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Tender Details

Date : 21-Aug-2024 03:16 PM

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Basic Details

Organisation Chain	Andaman Lakshadweep Harbour Works||Executive Engineer (CSWD)- Port Blair ALHW		
Tender Reference Number	ALHW/DCEM/TECH(E-97)/02/2024		
Tender ID	2024_ALHW_822164_1	**Withdrawal Allowed**	Yes
Tender Type	Open Tender	**Form of contract**	Item Rate
Tender Category	Works	**No. of Covers**	1
General Technical Evaluation Allowed	No	**ItemWise Technical Evaluation Allowed**	No
Payment Mode	Not Applicable	**Is Multi Currency Allowed For BOQ**	No
Is Multi Currency Allowed For Fee	No	**Allow Two Stage Bidding**	No

Cover Details, No. Of Covers - 1

Cover No	Cover	Document Type	Description
1	Fee/PreQual/Technical/Finance	.xls	Budgetary Offer

Tender Fee Details, [Total Fee in ₹ * - 0.00]

Tender Fee in ₹	0.00		
Fee Payable To	Nil	**Fee Payable At**	Nil
Tender Fee Exemption Allowed	No		

EMD Fee Details

EMD Amount in ₹	0.00	**EMD Exemption Allowed**	No
EMD Fee Type	fixed	**EMD Percentage**	NA
EMD Payable To	Nil	**EMD Payable At**	Nil

Click to view modification history

Work /Item(s)

Title	Budgetary Offer				
Work Description	Design, Manufacture, Supply, Transportation, Installation, Testing and Commissioning of Passenger Lift for G 2 Building (10-Person Capacity-01 No.), Passenger Lift for G 1 Building (15-Person Capacity- 01 No.) and Passenger Escalators (MS - 02 Nos.)				
Pre Qualification Details	Please refer Tender documents.				
Independent External Monitor/Remarks	NA				
Show Tender Value in Public Domain	No				
Tender Value in ₹	0.00	**Product Category**	Miscellaneous Works	**Sub category**	NA
Contract Type	Rate Contract	**Bid Validity(Days)**	90	**Period Of Work(Days)**	180
Location	Swaraj Dweep (Havelock)	**Pincode**	744211	**Pre Bid Meeting Place**	NA
Pre Bid Meeting Address	NA	**Pre Bid Meeting Date**	NA	**Bid Opening Place**	EE (CSWD), ALHW, Port Blair
Should Allow NDA Tender	No	**Allow Preferential Bidder**	No		

Critical Dates

Publish Date	21-Aug-2024 03:30 PM	**Bid Opening Date**	06-Sep-2024 03:00 PM
Document Download / Sale Start Date	21-Aug-2024 03:30 PM	**Document Download / Sale End Date**	05-Sep-2024 03:00 PM

BILL OF QUANTITIES/SCHEDULE OF WORK.

Name of work: Design, Manufacture, Supply, Transportation, Installation, Testing and Commissioning (DMSTIT&C)of Passenger Liftfor G+2 Building (10-PersondCapacity-01 No.), Passenger Lift for G+1 Building (15-Persond Capacity- 01 No.) &Passenger Escalators (Moving Stairs - 02 Nos.) at the project of **Development of Sea Port Terminal Building at Swaraj Dweep (Havelock), A&N Islands – 744211**.

Sl No	Description of Items	Unit	Rate Rs. ps.	Quant - ity	Amount Rs. Ps.
1.	Design, Manufacture, Supply, Transportation, Installation, Testing and Commissioning of MRL Passenger Lift 10 person capacity (660-750 kg) for SPT Buildings at Swaraj Dweep (Havelock), A & N Islands. The rate is inclusive of GST, transportation charges uptoSwaraj Dweep (Havelock), C & F Charges, Handling charges & Erection Charges at Swaraj Dweep (Havelock), Certification Charges from Inspector of Lift (if any), Port Charges, all labour charges required for installation & Commissioning works in the SPT buildings, etc. complete.	Each		01	
2.	Design, Manufacture, Supply, Transportation, Installation, Testing and Commissioning of MRL Passenger Lift 15 person capacity (1020-1125 kg) for SPT Buildings at Swaraj Dweep (Havelock), A & N Islands. The rate is inclusive of GST, transportation charges uptoSwaraj Dweep (Havelock),, C & F Charges, Handling charges & Erection Charges at Swaraj Dweep (Havelock), Certification Charges from Inspector of Lift (if any), Port Charges, all labour charges required for installation & Commissioning works in the SPT buildings.	Each		01	

3.	Design, Manufacture, Supply, Transportation, Installation, Testing and Commissioning of Passenger Escalators for SPT Buildings at Swaraj Dweep (Havelock), A & N Islands. The rate is inclusive of GST, transportation charges upto Swaraj Dweep (Havelock), C & F Charges, Handling charges & Erection Charges at Swaraj Dweep (Havelock), Port Charges, all labour charges required for installation&Commissioning works in the SPT buildings.	Each		02	
	Total				
	In words				

Signature and seal of Authorized Signatory of bidder.

Lowest Price Certificate

I/We do hereby certify that prices quoted by us against this tender are the lowest and is the same as applicable to other Government Departments/ Undertakings/ Other Organizations.

We also certify that the quoted rates are not higher than rates quoted / prices charged by us for same items to other Customers.

Date Signature of the Tenderer

Seal of the Firm

SCOPE OF WORK AND TECHNICAL SPECIFICATIONS:

SCOPE OF WORK:

APPLICABLE FOR 10 PAX AND 15 PAX CAPACITIES LIFTS FOR SPT BUILDING, SWARAJ DWEEP (HAVELOCK) A&N ISLANDS.

Design, Supply, Transportation, Installation, Testing and Commissioning of MRL (Machine Room Less) Passenger Lift for G+2 Building (10-Person Capacity)& Passenger MRL Lift for G+1 Building (15-Person Capacity) at SPT building, whichincludes Design, Manufacture, supply, Transportation installation, Testing and Commissioning of lifts along with connected cabling work, interfaces,equipment track etc.

TECHNICAL SPECIFICATIONS.

Applicable for Passenger Lift for G+2 Building (10-Person Capacity).

Some of the technical parameters required are mentioned below.

1. General

•Type: Electrically operated lift

• Capacity	: 10 persons (660-750 kg)
• Number of landings:	- G+2
• Rated speed	- Speed: 1.0 to 1.5 meters per second
•Travel Height	: Suitable for G+2 (Ground plus two floors = 4.5 Meter+ 4.00+3.75 M= 12.25 Meter).
• Stops and Openings	: 3 stops with front openings.
• Drive Type	: Gearless traction or hydraulic drive.

2. Cabin Specifications:

• Axle shaft size	: 2.80M x 2.83 M (Already provided at STP Buildingwithout Plastering)
•Cabin Size	: Compactable with axle shaft size.
• Cabin Finish	: Stainless steel.
• Lighting	: LED lighting
• Flooring	: Anti-skid material (e.g., PVC, granite).
• Handrails	: Stainless steel handrails on three sides.

3. Safety Features:

• Emergency Alarm: Push-button alarm
• Communication with building security.
• Intercom: Intercom system for communication with building security.
• Door Sensors: Infrared sensors to prevent door closure when obstructed.
• Overload Sensor: Overload warning and sensor.
•Automatic Rescue Device (ARD): In case of power failure, the lift automatically moves to the nearest floor and opens the doors.

• Safety Gear: Instantaneous safety gear to prevent free fall.

4. Power Consumption:

• Power Supply: 415V, 3-phase, 50Hz
• Energy Efficiency: Should conform to energy efficiency standards (such as BEE ratings).

5. Dimensions

• Size of the Lift Well (mm): 2800 mm (W) X 2830 mm (H).(Already provided at STP building without Plastering)

• Overhead Required (mm): 4000 mm H from Top floor finishes level.
• Depth of the Lift Pit (mm): 1960 mm from Ground floor finish level.

For Passenger Lift G+1 Building (15-Persons Capacity).

1. General

• Type	: Electrically operated lift.
• Capacity	: 15 persons (approximately 1020- 1125 kg).
• Speed	: 1.0 to 1.5 meters per second.
• Travel Height	Suitable for G+1 (Ground plus one floors = = 4.5 Meter+ 4.00 = 8.50 Meter).

• Drive Type: Gearless traction or hydraulic drive.

• Control System	: Microprocessor-based control system with automatic operation and manual override.

2. Cabin Specifications:

• Axle shaft size	: 3.50 M x 3.30 M.(Already provided at STP building without Plastering)
• Cabin Size	: Compactable with axle shaft size.
•Cabin Finish	: Stainless steel on two sides & Glasses on other two sides since 2 sides are open to atmosphere and glass finish gives aesthetic look.
• Lighting	: LED lighting.
• Flooring	: Anti-skid material (e.g., PVC, granite).
•Doors	:Automatic sliding doors, stainless steel finish.
• Operator Panel	: Control panel for the lift operator.

2. Safety Features:

• Emergency Alarm: Push-button alarm.

• Emergency Light: Battery-operated emergency light.
• Intercom: Intercom system for communication with building security.
•Overload Sensor: Overload warning and sensor.
•Automatic Rescue Device (ARD): In case of power failure, the lift automatically moves to the nearest floor and opens the doors.
•Door Sensors: Infrared sensors to prevent door closure when obstructed.
•Fireman Switch: Allows operation by fire personnel in an emergency.
•Safety Gear: Instantaneous safety gear to prevent free fall.
•Buffer Springs: At the base of the shaft to cushion the cabin in case of failure.

4. Power Consumption:

• Power Supply: 415V, 3-phase, 50Hz
• Energy Efficiency: Should conform to energy efficiency standards (such as BEE ratings)

5. DIMENSIONS

• Size of the Lift Well (mm): 3500 mm (W) X 3300 mm (H) .
• Depth of the Lift Pit (mm): 2060 mm from Ground floor finish level.
• Overhead Required (mm): 4000 mm H from Top floor finishes level.

6. Specification of Glasses to Lift Car 15 pax (G+1) capacity.

- Glasses –FireResistant Glass
- Thickness: The thickness of the glass ranges from 10 mm to 12 mm.
- Transparency: The glass used should have high optical clarity to ensure it is sufficiently transparent.
- Edge Finish: All edges should be polished to reduce the risk of injury and to improve aesthetics.
- Safety Film: A safety film is to be applied to the glass to prevent shards from causing injury in the event of breakage.
- Framing: The glass must be securely mounted in a metal frame, which provides additional structural support.
- Vibration and Impact Resistance: The glass must be able to withstand the vibrations and impacts.
- Maintenance: Ensure that the glass is easy to clean and maintain, as scratches or damage could compromise safety.
- Conform to:IS 2553 (Part 1): 2018: Indian Standard for "Safety Glass - Specification". This includes guidelines for the use of safety glass in buildings, including tempered and laminated glass, EN 81-20:2014: European standard for the safety of lifts. It includes specific requirements for materials, including glass, used in lift cabins.

The following specification and standards are applicable for **BOTH**10 Pax & 15 Pax capacity lifts

6. Applicable Codes and Standards

•IS 15259: Installation and maintenance of lifts.

• IS 14665: Safety rules for the construction and installation of lifts.
• IS 15330: Inspection and test of lifts.
• EN 81: European safety standards for lifts and escalators.
•NBC: National Building Code of India, particularly Part 8 (Building Services) and Part 4 (Fire and Life Safety).
• Safety systems with separate overspeed governor and brake system, emergencylowering with battery backup, handrail and advanced door safety mechanism with lightrays and pressure sensors.

• Magnetic driven controls.
• First and second automatic rescue devices.
• Trap doors, manual door key and hydraulic switch.
• Voice annunciation, landing chime, brail, illuminated buttons.
• GRL (Grease Less Rails).
• Car Door: Sliding type.

The Controller shall include protection against the following abnormalities and shall cut off thepower supply, apply the brake and bring the car to a rest in the event of any of the abnormalities occurring.

a) Over current
b) Under voltage
c) Overvoltage
d) Earth leakage.

TECHNICAL COMPLIANCE:
• Post installation TUV certification.
• SIL certification (Safety Integrity Level)

DRAWINGS

General Arrangement Drawings of Lifts and Escalators are to be got approved from the EIC before commencing the manufacturing works.

On completion of work, the contractor shall submit the 'As Built' drawings and equipmentoperation and maintenance manuals and original Test Certificates. Further, a copy of suchdetailed diagram and a set of instructions for evacuation of passengers in case of breakdownof the lifts shall be framed and installed by the contractor in the location approved by ALHW.

WORKS TO BE ARRANGED BY ALHW

The following items shall be provided to the Lifts & Escalator contractor under the instructions of theDepartment to suit the requirements of the contractor.

i. Construction of Shaft/Pit of specification as per General Arrangement Drawing.

ii. The floor,wall and ceiling finishes in hoist ways, pits; including painting (except paintingof equipment and materials supplied by Lift contractor and water proofing).

iii. Cables from the main L.T. Panel board to the Lift Control Board.

iv. 3 phase power supply during the installation, testing and commissioning of the lift.

v. Power Supply of 230 V single phase: 440 V three phase as input to the control of thepanel of the lift.

SAFETY

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

a) Against overload.
b) The over speeding car shall be automatically brought to a gradual stop on guide rails andpower supply to the hoist motor shall be switched off.
c) Over speed centrifugal governor operating the safety gear in case of overs speeding ofcar in the down direction.
d) Car gate lock so that in the event of car gate being opened when passengers are in thecar , the lift will be brought to rest.
e) Over travel limit switches at top and bottom limits of travel to disconnect the powersupply and apply brakes to stop the car within a defined safe distance in case of over travel ineither direction.

f) Ultimate terminal switches to stop the car automatically within top and bottom clearancesindependently of normal over travel limit switches but with buffers operative.

CAR

Cabin interior:
Floor – Vinyl floor, Walls and Ceiling - SS finished, 1 no. SS handrail.

Landing fixture:

The landing fixtures shall be recess mounted on a base junction box in the wall by the side oron top of landing doors as required. Each landing fixtures shall consist of micro touch typelanding call buttons with illuminated call acknowledge signal and illuminated digital type carposition indicators on separate stainless steel face panels with hairline finish. Alternatives asavailable with bidders shall be indicated in tender for owner's approval.The following landing fixtures shall be provided for each lift.

a) For Lowest floor

• Up call button
• Digital car position indicators
• Travel direction indicators
• "In use" indicator to signify the lift door is opened for delivery at a certain landing

b) For All floors other than lowest and topmost floor

• Button up and down call buttons
• Travel direction indicators
• Digital car position indicators with Gong (Optional)
• "In use" indicators to signify the lift door is opened for delivery at a certain landing
• Manual bypass key switch for lift landings.

c) The topmost floor

• Down call button
• Travel direction indictors
• Digital car position indicators with Gong
• "In use" indicators to signify the lift door is opened for delivery at a certain landing.
• Manual bypass key switch for lift landings.

Car door locking devices:

Every car door shall be provided with an electrical switch to prevent the lift car from beingstarted or kept in motion unless the car door is closed. A mechanical locking device shall alsobe provided to prevent door opening from inside the car whilst the car is in motion.

Landing door locking devices:

Every landing door shall be provided with a mechanical locking device to prevent opening ofthe door from the landing side in normal cases unless the lift car is in that particular landingzone.

Door locking devices:

All door locking devices, door switches and associated actuating rods, levers or contracts, shallbe inaccessible from the landing or the car.

Protective devices:

Protective devices shall be fitted to the leading edges of both car door panels. It shallautomatically initiate reopening of the door in the event of a passenger being struck (or aboutto be struck) by the door in crossing the entrance during the closing movement. The obstructionof either leading edge when closing shall actuate the protective device to function.

"Door open" alarm:

A “Door open" alarm shall be provided in the car to initiate alarm and a continuous buzzer if acar or landing door has been mechanically kept open for a present period. The period shall beadjustable from 0-10 minutes.

Emergency landing door unlocking devices and key:

Every landing door shall be provided with an emergency landing door unlocking device. Whenoperated by an authorized person with the aid of a key to fit the unlocking triangle, the landingdoor shall be unlocked

irrespective of the position of the lift car for rescue purposes. Whenthere is no "unlocking" action, the key shall only be able to stay in the locked position.
In the case of coupled car and landing doors, the landing doors shall be automatically closedby means of weight or springs when the car is outside the unlocking zone.

Door safety:

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

Double Door Operation:

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

Emergency Lighting:

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

Alarm System:

An emergency alarm buzzer, including wiring shall be provided and connected to a plainlymarked push button in the car operating panel. The alarm bell shall be located in central securityroom. The alarm unit shall be solid- state siren type, to give a waxing and waning siren whenthe alarm button in the car is pressed momentarily. Built in 3 way intercom system withtelephone instrument in the car, reception and security, (as directed by ALHW) including wiringtelephone instrument and associated EPABX shall be provided.

Sealed Maintenance Free Nickel Cadmium Batteries capable of maintaining the following in eachlift for 2 hrs after mains failure.

Emergency light of adequate illumination in car -Car Ventilation Intercommunication System.

Alarm bell:

Alarm bell shall be provided inside the car. In case of emergency, the user can press the buttonto activate the alarm.

Door Hangers and Tracks:

The car and the landing doors shall be provided with two-point suspension sheave type hangerscomplete with tracks. Sheaves and rollers shall be steel with moulded nylon collar and shallinclude shielded ball bearings. Tracks shall be of suitable steel section with smooth surface. Thelanding doors shall be complete with headers, sills, frames etc. as required.

Lift Door Protection:
Multiple-Infra red door protection and mechanical shoes shall be provided for all lift to controldoor movement which shall cover the entire door opening effectively.

Cabin fan:
A noiseless pressure fan shall be provided in the lift cabin. It shall have auto fan off facility. Incase no calls are registered for a pre-set time, the cabin fan shall be automatically switched off.

Safety Devices:
Safety devices shall be capable of operating only in the downward direction and stopping fullyloaded car, at the tripping speed of the over speed governor, even if the suspension devicesbreak, by gripping the guides, and holding the car there.

Landing Door Interlocks:
Electrical interlocks shall be provided to ensure that the car does not operate unless all doorsare closed and unless the car reaches a landing zone.

Over travel limit switches:
These shall be provided and installed to stop the car within the top and bottom clearance,independent of the normal car operating device. The bottom over travel limit switch shallbecome operative when the bottom of the car touches the buffer. When the over travel limitswitches are operative, it shall be impossible to operate the car until the car has been landedto a position within the normal travel limits.

Over speed governor:
Over speed governor shall be of centrifugal type and shall operate the safety gear at a speed at least equal to 115% of the rate speed and less than the over speed governors shall bedriven by flexible wire ropes with the following requirements.The over speed governors shall be sealed after setting the tripping speed.

FIRE SAFETY REQUIREMENTS
General requirements of lifts shall be as follows:
• Landing doors in lift enclosures shall have a fire resistance of not less than two hours.
• Lift car door shall have a fire resistance rating of two hours.
• Grounding switch (es), at ground floor level, shall be provided on all the lifts to enable thefire services to ground the lifts.

LIFT FOR DISABLED
The lifts shall be suitable for use by disabled persons. The following additional facilities shallbe provided in this lift.
• Full length handrails shall be provided on the rear and side wall panels.
• The door closing time shall be set for min 5 seconds and the door closing speed shall not exceed 0.25Mtr /sec.
• The “door open “and“door closed “announcements shall be audibly made in the car.
• Braille signs / buttons.
• Clear door size should be minimum 900mm.

OPERATING PANELS, BUTTONS AND SWITCHES

Main and secondary car operating panels, buttons and switches shall be located on one of the two frontwall panels next to the car door and as specified in the schedule of lifts and as per approved G.A drawing.

All buttons and switches shall be clearly legible with fade proof text and figures, and shall be easilyaccessible, especially for disabled persons.

AUTOMATIC RESCUE DEVICE (ARD)

The Automatic Rescue Devices (ARD) was meant for the purpose of bringing the lift car to the nearestlanding doors. The ARD shall have the following specifications:

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

b) ARD should monitor the normal power supply in the main controller and shall activate rescue operationwithin the time period as per manufacturer's standard subject to approval of lift /safety Inspector. It shouldbring the elevator to the nearest floor at a slower speed than the normal run. While proceeding to the nearestfloor the elevator will detect the zone and stop. After the elevator has stopped, it automatically opens thedoors and parks with door open. After the operation is completed by the ARD the elevator is automaticallyswitched over to normal operation as soon as normal power supply resumes.

c) In case the normal supply resumes during ARD in operation the elevator will continue to run in ARD modeuntil it reaches the nearest landing and the doors are fully opened. If normal power supply resumes when theelevator is at the landing, it will automatically be switched to normal power operation.

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

e) The battery capacity should be adequate so as to operate the ARD at least four times a day provided induration between usages is at least 30 minutes.

Electrical Wiring

Necessary insulated wiring to connect all parts of the equipment shall be furnished and installed. Insulatedwiring shall be flame retardant and moisture resistance and shall be run in G.S conduits. All cables shall be Flame– retardant with copper conductors.

Trailing cables for the lifts shall be EPR insulated stranded copper conductor flexible cables conforming to IS9968. They shall be flexible and shall be suitably suspended to relieve strains on individual conductors. All Copper conductors should be of appropriate gauge copper to avoid excessive Voltage drop. All wires, cables,conduits, metal boxes, fittings and Earthing shall comply with statutory requirements and BIS specifications.

Control cabling shall be with multi core stranded copper conductor PVC insulated and sheathed 1100 voltgrade cables conforming to IS 8130. The minimum size of the cable shall be 2.5 sq mm.

Where cables pass through walls or floor slabs, pieces of GI sleeves shall be provided for cast into the wall /floor and cable shall be drawn therein. Annular space around the cable in the sleeve shall be sealed withfireproof sealant.

The controller unit comprising of the MCCB, adjustable overload and phase reversal and phase failureprotection, all the circuit elements, transformer, rectifier for D.C control supply, inverter power pack, terminalblocks etc. shall be enclosed in an insect vermin proof, sheet steel floor or wall mounted cabinet with hingeddoors at front or at both front and rear. Proper warning boards and danger plates shall be provided on bothsides of the controller casing. Sheet steel used for controller cabinet shall not be less than 14 SWG and shallbe properly braced, where necessary. Suitable gland plate shall be provided for cable entry. The battery forthe charger unit shall be suitably placed. Degree of protection of Enclosure shall be IP 54; Enclosure shallhave provision of earthling studs.

PAINTING

All exposed metal work furnished in these specifications, except as otherwise specified, shall be given oneshop coat of anti-corrosive primer after approved surface treatment of metal surfaces and two coats ofapproved enamel paint of approved shape. After installation of Lifts, final touch up coat of paint shall beapplied.

TESTS AT SITE ON COMPLETION OF WORK

Levelling Test:

Accuracy of the floor levelling shall be tested with the lift empty, fully loaded. The lift shall be run to each floorwhile travelling 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 thesemeasurements for levelling at the floors when the car is empty and when it is fully loaded. The tolerances forlevelling shall be as + 5mm accuracy.

Safety Gear Test:

Instantaneous safety gear controlled by a governor should be tested with contract load and a contract speed,governor being operated by hand. Two tests should be made, however, with wedge clamps or flexible clampsafety, one with contract load in the car and the other with 68 kg (equivalent to one person) in the car. Thestopping distance obtained should be compared with specified figures and the guides, car platform, and safetygear should be carefully examined afterwards for signs of permanent distortion. Counterweight safety gearshould be tripped by the counterweight governor and the stopping distance noted. In this case, however thegovernor tripping speed should exceed that of the car safety governor but by no more than 10 per cent. Duringthe safety gear test, car speed (from the governor or the main sheave) should be determined at the instantor tripping speed with that stated in I.S. The governor jaws and rope should be examined for any undue wear.

Contract Speed:

This should be measured with contract load in the car, with half load with no load, and should not vary fromthe 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 willfacilitate 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 bya tachometer applied directly to shaft immediately below the sheave.

Lift Balance:

After the above test, some of the weight shall be removed until the remaining weights represent the figuresspecified by the tenderer. With this condition car at halfway travel the effort required to move the lift car ineither direction with the help of winding wheel shall be as nearly as can be judge by the same.

Car and landing doors interlock:

The lift shall not move with any door open. The car door relay contact and the retiring release cam must betested. The working of the door operation and the safety edges and light equipment, if any provided shall also
be examined. The operation of the contactors and interlocks shall be examined, and it shall be ascertainedwhether all requirements laid down in the specifications have been met.

Normal Terminal Stopping Switches:

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

Final Terminal Stopping Switches:

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

Insulation Resistance:

This shall be measured (after removing the electronic PCB's and their connection) between power and controllines and earth and shall not be less than 5 mega-ohms when measured with D.C. voltage of 500 volts. Thetest shall be carried out with contactors so connected together as to ensure that all parts of every circuit aresimultaneously tested.
The size, number of construction and fastenings of the ropes should be carefully examined and recorded.

IV.2.O. TESTS ON COMPLETION

The following tests shall be carried out to the satisfaction of ALHW.
i. Insulation resistance and earth test for all electrical apparatus.
ii. Continuous operation of the lift under full load conditions and simulated starts and stops (150 nos. perhour each) for one hour at the end of which time the service temperature of the motor and theoperating coils shall be tested. This shall be as per B.I.S. specification.
iii. The car shall be loaded until the weight on the rope is twice the combined weight of the car and thespecified load. The load must be carried on for about 30 minutes, without any sign of weakness,temporary set or permanent elongation of the suspension rope strands.
iv. The following items shall be tested:
a. Levelling accuracy at each landing in conditions of fully loaded and empty car.
b. Overload protection.

c. Gate sequence relays, if provided and installed.
d. Car and landing door interlocks.
e. Collective control and priority sequences, if installed.
f. Safety gear mechanism for car and counterweight with fully loaded car and also with only 68kgload.
g. Speeds on Up and Down travel with full load, half load and empty car.
h. Door contacts.
i. Final terminal stopping device.
j. Normal terminal stopping device.
k. Car and counterweight buffers with contract load and contract speed.
l. Operation of controllers.
m. Manual operation of lift at-mid-way travel.
n. Emergency operation.
o. Tests on completion shall also be performed to the satisfaction of inspector of Lifts, if applicableand a certificate will be obtained from the 'Lift Inspector' by the contractor.

STATUTORY APPROVALS
Necessary approval for the hydraulic lift shall be taken from the concerned authorities, if applicable.

IV.2.Q. MAINTENANCE DURING DEFECTS LIABILITY PERIOD
Comprehensive maintenance during Defects Liability period inclusive of periodic servicing, prompt attentionto client (ALHW) complaint, prompt rectification of all malfunctions and equipment failures, replacement ofdefective equipment / parts, replacement of light fittings, lubrication including lubricants, maintaining correctalignment, and levelling of cars and ensuring smooth running, starts and stops etc. all complete to Estate Office satisfaction shall be done.

(A) The following items are required to be submitted in duplicate along with the Tender.
i. Catalogues with offered items highlighted.
ii. List of imported components, if any.
iii. Compliance Statement for guaranteed parameters given in the above Specification.
iv. Confirmation that offer submitted meets the technical specifications and scope of work and thereare no deviations and exclusions from NIT.
v. The contractor shall specify in his offer the full capability of his system in this regard.
(B) The successful contractor, **after award of the contract,** shall furnish the following technical particulars ofthe equipment/devices for the approval by Engineer in charge.
i. Single line / schematic diagram of electronic control panel, lift and equipment etc.
ii. Layout of Hoist way, Lift machine room, showing foundation details in the pit, machine room,electric control panel, Lift & equipment etc.
iii. Earthling layout.

iv. Inspection manual for equipment and accessories covered in the scope of supply (8 copies).
v. Technical literature of operation, control and maintenance etc. (4 copies) along with CDs.
vi. Schedule of scope of maintenance service during defect liability period and AMC.
The technical parameters furnished by the tenderer would be examined in detail during the design submissionstage. All improvements considered necessary to meet the tender Technical Specifications would have tobe incorporated without any additional cost to ALHW with objective of providing high performance and safetyLifts.

Technical Specifications for Passenger Escalators- Moving Stairs- for Sea Port Terminal (Ground Floor to Mezzanine Floor) at SwarajDweep (Havelock) A&N Islands

1. Basic Specifications:

Type: Electrically operated escalator.
Usage: Continuous use application.

Height: Suitable for a height (Vertical) difference between ground floor and mezzanine floor (4.5M up to Mezzanine Floor Slab top from Ground Floor).

Inclination: 35 degrees.

Step Width: 1000 mm.

Speed: 0.5 meters per second.

Step Chain: High-strength, double roller chains.

2. Safety Features:

Emergency Stop Buttons: Accessible at both ends of the escalator.

Step Demarcation Lights: LED lighting on the step edges for visibility.

Speed Monitoring: To ensure the escalator operates within safe speed limits.

Handrail Entry Protection: Sensors to prevent objects from being caught at the entry point.

Safety Switches: For step chain breakage, step sagging, and handrail entry.

3. Power Consumption:

Power Supply: 415V, 3-phase, 50Hz

4. Applicable Codes and Standards:

IS 4591: Code of Practice for Installation and Maintenance of Escalators and Moving Walks.

NBC: National Building Code of India, particularly Part 8 (Building Services)

EN 115: European safety standards for escalators and moving walks.

SCOPE

This specification covers design, manufacture and supply at site, installation testing and commissioning of reversible escalators to be provided at Sea Port Terminal Building.

The Escalator shall be of State-of-the-art technology, having nominal step width of 1000 mm, with 4 or 3 nos. horizontal Steps on top and bottom landing area and the nominal speed will be 0.5 m/sec. For the aforesaid step width and nominal speed, maximum carrying capacity as per EN 115-1:2008 will be 100 passengers per minute. The escalator shall be complete with all safety features and shall fully comply with International Standard EN-115 latest version.

Escalators shall be reversible type and capable of operating safely, smoothly and continuously in both directions for a period of not less than 20 hours a day, seven (7) days a week with an alternating passenger load reaching 100% of Contract Load (120 kg per step) for two hours and 50% of Contract Load for the following hour within the environmental conditions as stated in the specification and at the location where the escalators are to be installed.

The vertical-height of floors is 4.50.

The angle of inclination of escalator shall be 35° and minimum transition radius shall be 2.6 meters at the upper landing and 2.0 meters at the lower landing.

Design criteria and Submittals

The design shall generally meet the following criteria: -

a. Application of state of the art technology

b. Service proven design

c. Design life 30 years

d. Minimum life cycle cost

e. Low maintenance cost

f. Use of interchangeable, modular components

g. Extensive and prominent labelling of parts, cable and wires

h. Use of unique serial numbers for traceability of components

i. High reliability

j. Energy efficient

k. System safety Adequate redundancy and factor of safety

m. Fire and smoke protection (provision of smoke detectors, etc.)

n. Use of fire retardant materials

o. Environment friendly

p. Adherence to operational performance requirements.

q. Indigenization (contractors are encouraged to introduce indigenization in part/ full; in future, the same is likely to be made mandatory)

r. Safety against garments such as Sari, loose clothes, etc.

s. All ball or roller bearings whether or not sealed for life time greasing shall have a design life of at least 110,000 operating hours under operating conditions.

t. Safety against water flooding in pits

Submittals

Every bidder must submit the following documents along with the offer:

A. Typical general arrangement/ layout diagram, which shall convey the following minimum information:

a. Vertical rise

b. Horizontal span length with break-up of constant span at upper and lower landing

c. Step width

d. Handrail type

e. Handrail center to centre distance

f. Width of truss

g. Width of escalator

h. Width of lower end opening

i. Detailed pit dimensions

j. Width of top end opening

k. Intermediate support, if involved

Type test reports in respect of systems/ sub-systems that will form a part of the escalator to be supplied.

L. Type test report in support of EMI/ EMC compliance

The contractor (successful bidder) will be required to submit the following Operation and Maintenance Manuals (one soft and one hard copy per station):

A. Drawings, installation and maintenance instructions, and other data pertinent to the components used in escalator systems, including detailed repair data for all components, including disassembly, inspection/gauging/ torque requirements, inspection and testing schedules, reassembly, testing methods and other related information. Manuals shall cover all mechanical and electrical components, operating panels, controls and indicators. Exploded view drawings shall be included to facilitate repair and maintenance functions.

STEPS

STEP DEMARCATION The surface of the steps shall be horizontal at all positions exposed to passenger. The nominal width of steps shall be 1000 mm unless otherwise specified. Yellow lines of 25 mm width shall be marked on both sides and front of the leading/trailing edges of the steps with durable and wear resistant materials to show demarcation between comb and cleat.

INTEGRAL DIE-CAST ALUMINUM STEP TREAD AND RISER

The step treads shall be die-cast aluminium with closely spaced cleats designed to provide a secure foothold, the latter being grooved parallel to the travel of the steps to mesh with the comb teeth at the entrance and exit. Step risers shall also be die-cast aluminium integral with the step treads and shall include vertical cleats designed to pass between the cleats of the tread on the adjacent steps thus providing a combing action with minimum clearances.

ROLLERS each step shall be supported on four rubbers or synthetic material tiered ball bearing rollers, grease sealed for life and so mounted that tilting and rocking of steps is prevented whilst ensuring smooth quiet operation in service.

TRACTION

Traction to the steps shall be by means of two endless roller chains.

DIMENSIONS OF STEP The depth of any step in the direction of travel shall not be less than 400 mm. The rise of any such step shall not be more than 240 mm.

CLEAR HEIGHT ABOVE STEP The clear height above the steps at all points shall not be less than 2.30 m.

FLAT STEPS There shall be at least a length of four complete steps at either end of the escalator travelling horizontally from the comb line.

STEP CHAINS

The steps shall be driven by at least 2 steel link chains of which at least one shall be located at each side of the step.

MATERIALS The step chains shall be made of high tensile steel links with hardened and ground pins QUIET OPERATION The rollers shall accurately engage with the drive sprockets to ensure smooth and quiet operation.

TRACKS

CURVED SECTION

All the curved sections of the tracks shall be manufactured in steel or aluminium pressure die-castings.

STRAIGHT SECTION The straight sections of the tracks shall be of steel or aluminium extrusions. The tracks forming both running surfaces and guards over the trailing rollers shall essentially be channels or of such formation as to prevent derailing.

LANDING OPENING AND LANDING PLATE

. OPENING Openings of adequate size in the floor will be provided by the Building Contractor on both upper and lower landings. The Contractor shall indicate on site the exact dimensions of the openings, excavation, drains and ventilation holes required.

LANDING PLATE Removable floor landing plates shall be provided by the Contractor over the openings to give access to the mechanism for maintenance purpose. These landing plates shall be of stainless steel or wear resistant aluminium alloy which shall afford a secure foothold. Alternative material will not be accepted without the prior approval of the Supervising Officer.

LANDING GAP The gap between the balustrade exterior panelling and the wall or obstacle shall not exceed 100 mm.

COMBS

COMBS

Combs shall be provided at the top and bottom landings and shall be wear resistant aluminium alloy with anti-slip pattern.

COMB TEETH SECTION The comb teeth sections shall have fine pitch teeth to allow the cleats of the step tread to pass them with a minimum of clearance. The comb teeth sections shall be made of synthetic resin, metal or equivalent material. Each such comb teeth sections shall be such that

(1) It is adjustable horizontally and vertically; and

(2) Sections forming the same are readily removable in case of emergency. The teeth of every comb teeth section shall be so meshed with and set into the slots of the

tread surface of the steps of the escalator that the points of such teeth are always below the upper surface of such tread surface.

BALUSTRADING

BALUSTRADES Solid balustrades shall be installed on each side of the escalator and shall consist of the following components:-

(1) Skirting- The skirting panels shall be vertical and constructed of smooth hairline finish stainless steel with thickness of not less than 2 mm. Embossed, perforated or roughly textured materials shall not be used.

(2) Interior profile- The interior profile shall be of hairline finish stainless steel with thickness not less than 2 mm. The interior profile and the balustrade interior panelling shall have an angle of inclination of at least 35 degree to the horizontal.

(3) Interior and exterior panelling -The glass shall be of a laminated or splinter-free one-layer safety glass (tempered glass type) and shall have sufficient mechanical strength and rigidity. The glass panels shall be at least 10 mm thick.

(4) Balustrade decking -The decking shall be of stainless steel or extruded aluminium, polished and anodized in natural colour. The decking is to be situated under the handrail and forms the top cover of the balustrade panelling. Appropriate measure shall be provided to discourage people from sliding along the decking.

(5) Extended newel- The newel including the handrails shall project beyond the root of the comb teeth by at least 0.6 m in longitudinal direction.

DRESS GUARD Dress guards of brush bristles type shall be provided along the full length of the lower part of the skirting panels. Brush bristles type dress guard shall be made of nylon filaments. The nylon filaments shall not support combustion and shall be durable and with flagged ends to give a soft face and be securely held within a pressed steel holder. The assemblies shall be easily removed when replacement is necessary. It shall consist of anodised aluminium carrier which is suitable for the escalator sidewall. The bottom of the carrier shall have chamfer angle to eliminate trapping of feet, trolley wheels and parcels, etc. The carrier shall be fixed onto the skirting panel by secret fixings which are concealed by the filaments but are easily removable.

EXTERNAL CLADDING Unless otherwise specified, the external cladding of the undersides and sides of the escalator will be of materials having a F.R.P. of not less than half an hour and will be provided by the Building Contractor.

HANDRAILS

RUBBER HANDRAIL The handrails shall be constructed of multi-layered canvas with the exposed surface covered with smooth black abrasion resistant rubber which shall be vulcanised into an endless loop.

SPEED The handrails shall move in the same direction and substantially at the same speed as the steps. The speed of the handrail is permitted to deviate from the speed of the steps, pallets or belt within the limits of 0% to +2%.

SAFETY GUARDSafety guards shall be provided where the handrails enter and leave the escalator newels to prevent pinching of fingers and hands.

HANDRAIL GUIDE The handrail guides shall be in specially formed section to allow easy movement of the handrail but properly shaped as to retain the handrail always in its place.

WIDTH OF HANDRAIL The width of the handrail shall be between 70 mm and 100 mm.

HANDRAIL CLEARANCE The horizontal distance between the outer edge of the handrail and walls, adjacent criss-cross escalators or other obstacles shall under no circumstances be less than 80 mm and shall be maintained to a height of at least 2100mm above the steps, pallets or belt of the escalator/passenger conveyor.

TRUSS

CONSTRUCTION The structural steel truss shall be a rigid steel fabricated structure and shall be capable of carrying a full complement of passengers together with mechanism of the escalator, the balustrades and the weight of exterior covering. The supporting structure shall be designed in a way that it can support the dead weight of the escalator plus a passenger weight of 5000N/m^2. The factor of safety used in the design of structural members of the escalator trusses shall not be less than 5 based on static load. The truss shall also be designed to support an additional load of the outer cladding panels and truss claddings up to a minimum load of 150N/m2. The truss design for SPT must ensure that for an escalator vertical rise up to 4.5m, there is no need for intermediate support. The truss design shall also ensure required safety to sustain the Steps and running Gear in operation.

In the event of failure of the track system, it shall retain the running gear in its guides. The construction and design of truss shall be such that it allows for easy inspection of the interiors of the escalator. Maximum deflection of Truss shall not exceed 1/750th of the distance between supports (distance between the supports for this purpose being not less than that corresponding to a 4.5m vertical rise of escalator without intermediate support). This will have to be physically proven by a deflection test for one escalator. Cladding of the truss shall be done with 1.5mm thick SS 304. The truss of escalator shall be hot dip galvanized up to minimum thickness of 80µm. Other parts inside the truss such as track, return station, shaft etc. shall be given suitable anti-corrosive treatment with zinc plating/ painting or similar process. The track system shall be constructed of steel with zinc plating. The track surface shall be straight and smooth. All joints, where possible, shall be diagonal across the width of the running surface. Maximum deflection of track system shall be designed not to exceed 1.00mm between any two adjacent track supports under 6,000 N/m2. Anti-jump track above step roller will restrain step

up-Elevatoring near comb area on both landings. The step roller track and the chain roller track wearing surfaces shall be of minimum 5mm and 3mm thickness on the passenger and return side respectively.

STEP CHAIN BREAKING- The entire tracking system shall be so designed that in the unlikely event of a step chain breaking, there shall be no likelihood of the steps Elevatoring out of place.

MACHINERY SPACE The upper section of the truss shall contain the drive machine and shall be fitted with a trap door. In cases where several drive machines are placed along the length of an escalator, suitable means of access to the drive machines shall be provided.

LUBRICATION

LUBRICATION Effective means for lubricating the bearings and moving parts as required shall be provided with easy access.

OIL PAN Oil tight drip pans shall be provided for the entire length of the escalator to contain any waste and lubricants within the truss. Where necessary, the oil tight drip pans shall be removable to give access to both the machinery space and the return station for maintenance.

DRIVING MACHINERY

INDEPENDENT DRIVING MACHINE Each escalator shall be driven by at least one machine of its own.

REDUCTION GEAR The driving machine shall incorporate a reduction gear system employing worm gear, planetary gear or other proven gear types.

(1) Worm gear system- The driving machine shall incorporate a worm reduction gear with a vertical flange-mounted motor or other proven design. It may be connected by chain or other proven means to the main drive shaft of the escalator. The worm shaft and worm wheel shall be housed in a substantial cast iron housing which shall also hold the lubricant.

(2) Planetary gear system - The motor, planetary gears and brakes shall be fully enclosed and form a unique, compact no chain unit. Motor and bearings shall have life-time lubrication.

MOTOR The motor shall be integrally mounted, A.C. squirrel cage, three phase induction motor of continuous rating, reversible type with high starting torque and low starting current and specially designed for escalator application. Other proven motor types may also be used subject to the approval by the Supervising Officer. Each traction machine shall be mounted within the truss or the machine pit and shall be removable enbloc from the truss for repair or maintenance. Suitable Elevatoring points shall be provided.

The escalator's driving machine shall be suitable for operation on 3-phase, 415Volt ±10%, 50Hz ± 3% AC supply and it shall comply with IS: 325/IEC 60034. The Total

Harmonic Distortion (THD) due to escalator motor drive shall be within the following limits: Current (I)* Maximum THD (%) in each phase I < 20A 20% 20A ≤ I ≤ 200A 15% * Fundamental current of motor drive at no load and rated speed The 3-phase Induction Motor shall be totally enclosed with external cooling fins having minimum IP-55 Protection and class F Insulation level. Sound level of the system shall not be more than 65 dBA at 1 meter from the balustrade. The required acoustic treatment shall be provided as necessary, to meet this requirement.

The overall efficiency of the combined motor and gearbox shall not be less than 82% at full load. The starting current of motor shall not exceed 3.5 times full load current. The starting current characteristic and the speed/torque characteristic for different duty ranges shall be submitted for acceptance by the purchaser.

SPEED The rated speed of the escalator shall not be more than 0.5 m/s for an escalator with an angle of inclination not exceeding 35° from the horizontal respectively.

BEARING The motor shall be fitted with grease lubricated ball bearings.

BRAKING

ELECTRO-MECHANICAL BRAKE Each escalator shall be provided with braking that is mechanically applied and electrically held off type of sufficient capacity to efficiently bring the escalator to rest with uniform deceleration when travelling at full contract speed in either direction. The brake shall automatically bring the escalator to a halt whenever the power is interrupted, or any of the operating and safety switch is operated. A device shall be provided to prevent the starting of the escalator if the brake does not operate properly. An indicator to indicate the wearing of the brake lining shall also be provided. Provisions for hand winding and the necessary tools to affect the hand winding shall be provided for each escalator.

AUXILIARY BRAKE Escalators and inclined passenger conveyors shall be equipped with auxiliary brake(s) acting immediately on the non-friction part of the driving system for the steps, pallets or the belt (one single chain is not considered to be a non-friction part), if

(a) the coupling of the operational brake and the driving wheels of the steps, pallets or the belt is not accomplished by shafts, gear wheels, multiplex chains, two or more single chains; or

(b) The rise exceeds 4.5 m;

(c) The operation brake is not an electro-mechanical brake;

(d) They are “Public Service Escalators” as defined in the Code of Practice on the Design and Construction of Elevators and Escalators.

HANDWINDING Provision shall be made for hand winding the escalator in either direction, and shall be suitably marked for "UP" and "DOWN" operation. Crank handles and perforated hand wheels are not permitted. Instructions for hand

winding devices in English and Hindi shall be displayed prominently in the machinery space. If the hand winding device is detachable, it shall not be accessible to unauthorized persons. The hand winding device shall be painted yellow.

STOPPING DISTANCES The stopping distances for unloaded and downward moving loaded escalators shall be between the following values:- Rated Speed Stopping distance between 0.50 m/s min. 0.20 m and max. 1.00 m. The stopping distance for an unloaded escalator shall be close to the minimum value, while for a downward moving loaded escalator it shall be close to the maximum value. The stopping distances shall be measured from the time the electric stopping device is actuated.

FOOTLIGHTS AND STEP LIGHTS UNDER LANDINGS

FOOTLIGHT Footlights shall be provided on either side of the interior of the skirting at both upper and lower landings and energy efficient fluorescent luminaries shall be used. The intensity of illumination shall be not less than 50 lux at the landings, measured at floor level.

STEP LIGHTS UNDER LANDINGS Energy efficient LED luminaries shall be provided underneath landings to illuminate the clearance between steps, steps and skirting, steps and comb, at the horizontal steps portion of the escalator. The colour of these lights shall be green.

REPLACEMENT OF LUMINARIES Facility shall be incorporated for the easy replacement of luminaries.

All supports and mounting facilities, e.g. R.S.J. beams, mounting brackets, bearing plates, etc. required for the installation of the escalator shall be provided by the Tenderer/Contractor.

SAFETY DEVICES

SAFETY DEVICE

(1) Emergency stopping devices- Emergency stop devices shall be placed in conspicuous and easily accessible positions at or near to landings of the escalator. (2) Broken step chain device -The broken chain safety device shall be incorporated as part of the tension carriage, and they shall operate if the bottom sprocket moves unduly in either direction in the event of either both step chains breaking or becoming unduly lengthened due to wear of the pins, or tension in either chain dropping below a pre-determined value.

(3) Broken drive chain device- A device shall operate for breakage of the chain between the driving machine and the escalator main drive shaft. Auxiliary brake if provided shall also operate.

(4) Broken step device -If any part of the step is sagging so that meshing of the combs is no longer ensured, switching off shall be operated at a sufficient distance

before the comb intersection line to ensure that the step which has sagged does not reach the comb intersection line. The control device can be applied at any point of the step Broken handrail device Broken handrail devices shall be situated inside both balustrades at the lower end of the incline, which shall be actuated if either or both handrails break.

(6) Non-reverse device A non-reversing device shall be arranged to prevent a travelling escalator to slow unduly or attempts to reverse its direction of travel. The escalator shall be stopped once the device is operated and it shall only be started again by the key operated switch.

OPERATION OF THE SAFETY DEVICE The operation of any one of these safety devices shall cause the electrical supply to the driving motor to be disconnected and the electro-mechanical brake to be operated thus bringing the escalator to rest.

CONTROL

ONTROL STATION

(1) Position Control station shall be provided at both the upper and lower landing newel, which shall contain an emergency stop switch, two key operated direction switches, an audio alarm switch and if specified a foot light switch. The station shall be so positioned as to enable any person operating any of the switches to afford a full view of the escalator.
(2) Type of switch -The emergency stop switch shall be push button type with a red button and shall be suitably protected against accidental operation. But the up and down directional starting switch shall be of the key-operated spring off type.

(3) Marking -All control switches shall be provided with clearly engraved markings both in English and Hindi.

AUTOMATIC OPERATION- Escalators which start automatically by the passing of a user shall start to move before the person walking reaches the comb intersection line. This can, for instance, be accomplished by light-rays or contact mat. The escalator shall be stopped automatically after a sufficient time (at least the anticipated passenger transfer time plus 10 seconds) the passenger has actuated the automatic starting device.

PROVISION FOR FUTURE REMOTE MONITORING OF ESCALATOR The Contractor shall provide dry contacts of the following output signals for each escalator installation in a stainless steel cabinet to serve as the interface unit for future connection by others:-

(1) Normal/Fault status

(2) Duty/Standby status

(3) Power Supply Normal/ Fault status

(4) Normal/ Essential Power status

(5) Emergency stop button activated- This interface unit shall be located at the management office/caretaker's room next to the escalator monitoring panel unless otherwise specified on the Drawing and/or in the Particular Specification.

CONTROLLER

CONTENT - The controller shall be a self-contained unit containing all the necessary electromagnetic switchgears including a residual current circuit breaker, local control push buttons, D.C. power supply, etc.

LOCATION The controller shall be located in the truss at the upper landing, and provision shall be made for easy access for maintenance.

METAL CABINET The controller shall be fitted inside a dust proof 1.2 mm thick stainless steel cabinet.

MAINTENANCE FACILITIES AND NOTICES

MACHINERY SPACE LIGHTING A permanent light, suitably protected, will be provided in the machinery space by the Electrical Contractor, and which can be switched without passing over or reaching over any part of the machinery.

SWITCHED SOCKET OUTLET -A 15 amp. 3 pin switched socket outlet will be provided by the Electrical Contractor in each escalator machinery space. The socket outlet will be fitted adjacent to the light switch.

EMERGENCY STOP SWITCH IN MACHINERY SPACES A stop switch for the machinery shall be provided in each machinery space where means of access to the space is provided.

The stop switch shall:- (1) Be of a manually opened and closed type;

(2) Be conspicuously and permanently marked "STOP". EXCEPTION: A stop switch needs not be provided in a machinery space if the main switch is located therein and close to the machinery.

NOTICE ON THE ACCESS DOOR On each access door to the machinery space in upper and lower landing a notice of durable materials with the inscription of the following message in English and Hindi shall be fixed :- "Machinery space - danger, access prohibited to unauthorized persons".

MARKING OF ESCALATOR At least at one landing, the name of the manufacturer & the manufacturer's serial number shall be indicated, visible from outside.

NOTICE FOR AUTOMATIC START In the case of escalators starting automatically, a clearly visible and audible signal system, e.g. road traffic signals, shall be provided indicating to the user whether the escalator is available for use, and its direction of travel.

NOTICES NEAR ENTRANCES OF ESCALATOR All signs shall be written in clearly legible characters in bilingual (as decided by the purchaser) where the escalator is

in operation. The following mandatory signs shall be provided by the contractor and fixed in the vicinity of the entrances as per the dimensions mentioned in EN 115: (1) Small children must be held firmly. (2) Dogs must be carried. (3) Stand facing the direction of travel; keep feet away from sides. (4) Hold the handrail. (5) Transportation of bulky and heavy loads not permitted. Whenever possible, these notices shall be given in the form of pictographs. The minimum size of the pictographs shall be 80 x 80 mm.

REQUIREMENTS FOR WEATHER-PROOF ESCALATORS

PROTECTION AGAINST CORROSION

Truss and metal work of escalator

The entire truss and metal work of the escalator other than moving parts shall be hot-dipped galvanized or adequately protected against corrosion by epoxy paint coating system designed for marine application. The surface of the completed truss and metal work shall be prepared and treated in accordance with the epoxy paint coating manufacturer's recommendation. All rust and dirt on the surface of the truss and metal work shall be removed by wire brushing and the truss and metal work shall be thoroughly degreased by degreasing solvent prior to application of any paint coating. The number, thickness and method of application of paint coating shall be in accordance with the epoxy paint coating manufacturer's recommendation but in any case at least three coats of epoxypaint coating system primer shall be applied followed by at least three coats of finishing epoxy paint coating.

The moving parts shall be adequately lubricated all the time by automatic oilers and suitably protected from water entering into the escalator interior. All ball or roller bearings such as those installed on the step driving chain, driving mechanism shall be of the sealed type.

LUBRICATION Automatic oilers shall be provided for chain lubrication and operated in pre-determined period. Device for separation of oil and water shall be provided if the lubrication system is of re-circulating type.

DRIVING MACHINE The driving motor shall have a degree of protection of at least IP 54. Watertight cover shall be provided on all bearings.

ELECTRICAL WIRINGS AND ACCESSORIES All exposed wiring terminals, junction boxes, switches, etc. shall have a degree of protection of at least IP 54.

DRAINAGE The Contractor shall provide effective drainage facilities for the escalator. A permanent drain point will be provided by the Building Contractor at the bottom of the escalator pit. An additional drain point at the upper pit of an escalator shall be provided by the Contractor if found practicable so that water can be collected and directed to the nearest drain pit provided by others. An alarm giving a warning of flooding at the lowest escalator pit coupled with a timer to stop the escalator after a preset time shall be provided by the Contractor.