO25745 Energy performance of lifts, escalators and moving walks

NCC 2016 National Construction Code

Federal Disability Discrimination Act 1992 (D.D.A.)

Local City Council

Department of Fire and Emergency Service

Worksafe Western Australia

TENDER DRAWINGS

The architectural drawings show the space provided to accommodate the escalator/s.

CONTRACT SUM

The Tender shall be for a fixed lump sum contract in Australian dollars (AUD), not subject to rise and fall. No consideration will be given to claims for variations to labour rates, material costs or exchange rates provided as part of this contract.

CONTRACT SUBMITTALS

A. Brochure. Submit manufacturer's brochure for each system proposed for use.

B. Shop Drawings. Submit layout drawings or product literature including the following:

1. Maximum loads and reactions on the building structure.
2. Escalator dimensioned layout with detailed construction requirements and all building works.
3. Details of all finishes.
4. The minimum size of circuit breaker that will carry peak loads without operating.
5. Terminal position and current capacity of submains cables.
6. Submitted in sufficient time for approval and for the Contractor to make arrangements for access requirements and any penetration or items of equipment to be built in.

Drawings shall be: –

1. Submitted in pdf format.
2. Prepared to comply with Australian Standards for Engineering Drawing Practice, AS1100 to AS1109 inclusive.
3. Drawn to the following scales – 1:1, 1:5, 1:10, 1:20 for components and 1:50, 1:100 for locations, except for wiring diagrams, which need not be to scale.
4. Dimensioned in S.I. units.
5. Prepared by competent draftsmen using CAD software, which can produce electronic files that can be viewed and plotted with the latest version of Auto Cad.
6. Amended as necessary and incorporated within the as-installed drawing set.
7. Thoroughly checked prior to submission as regards measurements, materials and details to ensure that they conform to the intent of the contract.
8. Complete in detail to show whether the equipment depicted complies with the contract and is suitable for its intended use and location.
9. Submitted in sufficient time to permit modifications to be made without delaying the works. Allow at least seven (7) working days for checking. All drawings shall be approved in writing before work is commenced.
10. Submitted in sufficient time for approval and for the Contractor to make arrangements for access requirements and any penetration or items of equipment to be built in.

SAMPLES

Samples shall be:

1. Submitted of all equipment/accessories whose appearance will be visible.
2. Approved before installation commences.
3. Held on site after approval and used as a standard for acceptance or rejection of subsequent production units. Samples will be returned on completion of the project.
4. Labelled to identify their intended use and relation to these documents.

Subject to approval, where an item of equipment is a standard, a copy of the manufacturer's catalogue or brochure may be accepted, provided that all dimensions and relevant information are shown in the catalogue or brochure.

QUALITY ASSURANCE & INSPECTIONS

Apply Quality Assurance as required by the contract. Implement a quality system, subject to external audit in accordance with AS/NZS ISO 9001.

Allow all assistance necessary for regular on-site inspections by the builder.

Allow to attend regular site, design and coordination meetings.

Provide regular monthly QA statements for the Builders PCG reports confirming all design is in accordance with the contract design, law, codes and authorities. Detail any non-conformances and rectification action.

WORKS FOR AND BY OTHER TRADES

The following works associated with the escalator services installation shall be coordinated by the escalator contractor and other trades.

BUILDING WORK

The principle contractor shall provide;

- ⊕ Pits, openings and supports to details and loads as shown on workshop drawings.
- ⊕ The accurate finished levels so escalators can be installed before floor finishes are applied.
- ⊕ Floor reinforcing or temporary floor propping if necessary along the escalator access route (for installation).
- ⊕ Make good around escalator after installation.
- ⊕ Handrails and toe-board to openings above escalator.
- ⊕ In fill between building balustrades and escalator balustrades.
- ⊕ Tactile ground surface indicators shall be installed by the builder at the escalator entrances and egresses to ensure compliance with codes for persons with disabilities.

SAFE ACCESS & STAIRWAYS

Safe access to landings is essential. Access should be possible by means of fixed stairways with fall prevention (e.g. temporary handrails) over the complete transportation / access route. Stairways and access routes should be illuminated. The use of ladders to gain access to either the site, storage facility or the escalator pit is not acceptable.

UNLOADING & STORAGE

In order to enable efficient material distribution it is important that the material can be unloaded from the delivery truck within a distance of 50 metres of the storage / unit location and have clear, rollable access from unloading area to storage area.

Onsite – Provide 30m², secure & weatherproof storage for City Lifts equipment and materials when delivered to site within 20 metres of escalator pit, with clear and level access between unloading/ storage area and escalator pit. Storage and access ways are required to be provided to allow all truss parts to be sent to site according to the number/size of units, manufacturer to provide sizes and weights of truss pieces at time of shop drawing submission.

The principle contractor is responsible for all traffic control at the site during equipment delivery.

ELECTRICAL SERVICES

Co-ordinate the following:

- ⊕ Location and rating of equipment and switchboards requiring an electrical supply.
- ⊕ Space available for termination of incoming cables on switchboards/control panels/equipment.
- ⊕ Discrimination and co-ordination of circuit protective devices.

The Electrical Services Sub-Contractor shall provide:

- ⊕ Prior to the commencement and during the entire installation of the escalator, provide uninterrupted temporary power.
- ⊕ This supply will cater for a maximum demand of 15 amps and be available in three phase 415 VAC and single phase 230 VAC. This supply will be used for erection, lighting, testing and operation of tools and hoisting equipment.
- ⊕ Prior to the commencement of installation, provide permanent power, located in the pit as shown, with a tail of 5 metres. If multiple escalators are being installed submains per escalator are required.
- ⊕ Rating of mains protective device, to be greater than largest escalator circuit breaker.
- ⊕ 24 hour lighting around the escalator installation area.
- ⊕ Space available for termination of incoming cables on switchboards/control panels/equipment.
- ⊕ Terminals for the connection of a signal indicating when the building is operating on the standby power supply.
- ⊕ Provide BMS and security interface cabling if applicable.

MECHANICAL SERVICES

Provide the following items for the Mechanical Services Sub-Contractor:

- ④ Low level interface from each escalator control panel to the BMCS for monitoring of escalator fault.

FIRE PROTECTION SERVICES

The Fire Services Sub-Contractor shall provide the following items for the escalator services:

- ④ Fire protection to authority requirements. This may include sprinklers and smoke detectors to the underside of the escalator/s.
- ④ Fire detection and protection fitted in the escalator pit must be of a type that will not adversely affect the escalator equipment or cause electrical hazards.

DESIGN CRITERIA & PERFORMANCE REQUIREMENTS

The Escalator Services shall be designed, installed, tested and commissioned in accordance with the Design Criteria summarised in the following tables in order to satisfy the specified Performance Requirements for the project.

TECHNICAL SPECIFICATIONS

Escalator	
Location	(2 Units)
Environment	Indoor
Arrangement	Parallel/Split
Speed	0.5 m/s
Inclination	35 degree (TBC)
Vertical Rise	4,029mm
Overall Length with Transition Top and Bottom	11,622mm
Overall Width Side by Side	3,200mm
Pit Dimension	3,200 mm W x 4,000 m L x 1,430 mm D
Step Width	1,000mm
Balustrade Height	1,000mm

ESCALATOR TECHNICAL DATA

General	
Carrying Capacity	9,000 passenger/hour
Minimum Major Service Life	100,000 hours
Designed Operation Hours	18 hours/day
Fault & Remote Monitoring	Not Included
Missing Step Monitoring	Included
Trolley Protection	Not Included
Timeclock Control	Not Included
Standby Speed Operation	Included
Drive Type	VVVF
Finishes	
Balustrade Inserts	10mm Tempered Clear Glass Balustrade Panelling Standard Joints
Front Plates	Satin Polished Stainless Steel
Skirting	Brushed Stainless Steel
Handrail colour	Black
Cladding	Painted Sheet Steel
Comb	Aluminium Comb Non Slip finish
Access Cover	Ribbed Aluminium
Decking	Brushed Stainless Steel / Anodised Aluminium
Step Type	Grooved Aluminium
Step Colour	Silver Aluminium
Landings	Non-Slip Finish
Skirting Lighting	Not Included
Comb lighting	Static White LED
Soffit Lighting	Not Included
Handrail Lighting	Not Included
Traffic Lighting	Included

GENERAL

Each escalator shall:

- ⊕ Have 2 horizontal steps at the bottom and the top.
- ⊕ Have no intermediate supports.
- ⊕ Have safety brushes for the full length of the steps to keep feet away from the skirting.
- ⊕ Be capable of operating in either direction.
- ⊕ Be delivered to site as a self-contained unit consisting of truss, tracks, step drive units, steps, step chains, comb plates, handrails, driving machine, controller, safety devices, balustrades and all other parts required to provide a complete and satisfactory operating installation.
- ⊕ Provide suitable cover to escalators during installation and for the duration of the construction to adequately prevent damage or build up of dust and foreign objects from accumulating on any part of the new escalators.
- ⊕ Indicate faults to the Building Management System (BMS).
- ⊕ Have child resistant stop buttons with alarmed covers.

- ⊕ A clear glass fall protection barrier (without mullions) to each side of an escalator where a passenger could fall. The barrier shall be vertical and extend to at least 1300mm above the steps.
- ⊕ Be smooth and quiet in operation.

All materials and equipment shall be new. All equipment shall be suitable for the area in which it is installed and be suitable for a modern building.

TRUSS

The truss shall be of structural steel. It shall be designed for rigidity and to carry the passenger loads, the mechanism of the escalator, the balustrades and the exterior covering. The upper section of the truss shall contain the drive machine and the controller. Provide a full – length drip pan to the underside of the truss.

Provide bearing plates and resilient supports between each end of the truss and the building structure. Resilient supports shall be selected so that noise, which is transmitted through the escalator structure is not audible in any occupied areas.

TRACKS

The tracks shall: –

- ⊕ Be constructed of rigid steel sections.
- ⊕ Provide solid support for the step and step chain wheels.
- ⊕ Be aligned to ensure smooth operation of the escalator under all conditions.
- ⊕ Have suitable radius to provide smooth transition from inclined to horizontal movement.
- ⊕ Have a smooth finished track surface.

DRIVE MACHINE

The machine shall: –

- ⊕ Propel the steps smoothly. It shall start and stop without vibration, noise or abrupt accelerations.
- ⊕ Be an integral gear type. Gear members shall be of steel and special bronze run in oil in an oil tight housing.
- ⊕ Have dust proof bearings with suitable means for lubrication.
- ⊕ Have an electro mechanical break, to stop the escalator under all normal operating conditions.

The brake shall stop the escalator gradually. An additional brake shall be provided, mounted integral with the sprocket drive unit, if chains are used to connect the driving machine to the main drive shaft. This brake shall stop the escalator gradually if the chain between the driving machine and main drive shaft breaks.

STEP CHAINS

The step chains shall: –

- ⊕ Be of the endless roller type located on each side of the steps.
- ⊕ Be made of high grade steel links with hardened pins and rollers designed to accurately engage the drive sprockets to ensure smooth operation.
- ⊕ Have an automatic tension device at the lower landing to maintain proper chain tension under varying load conditions.

STEP TREAD AND RISERS

Step treads and risers shall be die-cast aluminium or stainless steel. The treads shall have fine pitch cleats, which mesh with grooves in the adjoining riser providing a combing action to prevent material being caught between adjacent steps.

Steps shall have synthetic rollers, which rotate to prevent flat spots. Individual steps shall be readily removable without disturbing the balustrade or chains. Yellow demarcation strips shall be provided along both sides of each step tread.

COMBPLATES

At each end of each escalator provide comb plates which: –

- ⊕ Have teeth which mesh with and set into the slots in the tread surface so the points of the teeth are always below the top of the treads.
- ⊕ Have replaceable sections containing the comb plate teeth.
- ⊕ Have comb plate teeth of non-ductile material which would break before the end of one tooth was deflected to touch the adjacent straight tooth.

FLOOR PLATES

Provide removable full width floor plates to cover the truss extensions at each end of the escalators. Floor plates shall have a grooved non – slip surface and shall be of the same material as the step treads.

Provide tactile warning strips complying with AS1428.4, recessed in the landing plate at the top and bottom landing.

BALUSTRADES

Provide the escalators with clear safety glass balustrades. The glass panels shall be mounted vertically without mullions and with the joints at right angles to the handrail.

The interior of the balustrades shall be vertical. Top and bottom landing balustrade newel stands shall extend beyond the line of the tread way to permit passengers to grasp the handrail and achieve balance prior to stepping on and off the escalator.

The balustrade skirting shall:

- ⊕ Be satin finished stainless steel.
- ⊕ Be thick enough to resist bending.

The decking between the skirting and the glazing shall be stainless steel.

HANDRAILS

The handrails shall be reinforced black rubber with smooth vulcanised joints to operate on specially formed guides and move in synchronism with the steps. Safety guards are to be provided where the handrails enter and leave the newels. The handrail drive shall be of the traction type arranged to maintain the handrail at a uniform tension.

MOTORS

Motors shall:

- ⊕ Be suitable for use with escalators.
- ⊕ Have high starting torque and low starting current.
- ⊕ Be protected against overloads, loss of phase and phase reversal.

CONTROLLERS

Provide an enclosed sheet metal control panel in the motor room at the top of each escalator. The control panel shall include:

- ⊕ A lockable main switch.
- ⊕ A motor over speed monitor to cut off the power and stop the escalator gradually if it over speeds for any reason.
- ⊕ A non-reversing device to stop the escalator should the direction of travel be accidentally reversed while the escalator is operating in either direction.
- ⊕ A device to stop the escalator gradually on operation of any safety devices which shall include:
 - skirt switches in case an object is caught between a step and the skirt panel.
 - handrail guard switches in case an object is caught at any of the handrails entries.
 - chain tension switch in case the tension on either chain is outside the required range.
 - stop buttons.
- ⊕ An interface with the BMS so the escalator controls indicate by closing a volt free contact, when there is a fault on the escalator or the escalator has been stopped by operation of a safety device. Provide a variable speed drive for each moving walk interconnected with passenger sensors.
- ⊕ Escalators shall be set to reduce speed after 60 sec (adjustable 30–600 sec) without passengers. Sensors shall be interfaced with controls so that escalator is travelling at full speed when the passenger reaches the first step. Sensors shall be of a type that do not require posts external to the moving walk.

SAFETY DEVICES

The escalators shall be equipped, as a minimum, with the following safety devices:

- ④ Chain safety contacts to ensure the immediate stopping of the machine in the event of excessive chain stretch or breakage.
- ④ Comb-plate contacts to operate and stop the escalator if the comb-plate is moved from its normal working position when objects are lodged between the treads and the comb-plate.
- ④ Handrail-inlet safety devices at the entry-point of the handrail into the balustrades. These switches when tripped shall immediately stop the escalator electrically in order to avoid passenger injury or equipment damage.
- ④ Controller phase loss protection.
- ④ Emergency stop push buttons with covers and audible alarm located at each end of the escalator in the balustrade decking and newel.
- ④ Maintenance cable sockets in both upper and lower reversing stations.
- ④ Means for hand winding of flywheel in order to move the step band manually if required.
- ④ Step running control devices within the step band with five (5) actuation points at each end of the escalator. System designed to stop the escalator if and when damage to the steps or to the rollers occurs.
- ④ Speed governor for the control of overspeed and/or unintended reversal.
- ④ Stop switches as control circuit breakers in both reversing stations.
- ④ Protective maintenance guards in reversing stations.
- ④ Missing step and broken-step device.
- ④ Handrail speed monitoring device which will stop the escalator in the event of broken or stopped handrail within 15 seconds.
- ④ Lighting in upper and lower wells.
- ④ Fluorescent step demarcation lights under steps at top and bottom landings.
- ④ Skirting micro switches to stop the escalator if a foreign object becomes wedged between the step and the skirting.
- ④ Step up-thrust device at lower landing to stop the escalator if a foreign object becomes wedged between the riser and tread of adjacent steps.
- ④ Step demarcation on skirts to be provided by brush guards to side of escalators.

KEY OPERATED SWITCHES AND EMERGENCY STOP BUTTONS

Provide emergency stop buttons at the upper and lower landings of each escalator to stop the escalator upon momentary pressure. The emergency stop buttons shall be protected by an approved child resistant cover or flap, located on the outside skirting adjacent to the floor, or other approved position. Moving the cover or flap shall cause a local alarm to sound until the cover or flap is replaced.

Provide up/down key operated switches at upper and lower landings for starting or reversing the direction of each escalator.

MATERIALS & FINISHES

All steel used for the truss construction shall be sandblasted and shall receive one coat of anticorrosive primer. All other steel components and castings shall receive the same protection against corrosion as the truss construction, unless they are treated by other anticorrosive measures mentioned separately. Clear anodising of aluminium parts shall be used.

Aluminium: Extrusions per ASTM B221; sheet and plate per ASTM B209.

Cold Roll Steel Sheet: ASTM A366. Structural Steel: ASTM A36. Stainless Steel: AISI, Type 304.

MOVING AND POSITIONING

Make allowance in the tender for council fees, unloading, assembly, moving through site to relevant location and final positioning of moving walks.

NOISE & VIBRATION

The noise level shall not exceed 60dB(A) one metre from the escalator. Determine the cause and eliminate any undue noise.

PAINTING & SIGNS

Upon completion of the installation paint to an approved colour, machinery and equipment installed in the escalator pits.

All steel surfaces shall be effectively rust – proofed. Due care shall be exercised during installation to prevent damage to surfaces.

Provide a prominent warning notice at each end of each escalator in lettering at least 10mm high:

WARNING

STAND BETWEEN YELLOW LINES

or other signage as required by statutory authorities.

GUARDS & BARRIERS

Provide transparent soffit guards where escalator passes through a floor and the handrail is within 500mm (horizontally) of the floor opening.

Provide transparent barriers between balustrades at top and bottom of parallel pairs to keep people out of the space between escalators.

Guards shall be constructed from robust plastic material, ~15mm thick, with rounded corners.

COMMISSIONING & TESTING

GENERAL

Subject all escalator systems to a commissioning and testing procedure before they are put into service.



Provide all test instruments, other testing facilities and skilled and unskilled labour required to verify system and equipment performance and to complete all checklist records. Include cost in tender price. Any work, which does not comply with the specification, shall be made good.

Give at least 2 weeks' notice prior to the start of the commissioning of any particular system, and submit a programme of testing and commissioning procedures for that system. Modify the programme as required.

CHECKLIST

Prepare a detailed and comprehensive checklist prior to commissioning and testing. Two months prior to the start of commissioning submit the proposed checklist for approval.

The purpose of the checklist is to:

-  Ensure that all items that should be checked are checked.
-  Produce a permanent record of the commissioning checks carried out.

Accordingly the checklist must be built up from information contained in this specification, from suppliers, manufacturers' installation and commissioning data and from experience in commissioning similar equipment and systems.

The detail of the checklist must be such that it can be completed with a reading or a tick, which means that every device must be listed e.g. Speed – 0.5 m/s – OK

The check list for escalators shall cover at least the following:-

Brakes.	Load notice.
Drive machine.	Step rollers.
Safety switches and devices.	Speed control.
Equipment labels.	Speed.
Motor room accessories.	Safety notices.
Lights.	Buttons and switches.
Chains.	Timers.
Clearances.	Controls.
Pit access devices.	Balustrades clean and undamaged.
Steps and tracks clean and free from site damage.	Dimensions.
Step demarcation.	Finishes.
Tension of step band.	Noise.

PROCEDURE

Commissioning and testing procedures shall generally include:

- ⊕ Visual check of all work for completeness, and against diagrams of all wiring.
- ⊕ Check that all work complies with the relevant Regulations.
- ⊕ Check that all equipment is safe to operate, and that overloads, safety devices and interlocks are all in working order.
- ⊕ Verification of performance under site conditions, under load and simulated "worst case" condition.
- ⊕ Test continuity and unique identification of all conductors in all cables.
- ⊕ Check main earth connection and test all earth continuity connections.
- ⊕ Check polarity and phase rotation of supply at all outlets.
- ⊕ Check all work for completeness and proper working order.
- ⊕ Test run all equipment for at least 24 hours.
- ⊕ Check calibration and operation of each device.
- ⊕ Final tests shall be conducted in the presence of the consultant.

AUTHORITIES' INSPECTIONS, FEES & CERTIFICATION

After the commissioning tests have been concluded successfully, arrange for the inspection of the equipment to Regulatory Authority requirements and issuing of the relevant certificates.

Carry out demonstrations of all systems as required by the authorities. Also allow for all pre-inspection testing to ensure that all systems are ready for the authorities' inspection.

Lodge all notices and pay all fees required by the Controlling Authorities, including escalator registration fees.

The escalator contractor shall make a final check of each escalator operation with the owner or owner's representative present prior to turning each escalator over for use. The escalator contractor shall determine that control systems and operating devices are functioning properly.

Hand over 3 sets of keys to operate each type of key-operated switch and lock associated with the escalators. Any keys that over-ride the security system shall be of the restricted broach type that cannot be copied without written authority from the building owner.

Allow in the Tender Price to pay for any necessary and chargeable testing work.

AS-INSTALLED DRAWINGS & MANUALS

GENERAL

Provide as-installed drawings and manuals on completion of the works and prior to the issue of the Certificate of Practical Completion.

Submit preliminary copies of the documents for checking.





After approval provide three (3) prints of the drawings full size and one (1) print reduced to A3, three (3) hard copies of the manual and AutoCAD and PDF files for the drawings on compact disc.

DRAWINGS

The drawings shall be carried out by competent draftsmen.

Workshop drawings prepared and submitted prior to installation shall be amended to show all variations and will be accepted as as-installed drawings.

The drawings shall also show the following:

-  The as-installed location of all equipment.
-  The arrangement of control panels.
-  Wiring diagrams.
-  The arrangement of switchboards.

MANUALS

Provide 3 hard copies, and one PDF copy on CD-ROM of each installation manual. The manual shall include a full description of the installation and functioning of the systems and instructions for efficient operation and maintenance. The manual shall be bound in a folder with printed label on the front in the following format:-

INSTALLATION MANUAL FOR ESCALATORS

Escalator Contractor

(as appropriate)

The words "Escalator Manual" and the job name shall be printed along the spine of the folder.

The manuals shall incorporate the following information grouped into sections.

- ④ Index.
- ④ Operating instruction for all equipment; include procedures in case of malfunction or civil emergency.
- ④ Manufacturers' brochure for all equipment.
- ④ Schedule of Recommended Maintenance by the building managers.
- ④ Schedule of Recommended Maintenance by a Maintenance Contractor (who, for the first 12 months, is the installer).
- ④ All relevant information to assist the Proprietor in carrying out the maintenance, additions and/or alterations to the installation.
- ④ Completed checklist (refer Commissioning & Testing).

Where manufacturers' drawings are provided with the manual, they shall be folded and included within the manual, or alternatively bound separately and cross-referenced in the manual.

WARRANTY & MAINTENANCE

OPERATIONAL WARRANTY MAINTENANCE

(12 MONTHS AFTER PRACTICAL COMPLETION OF HEAD CONTRACT)

The escalator contractor guarantees the materials and workmanship of the apparatus furnished under these specifications. The escalator contractor shall make good any defects which may develop within one (1) year from the date of practical completion of the head contract, not due to ordinary wear and tear, vandalism, improper or insufficient maintenance by others, abuse, misuse, neglect or any other cause beyond the control of the escalator contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.

This service shall not be subcontracted but shall be performed by the escalator contractor.

During the warranty maintenance period provide qualified and experienced personnel to perform the maintenance required for safe and reliable operation, including the following:

- ④ Make regular service visits at the required intervals and at times agreed with the building staff, and carry out regular maintenance procedures, including running adjustments, lubrication and the like.
- ④ Promptly attend stoppages or unsatisfactory operation of equipment at any time of the day or night, and restore the installation to proper working order. Before the start of the maintenance period, supply the contact telephone numbers of the persons to be called.
- ④ Make good faults or damage caused by defects in the installation, and replace defective parts or parts showing signs of undue wear.
- ④ Supply the necessary maintenance materials including lubricants and cleaning materials.
- ④ Leave the areas and equipment in and on which maintenance work was performed clean and tidy after each visit.

- ⊕ Provide a record of each visit including the date and time, work carried out, name of the service operator and any relevant, information in one of the following forms:
 - a computer record;
 - a log book with pages set up for operational maintenance records, neatly bound in durable vinyl or similar hard covers, permanently labelled with the project name and date of issue.
- ⊕ At the end of the warranty maintenance period, make a service visit. Test the safety and protective devices, demonstrate the satisfactory operation of escalator installation, and certify in writing that it is in satisfactory working order, and is operating correctly.

COMPREHENSIVE MAINTENANCE

Include as a separate item in the tender the annual cost, as at the date of closing of tenders, for maintaining each escalator in a proper and safe operating condition under a 5, 10 or 20 year comprehensive maintenance contract commencing after expiry of the operational warranty maintenance period and in accordance with the following:

- ⊕ Regular inspections, maintenance, adjustments and lubrication of each escalator by a competent mechanic and assistant, during normal working hours at a mutually agreed upon time.
- ⊕ Replacement and/or repair all components of the installation necessitated by reason of normal wear and tear.
- ⊕ Provide all lubricants, compounds and cotton waste.
- ⊕ Promptly answer all calls necessitated by stoppages, or unsatisfactory operation of the equipment, during and after normal working hour periods, and restore the equipment to proper working order.
- ⊕ Carry out major replacement or repair work during normal working hours. If otherwise directed, claims will be received for additional labour costs based on the difference between afterhours and normal hour rates for the periods worked.