

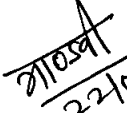
PURCHASE SPECIFICATION

EM-PS-ELE-4829-13

PASSENGER ELEVATOR

VYASI HYDROELECTRIC PROJECT



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PREPARED BY	CHECKED/APPROVED BY

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1.0 INTRODUCTION

An Elevator (or lift) is a vertical transport vehicle that efficiently moves people or goods between floors of a building. They are generally powered by electric motors that drive traction cables and counterweight systems.-

2.0 SCOPE OF WORK

This scope of specification covers provision of all labour, tools, plant, materials and performance of all works necessary for the design, manufacture, quality assurance, quality control, shop assembly, shop testing, proper packing, delivery at site, site storage and preservation, erection testing and commissioning, performance testing, acceptance testing, training of owner's personnel, handing over to customer and guarantee for 2 years of elevator as per specifications hereunder, each complete with all auxillaries, spare parts and warranting a trouble free operation.

Scope of supply:

1 no. 10 passengers Elevator complete with control and accessories and embedded parts, scaffolding, fire service switch, sound-reducing systems, safety devices, pit ladder, indicators, facia and alarms etc. along with spares as listed below:

S. No.	Description	Qty.
1	Motor of all type and size	1 no. of each type
2	Brake lining	4 sets
3	Brake motor / Electromagnetic brake	1 no.
4	Fixed brake disc	1 no.
5	Car door guide roller	2 sets
6	Landing door roller	2 sets
7	Special Tools & Instruments for repair and maintenance (Bidder to furnish the list in bid.)	1 set

2.1 Completeness of the equipment.

All fittings and accessories of Elevator that may not have been specially mentioned in this specification but are usually necessary for completion of equipment, shall be deemed to be covered by the specification and shall be indicated and furnished by the Vendor without any extra charges to the BHEL. Vendor is responsible for supply and E & C of the system at site for trouble free operation.

3.0 STANDARDS

The system and equipment shall be designed, built, tested and installed to the latest revisions of the applicable standards listed below or equivalent.

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Sl. No.	Description	Applicable Standard
1.	Outline dimensions of Electric Traction Passenger Lifts.	IS: 14665 : 2000 (Part I)
2.	Code of practice for Installation, Operation & Maintenance of Electric Traction Lifts for Passenger, Goods & Services.	IS : 14665 : 2000 (Part 2 Sec. 1&2)
3.	Safety rules for Electric Traction Lifts for Passenger, Goods & Service.	IS: 14665 : 2000 (Part 3 Sec. 1 & 2)
4.	Components Lift buffers, Lift Guide Rails & Guide Shoes, Lift Car Frame, Car Counter Weight and Suspension, Lift safety Gears & Governors, Lift Retiring Cam, Lift Doors, Locking Devices and Contacts, Lift Machines and Brakes, Lift Wire Ropes, Controller and Operating Devices.	IS: 14665 : 2001 (Part 4 , Sec. 1 to 9)
5.	Inspection manual for Electric Traction Lift	IS: 14665 : 1999 (Part 5)

4.0 GEOGRAPHIC DETAILS OF PROJECT SITE

The project is located at high altitude area with atmospheric temperature variation between 0.3°C to 42.8°C. Different systems of Elevator shall be suitably designed and materials for different components shall be selected suitably to remain undistorted under the wide variation of atmospheric temperature. **(Annexure – I).**

5.0 SPECIFIC TECHNICAL & FUNCTIONAL REQUIREMENT OF SYSTEM

	LIFT
1. Type of service	Passengers
2. No. of the passengers/load capacity of the lift	10 passengers / 680 Kgs
3. Rated speed -	1.0 m/sec.
4. Total length of travel for serving	30.1 meter.

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5. No. of floors to be served	Seven nos. of floors at EL 513.90, 519.85, 525.00, 530.00, 535.00, 540.00, 544.00 (As per customer approved DM)
6. Method of control	Variable voltage and variable frequency (VVVF) control system.
7. Position of machine room	Directly above the lift well, above top most landing
8. Inner dimension of lift well	1900mm(W) x 2100mm (D)
9. Construction, design -	Stainless steel paneling, one fan of suitable capacity and adequate lighting shall be provided in the car. The car floor shall be of stainless steel construction.
10. Car entrances	
a) Number & type	One number, made of stainless steel, auto Centre opening, sliding, double closed door
b) Method of operation	Electric power - operated with automatic door opening and closing devices.
11. Operation & interlocks	Selective or collective automatic operation with or without attendant. The lift operation shall meet the following requirements:
	i) Lift shall not move unless the car door, landing doors and all other protected openings connected with control circuit are closed.
	ii) Landing doors shall be interlocked so that the landing door of any floor shall not open when the lift is not on that floor.
	iii) Push button control inside the car for holding the doors open for any length of time required.
	iv) Push button control at all landings to call the car.
12. Signals	i) Digital direction and floor indications with Up/Down indications at all landing floors.
	ii) Digital direction and car position indicators inside the car.
	iii) Lift communication shall be connected to power house communication system.
	iv) Rechargeable battery operated alarm bell and emergency light.
	v) Inter communication system should be extended upto control room, so that message can be directly given to control room in case of accident, emergency, power failure, breakdown etc.
	vi) The following additional signals also to be provided: a) Overload indication b) Emergency stop button
	vii) Auditory signals, Braille symbols shall be incorporated in the lift.
13. Electric supply	
a) Power -	AC 415V, 3 Phase, 50 Hz
b) Lighting and fan inside the car	Recessed fluorescent light fittings for illumination level of 100 lux on Car floor shall be provided. Cabin ventilation fan with control suitable for operation on 240 V, 50 Hz, AC single phase power supply shall be provided.
14. Braking arrangement	Electromagnetic brakes

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15. Duty cycle	100 to 120 starts per hour
16. Safety system for closing and opening of the door.	Infra-red Light curtain system.
17. Shaft lighting.	The Elevator shaft shall be suitably illuminated by providing CFL fittings at every 3m (three meters) from bottom of Lift well.

5.1 General.

- 5.1.1** The construction of elevators shall be such that all motions shall take place smoothly and positively with no slippages, jerks and vibrations.
- 5.1.2** Elevator shall be provided with all safety devices, alarms, fire service switch & one number fire extinguisher (suitable for electrical fire) shall be provided with the elevator.
- 5.1.3** Elevator shall be supplied in accordance with "General Technical Specification Annexure-A"

5.2 Lift car

- 5.2.1** Elevator car shall be carried in a complete **frame** of steel, sufficiently rigid to withstand the operation of the safety gear without permanent deformation to the car frame. A solid roof capable of supporting two persons that is 2 x 68 kg shall be provided. **Car doors** shall be constructed from at least 1.5 mm thick (16 gauge) sheet steel and stainless steel cladding. **Platform** shall be of framed construction of steel. Car floor shall be of a flat non-slip surface or chequered surface.
Car Interior Details:

- Material for car cabin SS 304, hairline finish 16SWG
- SS handrail one on the left and other on the right side.
- Emergency exit.
- SS handrail near emergency exit.
- Phone connected to EPBAX system.
- Vision panel.
- LED lights.
- A switch shall be provided inside the car, designed to open the control circuit to cause the lift car to stop during emergency.
- A three-pin plug socket with switch for a hand lamp shall be fitted on the roof of the lift cars for use by persons working thereon.
- An annunciator to announce, inside the car, in case the lift is overloaded and announcement for the particular floor on arrival.

- 5.2.2** The lift car shall be made of steel frame provided with closed roof. Any opening work in the roof of the lift car shall be sufficiently closed with casing to provide reasonable protection against falling articles to any person traveling in the car. The car floor shall be of stainless steel construction.

- 5.2.3** The lift car shall be provided with adequate lighting and ventilation. The car shall be fitted with a fan of adequate capacity and it shall not run when the lift is not in use. A three-pin plug socket with switch for a hand lamp shall be fitted on the roof of the lift car. Vision to be provided in elevator for auto landing to nearest floor in case of power Failure.

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5.2.4 Lift car platforms shall be of framed construction designed to suit the conditions of the landing. The minimum factor of safety shall meet the requirements of IS 14665.–Mechanical Pressure detection system for opening / closing of Landings and Car Doors.

5.2.5 Glass shall not be used in lift car except for covering the lighting fixtures and for the vision panels and mirrors. The total glass area in any case shall not exceed the limits specified in IS 14665.

5.2.6 The car doors shall be solid sliding type, Centre opening and shall be equipped with power operated automatic opening and closing devices. The operation of doors shall be so arranged that they cannot be opened, unless the lift car is within the landing zone. The doors shall be guided at top and bottom. The car door shall be so designed that their closing and opening is not likely to injure any person traveling in the car. The door shall be provided with sensitive reopening arrangements on the moving edges, which are likely to come in contact with person/ person entering or coming out of the car. The doors and their tracks shall be capable of withstanding thrust as IS 14665.

5.2.7 The car shall be provided with an emergency alarm push button in red color.

5.3 Landing Doors

5.3.1 Suitable inter-locks shall be provided for opening or closing of both the doors simultaneously.

5.3.2 All landing openings in the lift well enclosure shall be protected by providing the solid sliding doors, similar to the car doors and shall extend the full height and width of the landing opening. The doors shall be provided with automatic opening and closing devices.

5.3.3 Every landing door shall be fitted with a locking device to ensure that it shall not be possible to open the landing door from landing side until the lift is within that particular landing zone. The locking device for landing zone shall be so designed that the lock contact is not closed until the door is closed. The levers operating the locking device shall not interfere with the landing side or lift enclosures. Provision shall be made to prevent the opening of any landing doors when the car is passing that zone in response to call from another landing.

5.3.4 Note: All Car doors & Landing doors orientation shall be on same side.

5.4 Counter Weights

5.4.1 Suitable counter-weight of metal shall be provided as per IS 14665.

5.4.2 The counter weights shall withstand the effect of buffer impact.

5.5 Suspension Ropes

5.5.1 The car and counter-weight shall be suspended by traction steel ropes. Chains shall not be used for suspension. Car and counter-weight ropes shall be in one piece and without intermediate joints. All ropes shall be anchored to a winding drum which shall have not less than one complete

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turn of the ropes on the winding drum when the car or counter weight has reached the extreme limit of its travel. The hoist rope shall include adjustable self-aligning hitches.

5.6 Shaft and Main Driving Gears

5.6.1 All shafts and axles shall be made of steel. They shall have sufficient rigidity and bearing surfaces.

5.6.2 No friction gearing, belt, chain, clutch or chain driven mechanism shall be used for connecting the main driving gear to the traction sheaves.

5.7 Guides for Car and Counter Weights

5.7.1 Guide rails for the counter weight shall be machined 'T' sections and continuous throughout the entire length and shall be provided with adequate steel brackets or equivalent of such designs and spacing that the guide rails shall not deflect more than 5 mm under normal operation.

5.8 Buffers

5.8.1 Buffers of oil/spring type shall be fitted under the lift car and counter weights directly or on the pit floor with suitable concrete or steel foundation. The buffers shall be capable of stopping the car or counter weight at the extreme limit of travel without permanent damage or deformation to itself or any part of the lift equipment.

5.9 Governors

5.9.1 The lift shall be equipped with an over speed governor device which shall apply the safety gear in the event if the speed of the lift car and counter weights in the descending direction exceed the predetermined limit specified in IS 14665.

5.10 Safety Gears

5.10.1 The lift shall be provided with suitable safety devices attached to the lift car frame and placed beneath the car. The safety devices shall be capable of stopping and sustaining the lift car with full rated load in the car at governor tripping speed or in the event of failure of suspension ropes.

5.10.2 Car and counter weight safety devices shall be actuated by separate governors. Vibration of the lift car frame shall not cause the safety gear to be applied.

5.10.3 Safety gear shall not stop ascending of lift or counter weight. The governor shall, however, open the motor circuit and apply the break in the event of over speed in the ascending direction. The safety gear shall meet all other requirements specified IS 14665.

5.10.4 Safety device like ARD (automatic rescue device) shall be provided as per latest practices.

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5.11 Electrical Equipment and Controls

The electrical equipment, control and interlocks shall be furnished complete for a fully automatic elevator. It shall provide smooth and uniform acceleration, retardation, and automatic slow down and stopping at all landings independent of the loading within its rated capacity. Electrical system shall consist of hoisting/lowering motors, brakes, automatic door operators, terminals and final limit switches, car lighting, signal lights and intercom set.

5.12 Variable Voltage Control Equipment

The control shall be variable voltage variable frequency (VVVF) control system, which shall be arranged to provide smooth and constant acceleration and retardation under all conditions of operation.

5.13 Electric Motors

The driving motors shall conform to I.S.325 and shall be of suitable capacity for the duties specified. The rated capacity and torque characteristics shall properly match the requirements of lift for the specified duties. All motors shall be squirrel cage induction type, suitable for operation at 415 volts, 3 phase, 50 Hz and shall give satisfactory continuous operation within the limits of voltage and frequency variations specified. The breakdown torque of the motor shall be not less than 225% of full load torque with rated voltage and frequency. The bearings of the motor shall have ample strength to withstand the heavy shocks and vibrations to which they may be subjected to in service without undue wearing. Motors shall be screen- protected type with class-F insulation or better.

5.14 Earthing

The lift structures, motor frames and metal cases and all electrical equipment, including metal conduits or cables armoring guards shall be sufficiently bonded and earthed to the earthing conductors provided in the machine room.

5.15 Brakes

The lift drive shall be equipped with automatic electro-magnetic brakes.

5.16 Control

The control shall be microprocessor based control with the operational card file containing a logic board with Microprocessor chip, Random Access Memory (RAM) and Erasable Programmable Read Only Memory (EPROM) chips to monitor and take over the commands of the elevator shall be provided. The Motion control shall consist of high performance, fully digital control VF drive which shall directly control the torque and speed of the Elevator Motor; and thus provide constant speed control under all load condition and Pulse Width Modulation technique shall be used for speed control. A large number of user-friendly features shall be included in the microprocessor-based controller such as:

- Motor Over current protection (Built in inverter drive)
- Fast speed/ deceleration protection
- Passenger Overload Warning
- Overload non-starter

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5.17 Car operating panel

At least the following facilities shall be included in the car operating panel of each elevator:

- Red push button / switch for emergency stopping,
- An Alarm button. Communication (speaker phone, grille, and push-to-call button).
- Overload indicator,
- Digital floor and direction indicators,
- Facility for transfer from normal passenger control to car preference feature by a key operated switch in the car,
- "DOOR OPEN" button, "DOOR CLOSE" button,
- Car fan and light switches,

5.18 Emergency exit

Car top for the elevators shall be manufactured with a hinged emergency exit panel held in place with non-removable fastening devices at each corner, and manually openable from top of the car and key-openable from inside. Exit shall be equipped with electrical contacts that will prevent operation of car when exit door is open and cause the alarm bell to ring.

5.19 Communications

A telephone system in stainless steel cabinet shall be provided for each elevator. A speaker type intercom with push-button to activate shall be installed in the car. In addition to above provision shall be there to install a telephone connected to power house EPBAX exchange.

5.20 Audible signals

Audible signal at each floor landing and in the car shall sound coincident with the digital indicators. The audible signal shall be not less than 20db with a frequency not higher than 1500Hz.

5.21 Car lighting, ventilation, fan and other utilities

Each elevator car shall be fitted with a luminous ceiling light which shall be left burning during the whole time the elevator is available for use. Provisions shall be made for adequate ventilation, a fan, a battery operated emergency light and a battery operated emergency alarm inside the elevators.

5.22 Landing fixtures

At each landing, hall push buttons as per requirement shall be provided. A digital hall position indicator with direction Indication shall be installed at every landing. All hall push buttons shall illuminate after pushing until Elevator reaches the landing. Push buttons and indicators should be flushed with wall. A fire service switch for each elevator shall be located at every landing.

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6.0 DELIVERY & PACKING IN CONTAINER, INSTALLATION, COMMISSIONING

The Vendor shall follow the requirements of Delivery, Installation and Commissioning. In order to avoid pilferage, misplacement, damage to the various elevator components, **all items are to be duly packed in suitable size wooden boxes & then to be packaged in Container, before dispatch of material to site.** All components are to be duly verified during inspection vis a vis packing list prepared by vendor, before sealing of container.

7.0 DRAWINGS, DOCUMENTS AND DESIGN CALCULATIONS

The Vendor shall submit drawings and documents listed below after the award of contract.

7.1 The Vendor shall submit the design covering at least the following for review / approval by BHEL / Customer

- Detail dimension of wells,
- Calculation for selecting the rope, motor size and speed of the elevators, control & Protection
- GA Drawing for Lift, Machine room, Earthing, control panel,
- BOM, Technical Data Sheet, QAP, Catalogue.

7.2 Construction methodology

The well for elevators shall be constructed by customer, however, scaffoldings any other equipment, material etc. required for the erection of the elevator shall be arranged by the Vendor. The Vendor is required to provide all dimensions of well for proper construction. If any chipping work is required the same shall be carried out by the vendor. Assembly & commissioning of the equipment shall be done by skilled workers in workmanlike manner.

8.0 DOCUMENTS/ DATA REQUIRED TO BE SUBMITTED ALONG WITH BID

- a) GA Drawings for Lift, Machine room & control panel.
- b) List of Special Tools & Instruments for repair and maintenance.
- c) Catalogue of each item / machine along with the Data Sheet (**Annexure – III**) duly filled.
- d) The Bidder shall submit **CHECK LIST** of the equipment as per data sheets at **Annexure –II** on placement of purchase order.
- e) List of special accessories as listed in the specification in terms of numbers indicating sizes / rating with price.
- f) Bidders to indicate number of packages of consignment with approximate size of packing box (L x W x H) and gross weight, package wise with bid.
- g) Bidder to submit list of bought out items indicating their make in bidding document.
- h) **The Bidder shall submit a list of similar installation of the equipment.**

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- i) **Deviations.** The Bidder shall indicate the deviation, if any, in Schedule of Technical Deviation, as per **Annexure – IV**, together with the justification for the deviation.
- j) Signed & stamped copies of Quality Assurance Plans for manufacturing, erection, commissioning as specified in this specification.

9.0 DOCUMENTS REQUIRED TO BE SUBMITTED AFTER THE AWARD OF ORDER.

- a) All drawings shall include / show plan, elevation, side view, cross– section, skin section, blow – up view and all major self-manufactured, bought out items, standard as well as optional accessories which are covered under the bidder's scope of supply shall be labeled and included in BOQ / BOM in tubular form.
- b) Requirement of withdrawal space for maintenance, if any, shall be shown in general arrangement drawing in dotted lines with dimensions from the reference point like edge / centre of the machine.
- c) Recommended clearance / maintenance space around the machine shall be shown in the general arrangement drawing in dotted lines with dimensions from the reference point like edge / centre of the machine.
- d) The drawings/documents required to submitted are as follows:
 - GA of lift well, machine room.
 - Control schematic diagram.
 - Wiring diagram of elevator.
 - Bill of material.
 - Technical data sheet.
 - Calculation of rope size, Motor.
 - O & M manual.

10.0 VENDOR TO INSURE SUBMISSION OF THE FOLLOWING DOCUMENTS ALONG WITH THE SUPPLIES.

10.1 O & M Manual

10.2 Model Packing List indicating total number of accessories along with loose (which shall be assembled during erection), spares and tooling which were included in the bid by the vendor. It shall indicate quality and quantity of items as per the scope of supply under the purchase order.

10.3 Test Certificates: The vendor shall furnish all test certificate / factory test report along with supply of material.

10.4 Performance Guarantee: Vendor shall furnish a Performance Guarantee Certificate for all the equipment Instruments along with material supply.

10.5 Warrantee Certificate : Vendor shall furnish Warrantee Certificate for a period of 18 months from the date of delivery or 24 months from the date of commissioning whichever is later.

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11.0 LIST OF ELEVATOR OPTIONAL PRICES

The following optional prices to be indicated along with offer.

- i) Rate for addition / deletion of 1 number landing.
- ii) Rate for addition / deletion of 1Mtr. in travel height.
- iii) Additional price of Automatic Rescue Device (ARD) for increased height of 15 Mtrs.

12.0 QUALITY ASSURANCE AND TESTING

The equipment offered shall be of proven design, materials utilized shall be of that which have been established for use in such applications. The Vendor shall follow the duly approved QAP during manufacturing, shop testing, E & C and final testing at site without any price implication at later stage. Elevator is subject to inspection by BHEL & Customer and inspection call shall be given 15 days in advance. Materials can be dispatched only after obtaining CHP clearance & MDCC clearance from customer.

Note: 1) In case of any contradictory requirements are found at any place in specification, bidder to take BHEL's concurrence before bid submission and BHEL's decision shall be final.

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ANNEXURE I

GEOGRAPHIC DETAILS OF THE PROJECT SITE

Project Name	VYASI HYDRO ELECTRIC PROJECT (2X60 MW)
Project Address	Village-Vyasi, Dist- Dehradun, State- Uttarakhand, India
Nearest Rail Head	Dehradun,
Nearest Village	Vyasi.
Nearest Airport	Dehradun,
Latitude	30° 31' 00" N
Longitude	77° 53' 00" E
Minimum <u>Winter</u> temp. at project site	(-) 0.3 °C
Max <u>Summer</u> temp. at project site	(+) 42.8 °C

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ANNEXURE II

CHECK LIST FOR DOCUMENT TO BE SUBMITTED WITH BID.

(Bids are liable to be rejected if the Bidder does not furnish the technical data in the schedule given below)

SR. No.	Description	To be filled by Bidders
1	Submission of Data Sheets	To be filled in the format given in Annexure III
2	Equipment catalogue / drawing	
3	Reference List of similar installations submitted.	
4	List of all embedment parts / foundation details.	
5	List of special Tools, instruments & accessories.	
6	Type test reports.	
7	List of bought out items.	
8	Factor of Safety :: (IS : 14665)	
9	Relative Duty Factor (IS : 14665)	
10	Number of start ups per hour. (BS : 5655)	
11	Degree of Protection (IS : 14665)	
12	Type of Speed Control (IS : 14665)	
13	Confirm lift travel as per specification.	
14	Confirm number of landings as per specification	
15	Confirm orientation of lift doors as per specification.	
16	Confirmation for accepting QAP as per Specification.	
17	Technical Deviation if any.	

Seal

Signature of the Bidder

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15	Electric supply	
16	Electric safety device	
17	Driving motor	
18	Braking arrangement	
19	Duty cycle	
20	Max live load on landings	
21	Worm gear	
22	Safety system for closing and opening of the door.	
23	Driving sheave	
24	Driving ropes	
25	Car ventilation	
26	Car lighting	
27	Levelling accuracy	
28	Material of car door	
29	Material of landing door	
30	Material for car entrance	

Seal

Signature of the Bidder

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Annexure III

DATA SHEET TO BE SUBMITTED BY THE VENDOR

(Bids are liable to be rejected if the bidder does not furnish the technical data in the schedule given below)

Sl. No.	Name of Project / Tech. Data	VYASI
01	No. of the passengers/load capacity of the lift	
02	Design Code	
03	Type of service	
04	Travel	
05	No. of floors to be served	
06	Method of control	
07	Position of machine room	
08	Inner dimension of lift well	
09	Size of Lift Car (Internal)	
10	Construction, design of car	
11	Car entrances	
12	Door operation	
13	Signals	
14	Hoist way entrance	

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Annexure IV

TECHNICAL DEVIATIONS (IF ANY)

(Bidder to specify deviations, if any, along with their bids in format given below. Vendors seeking deviations after Bid opening shall amount to rejection of their bid). Deviation specified anywhere else in their offer shall not be considered.

CI Ref.	DEVIATION

Seal

Signature of the Bidder