An ISO 9001 Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
MATERIALS MANAGEMENT

ENQUIRY FOR ELEVATORS	Phone: +91 431 2577405/2577731 Fax : +91 431 252 0719 Email : bsunder@bheltry.co.in

	Reference Number: Enquiry 1701201317/18	**Enquiry Date: 17.12.2012**	**Due date for submission of quotation: 18.01.2013**
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

BHEL/Trichy is looking for empanelment of new vendors (manufacturers only) for supply, erection and commissioning of "PASSENGER CUM GOODS ELEVATORS FOR THERMAL POWER PROJECT – **VARIOUS SITES IN INDIA"**

BHEL commercial terms & conditions with Price Bid formats and all annexure can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units) Bharat Heavy Electricals Limited under enquiry reference "1701201317/18"	
Tenders should reach us before 14:00 hours on the due date Technical bid will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.	Yours faithfully, For **Bharat Heavy Electricals Limited** MANAGER / MM / BOI

Bharat Heavy Electricals Limited

HIGH PRESSURE BOILER PLANT, TIRUCHIRAPALLI-620014.

TECHNICAL DELIVERY CONDITIONS

FOR SUB-DELIVERY COMPONENTS OF

CONTROLS & INSTRUMENTATION

SPECIFICATION FOR
PASSENGER & PASSENGER CUM GOODS ELEVATOR

(Rate Contract)

REV. NO	DATE	DESCRIPTION	PREPARED SRR	CHECKED RD	APPROVED ENGG. PMV	 QAC SD
00	17-07-2003	INITIAL RELEASE	Sd./SRR	Sd./RD	Sd./ PMV	Sd./ SSM
01	25-05-2010	GENERAL REVISION				

SPECIFICATION FOR PASSENGER & PASSENGER CUM GOODS ELEVATOR

01.00.00 **SITE CONDITIONS**

01.00.01	Altitude above MSL	: Less than 1000m.
01.00.02	Relative humidity	: 100%.
01.00.03	Design Ambient Temp.	: 50 deg.C
01.00.04	Atmosphere	: Tropical, Dusty, Corrosive and highly polluted.
01.00.05	Seismic Loads - Zone III	: As per latest revision of IS-1893-III/ 1984
01.00.06	Wind loads @ 10 metres above sea level	: As per IS-875(Part 3) / 1987

02. 00.00 **GENERAL**:

This specification is intended to cover the design, engineering, manufacture, inspection, testing, delivery, erection, site testing, commissioning, handing over to customer and maintenance & services of passenger & passenger cum goods Elevator.

03.00.00 **DRAWINGS / DOCUMENTS**

The following preliminary documents / drawings should be enclosed along with the offer without fail.

03.00.01 Detailed description of the system offered.

03.00.02 Write-up on interlocks, controls and safety devices provided.

03.00.03 General Arrangement of Elevator (including hoist way, pit well etc**.)**

03.00.04 General Arrangement of machine room and equipment in machine room.

i. Electrical control scheme with legend and write-up.

ii. Machine room Air-Conditioning details.

iii. Foundation and loading details of machine room floor and the concrete structure.

iv. Manufacturing schedule.

v. Filled in vendor data sheet for Elevator, Main motor and Door operator motor.

03.00.11 Filled in vendor quality plan.

03.01.00 **The signed "No deviation format" shall be sent along with the offer and BHEL will evaluate the offer only upon receipt of the same.**

03.02.01 The make, type, capacity, range of all bought out items to be furnished by the vendor along with the offer.

03.02.02 The major components of lift with weight details to be indicated by the vendor in the offer itself.

04.00.00 **GUARANTEE**

The Elevator Vendor shall guarantee that the materials, workmanship and performance of the apparatus installed under this specification is perfect in every respect and that they will make good of any defects (not due to careless operation) which may develop within 18 months from the date of formal handing over of the equipment.

05.00.00 **MAINTENANCE**

After the completion of the installation, maintenance and service for the equipment furnished under this specification shall be provided by the vendor for a period of eighteen months. This service shall include monthly inspections of the installation during regular working hours by trained employees and shall include all necessary adjustments, greasing, oiling, cleaning, supply of genuine standard parts to keep the equipment in proper operation except any part made necessary by misuse, accidents or negligence caused by others.

06.00.00 **STATUTORY REQUIREMENTS**

All registration and statutory inspection fees if any, in respect of his work pursuant to this contract shall be to account of the elevator vendor. However any registration, statutory inspection fees lawfully payable under the provision of any statutory laws and its amendments from time to time, during erection in respect of the plant equipment ultimately to be owned by owner shall be to the account of the owner. Should any such inspection or registration need to be re-arranged due to the fault of the vendor or his sub-contractor, the additional fees for such inspection and / or registration shall be borne by the vendor. While the statutory payment shall be made by the owner for any registration, statutory inspection etc. during erection, the vendor shall be responsible for carrying out and co-ordinating various activities with the statutory authority as well as for obtaining the clearance and registration of the equipment.

07.00.00 **WORKS NOT INCLUDED IN ELEVATOR CONTRACT**, but furnished by others in accordance with local codes and regulations and the approved drawing of the Elevator vendor.

07.01.00 Civil works associated with the Elevator pit.

07.02.00 Furnishing and installation of steel beams (Hoisting beams) in the machine room, to lift equipment during installation and to facilitate maintenance.

07.03.00 Machine room civil works including concrete flooring.

07.04.00 Steel structures for Columns and associated bracings and approach platforms up to landing doors at each level.

07.05.00 Supporting steel material between hoist way & car will be provided by BHEL.

08.00.00 **AUTOMATIC TERMINAL STOPS:**

The Elevator shall be equipped with an automatic stopping device arrangement to bring the car to a stop at the terminal landings independent of the regular operating device in the car. Final limit switches shall be provided in the hoist way, operated by the car and arranged to stop the car and prevent normal operation, should it travel beyond the zone of the normal stopping device.

Elevator shall be suitable for continuous 24 hours round the clock operation.

09.00.00 **SCOPE OF WORK:**

09.00.01 Design, engineering, manufacture, inspection, testing, delivery, erection, site testing, commissioning, and maintenance & services **during guarantee period.**

09.00.02 Necessary chain and pulley block, hoist, rope and hook arrangements at the machine room ceiling to carry out the maintenance and erection of equipment shall be supplied by Elevator vendor. These equipments shall be handed over to owner after completion of commissioning. The necessary mono-rail beam will be supplied by purchaser (BHEL).

09.00.03 A steel ladder has to be provided for access to the pit by the Elevator vendor. Any necessary erection / commissioning spares and consumables shall be included in vendor scope. Necessary tools and tackles required for maintenance or testing or inspection shall be covered in vendor scope.

09.00.04 Guard to protect the hoist way including temporary barricades at hoist way openings by Elevator vendor.

09.00.05 Scaffolding as per erection requirement shall be provided by the Elevator vendor. After completion of handing over activities, the scaffolding materials are to be taken by the vendor. Suitable provision to be made by vendor accordingly.

09.00.06 All the electrical equipment including Lift well, Hoist way & machine room lighting with fittings, Power/control/trailing cables, MCCB/MCB & ELCB for 415 V AC 3 ph supply and 240 V AC single phase supply (to receive the incoming feeders provided by customer) shall be included in the Elevator vendor scope.

09.00.07 The vendor shall assume all responsibility in proper design and operation of each and every component of the elevator as well as the elevator as whole. Complying with Indian electricity rules & Indian electricity acts and applicable statutory requirements (of Government Of India and applicable States) and design as well as procedural formalities also shall be taken care by vendor.

09.00.08 The equipment shall comply with latest revision of Indian standard and wherever 'IS' is not available, it shall comply with the generally accepted international codes and practices.

10.00.00 **POWER SUPPLY:**

One three phase 415V, AC, 50 Hz, and one single phase 240V, AC, 50Hz supply feeders will be provided in the machine room by BHEL.

The junction box having MCCB/MCBs of adequate rating shall be arranged by the vendor to receive the above supplies. The Elevator vendor shall also indicate the proposed location of junction box in the machine room. All further cabling and wiring from the junction box shall be carried out by the Elevator vendor.

Further the Elevator vendor shall tap the supply with necessary MCCB /MCB units and distribute the power supply to the Elevator equipment and hoist way lighting.

a.	Lift operation	415V, 3 phase, 50 Hz 3 wire supply
	Variation in	i. Voltage : ± 10 % ii. Frequency : ± 5 %
b.	Lighting and fan	240 V, single phase, 50 Hz supply
	Variation in	i. Voltage : ± 10 % ii. Frequency : ± 5 %

The vendor shall arrange to tap power supply required for constructional purposes from the point terminated by the owner. **The exact Power**

requirement of 3 phase supply and single phase power supply shall be indicated in the offer.

NOTE:
Vendor has to note the Power Supply provision made by us as below. Any change required shall be intimated in offer stage itself in writing.

I. 3 Ph, 3Wire 415 V, 50 Hz AC :
(Max. 3 Ph Power shall be 20 kW)

II. 1 Ph, 240 V, 50 Hz, AC :
a) Lighting for Hoist way, Car & Machine Room:
b) A/C Machine :
c) Controller:
(Max. 1 Ph Power shall be 10 kW)

11.00.00 DETAILS OF SPECIAL TREATMENT FOR ELEVATOR

As the Elevators are to be installed in a heavily polluted and dusty area in a thermal power station, the Elevator components shall be given special corrosion treatment as indicated below.

Item no.	Description	Special Treatment
11.00.01	Cars & Counter weight	Anti-corrosive epoxy paint
11.00.02	Fish plates	Anti-corrosive epoxy paint
11.00.03	Car & Counter weight buffer	Anti-corrosive epoxy paint
11.00.04	Supports(Buffer)	Anti-corrosive epoxy paint
11.00.05	Rail Brackets	Anti-corrosive epoxy paint
11.00.06	Bracket & rail fasteners	Zinc-passivated with epoxy painted
11.00.07	Tie down bolts	Zinc-passivated with epoxy painted
11.00.08	Machine	Anti-corrosive epoxy paint
11.00.09	Brake adjusting screw & coupling fasteners	Zinc-passivated
11.00.10	Bracket	Anti-corrosive epoxy paint

11.00.11	Controller cabinet	Anti-corrosive epoxy paint as per industry standard.
11.00.12	Hall buttons	Dust-proof with aluminium face plate or stainless steel hardware.
11.00.13	Car operating panel	Dust proof stainless steel plate and hardware.
11.00.14	Governor	Cover and casting epoxy painted. Other components zinc plated.
11.00.15	Governor Tension frame	Hot dip galvanised and anti-corrosive epoxy paint with M.S. shaft for sheave.
11.00.16	Car frame, level brace rods and counter weight frame	Epoxy paint as per IS-1477
11.00.17	Safety equipment (Linkages)	Zinc-plated
11.00.18	Safety switch and car gate switch	IP-65. Dust proof heavily zinc plated arm, stainless steel shaft and housing as per vendor standard.
11.00.19	Guide shoe	Zinc-plated
11.00.20	Cam bar mountings and channels	Zinc-plated and anti-corrosive epoxy paint
11.00.21	Counter weight frame	Anti-corrosive epoxy paint
11.00.22	Guide shoe with Nylon ribs	Zinc-plated
11.00.23	Filter weights	Anti-corrosive epoxy paint
11.00.24	Rope fasteners	Zinc-passivated and chromate dipped
11.00.25	Hoist rope	Greased after galvanising
11.00.26	Governor rope	Greased after galvanising
11.00.27	Car enclosure, interior gate, car door and landing door	Anti-corrosive two coats baked enamel paint
11.00.28	Alarm and door open bells (Electronic hooter)	Painted.
11.00.29	Junction box	Metallic body - dust proof with Anti-corrosive epoxy paint

11.00.30	Hall position indicator and car position indicator	Dust proof with stainless steel enclosure and Face plate.

The Lift shall be designed to meet the latest applicable requirements of all local Lift acts and rules.

12.00.00 **MACHINE ROOM Air conditioning:** Machine room shall be provided with 5 tons or with 2 nos., of 2.5 tons capacity A/C units (minimum) to make the machine room dust proof. If higher capacity of A/C is required for proper cooling, the same to be indicated in the offer and provided. Vendor to indicate the power consumption of A/C units.

13.00.00 **ELEVATOR PARTICULARS & DESIGN PARAMETERS**

13.00.01 Passenger cum goods & passenger Elevator shall be provided with 1 no. fireman's switch (Alarm Switch).

13.00.02 The Lift shall be located on the side of the boiler as indicated in the plant layout drawing. Entry to the Lift shall be from the side parallel to boiler axis.

13.01.01 The Lift shall be designed in line with the recommendation contained in the latest editions of Standards **IS:14665:2000 (All Parts)**- 'Specification of Electric Passenger and Goods Lifts', 'Codes of practice for Installation, Operation, Maintenance of Electric Passenger and Goods Lifts' and 'Outline Dimensions of Electric Lifts'.

13.02.00 **Design Criteria and Equipment specification for passenger cum goods Elevator & passenger Elevator**.

13.02.01	Type of service	Passenger cum goods & passenger Elevator (as per enquiry/PO)
13.02.02	Number required	As per enquiry
13.02.03	Load on the Elevator	As per enquiry (3000kg, 2000kg, 1000kg for goods and 1088kg for passenger)
13.02.04	Rated speed	As per enquiry (1.0 mps for passenger and 0.55mps for goods)
13.02.05	Total travel	As per enquiry
13.02.06	No. of floors to be served	As per enquiry

13.02.07	Entrances	One number in each floor
13.02.08	Entrances and Platform size	As per IS:14665-2000.
13.02.09	Landing levels: floor to be served	As per the List of Lift requirements with Variants (sh.no.21 of 21)
13.02.10.	Method of control	**Motor Speed Control:** Resistance Control for Two speed motor. (or) Variable Voltage variable frequency (VVVF) control (Preferred) **Logic Control:** Relay logic control or Microprocessor Control with automatic level adjustment. **The control system shall be of field proven design and having satisfactory track record.**
13.02.11	Flooring of Car	Chequered plate (6 mm thick) with heavy timer underlay over steel sheeting and replaceable felt spreading, each 25 mm thick. Car floor shall comprise of a smooth non-slip surface.
13.02.12	Position of Machine room	Directly above the Lift shaft
13.02.13	Design, construction and finish of car	MS sheet fabricated, smooth finish, spray painted to approved shade.
13.02.14	Lighting and fan in the car	One cabin fan and two nos. of 20 Watts, recessed fluorescent lamp fitting for operation on 240 V, 50 Hz, AC single phase power supply
13.02.15	Car entrance and landing door	Shall be as per IS 14665-2000
13.02.16	Method of operation of car	Power operated type – automatic, Centre opening / closing car and

		landing doors.
13.02.17	Operation of Lift	Automatic, simplex, selective, collective with and without attendant, through illuminated pushbutton station located inside the car with provision for locking control in Auto or attendant position.
13.02.18	Signals	Car position indicator in car, hall position indicator at all floors, telltale lights at all floors, battery operated alarm bell and emergency light with suitable battery and battery charger and controls. Audio annunciation for car position indication shall also be provided. Overload warning indicator with audio annunciation.
13.02.19	Shaft lighting	The Lift shaft shall be suitably illuminated by providing the fittings at every 3m (three metres) from bottom of Lift well. Industrial bulk head / industrial bulk head with integral mounted control gear - 1X100 W incandescent lamp / 1X 70 W HPSV

Fittings type : 60 W Bulk head fitting with bulb, conduiting, pull boxes, wiring, switches, other components / accessories and necessary switches**. The make of the fittings & accessories shall be indicated in the offer.**

Note: Whenever levels, elevations/ locations are specified, the same shall be subject to confirmation after the award of contract.

13.02.20 Foundation plan and elevation with landing levels shall be as per purchaser (BHEL) drawings.

14.00.00 **MECHANICAL EQUIPMENT:**

14.00.01 **LIFT CAR:**

The car platform frame and sling shall be of steel construction. The platform shall be suitably isolated from its sling. The car shall be enclosed with suitably braced and reinforced sheet metal panel. The sheet metal panel shall have ventilation

slots at the base. The car interior, the car doors and the landing doors shall be finished with two coats of baked enamel or other suitable paint as approved by the purchaser. All other exposed steel or cast surfaces shall be painted with one coat of suitable metal primer and two coats of machinery enamel paint. The car shall be provided with the following accessories:

a) Car control station with position indicator inside the car and at landing platforms.

b) An emergency stop switch (shall have two sets of potential free contact. Second one shall be taken and terminated in machine room for further connection by owner)

c) A three pin plug & socket with switch on top of Lift car for use by persons working there on.

d) Telephone instrument shall be provided inside the car. Connection from the same shall be brought up to the machine room for further connection to plant network by customer. Telephone instrument provided inside the car shall have provision for hands free operation also, i.e. Speaker phone shall be provided for hands free operation

e) A mimic diagram showing the elevator location with respect to boiler as per the drawing furnished by BHEL for individual project.

f) For better safety, elevator vendor to provide car top barricade on car top to ensure that service personnel stay inside the car region. A selector switch and a set of push buttons shall be provided on the top above the ceiling of the car to operate the elevator locally for inspection and maintenance. The selector switch when set to position “inspection” shall exclude control from other places and movement of the car in the desired direction shall be effected by the push buttons. For normal operation of the elevator, the selector switch shall be set to the position working. It shall be possible to operate the elevator only when the appropriate button is kept in pressed condition. The roof shall be strong enough to support at least two persons.

Adequate lighting and ventilation shall be provided in the Lift car. The car shall be fitted with fan of adequate capacity and lighting with decorative fittings. The car platform shall be robust in construction and elegant in appearance.

The car shall be provided with an emergency alarm push button inside the Lift car which shall be clearly marked. The alarm shall be clearly audible outside the Lift way in order to obtain assistance in case of breakdown or failure between the floors.

Car shall be equipped with handrails on three sides.

14.00.02 **CAR DOOR:**

The car door shall be of hollow metal construction 16 gauge thick sheet steel. Sides of the door shall be flush with all seams continuously welded. Guide shoes shall be rubber or roller type designed for operation on un-lubricated guides. The car door shall be provided with locking gear of heavy and robust construction, so arranged mechanically and interlocked that the doors cannot under any circumstance be opened unless the Lift car is within a particular landing zone. Conversely the Lift shall not move until all the landing doors are closed and interlocked properly.

Width of Car Entrance shall be as per IS:14665 (table-1 for passenger lifts and table 2 for goods lifts)

The live load coming into play shall be taken into consideration while designing doors, door frame and hanger tracks. The car doors shall be designed such that their closing and opening is not likely to injure a person. A retractable safety shoe shall extend the full height and project beyond the front edge of the car, to open the closing door if and when it touches a person or an object. Alternatively opening of car by means of optical sensing.

14.00.03 **LANDING DOORS:**

All landing openings in the Lift well enclosure shall be protected with doors which shall extend the full height and width of the landing opening. The type of door provided shall be similar to the Lift car door. Every landing door shall be fitted with a locking device. The door shall be suitably interlocked so that they cannot open unless the car is within a particular landing zone. The locking device is closed until the door is closed. The levers operating the locking devices shall not interfere with the landing side or Lift enclosures. Landing doors of the elevators shall have fire resistance of at least one hour. These doors shall also be smoke tight as far as possible.

14.00.04 **LOAD PLATE:**

A load plate displaying the rated load of the Lift in terms of persons and kilograms shall be fitted in the car in a conspicuous position.

14.00.05 **SUSPENSION ROPES:**

The car and the counter weights shall be suspended by steel wire ropes. Chain shall not be used for suspension. Not less than four independent stranded steel wire suspension ropes shall be used for car or counter weights of the Lift with traction drive. The minimum diameter of the stranded rope shall not be less than 12.5 mm and minimum factor of safety shall not be less than 12. The suspension

ropes shall conform to latest edition of IS 2365 -" Specification for steel wire suspension ropes for Lifts and hoists" or equivalent International Standards.

14.00.06 **SHEAVES AND PULLEYS:**

All driving sheaves and pulleys fixed to and revolving with the shaft shall be fixed by means of sunk keys of sufficient strength and quality. Sheaves and pulleys shall be made of cast steel to IS:1030 and free from cracks, sand holes and other injurious defects. They shall have suitable flanges and smoothly machined rope grooves. The diameter of the sheave or pulley shall be as specified in the latest edition of IS 14655 or equivalent International Standards.

14.00.07 **SHAFT:**

Shafts and axles shall be forged steel. They shall have sufficient rigidity and bearing surface. Any shaft when stepped, shall be turned to a reasonable radius at the point of reduction.
The Lift Well dimensions shall be 3600mm (W) X 3800mm (D) for all elevators.

14.00.08 **COUNTER WEIGHTS:**

The Elevator shall be provided with suitable counter weights located in the Lift shaft. The counter weight shall be designed for smooth and easy operation of the Lift and shall be in accordance with Indian Standard referred earlier or equivalent International Standard. Suitable counter weight screen shall be provided in the Elevator shaft. The counter weights shall consist of cast iron weight contained in structural steel frame. It should preferably be equal to that of the car weight plus 40 % of the rated load. The traction should be such that no appreciable slip may occur but that slip shall free to take place upon the landing of either the car or the counter weights.

14.00.09 **GUIDE RAILS:**

Guide rails for the car and counter weights shall be machined 'T' sections and continuous throughout the entire length and shall be provided with adequate steel brackets or equivalent fixing of such design and spacing between brackets shall be such that to avoid any deflection during the normal operation. Guide rails section shall be adequate to withstand the forces resulting from the application of the safety gear when stopping the counter weights or fully loaded car. The guide shoes or their lining shall be easily renewable, adjustable and self lubricated. Guides shall be of such length that it shall not be possible for any of the car or the counter weight shoes to run off the guides.

14.00.10 **BUFFERS:**

Sufficient number of buffers of spring loaded type shall be fitted below the Lift car and counter weights. The buffers shall be capable of stopping the car or counter-weights without permanent damage or deformation to itself or any part of the Lift equipment. The number of buffers shall be so fixed as to ensure proper sharing of the impact loads by all of them.

14.00.11 **EMERGENCY SAFETY DEVICES AND BRAKES**:

The Lift shall be provided with safety device attached to the Lift car frame and placed beneath the car. The safety device shall be capable of stopping and sustaining the Lift car up to governor tripping speed with full rated load in car. The application of the safety device shall not cause the Lift platform to become out of level in excess of 3 cm/m measured in any direction. Slack rope switches, if necessary, shall also be provided. The Elevator vendor shall also provide personnel evacuation system during the power failure to the Elevator.

The Machine shall be provided with direct current spring set, solenoid release double shoe brakes of sufficient capacity to stop the car at any position with the design load. These brakes shall be designed in such a way that it gets applied automatically in the event of power failure.

AUTOMATIC RESCUE DEVICE (ARD)-(BATTERY DRIVE) :
Contractor shall provide a modern advanced electronic drive system of "RESCUING Passengers Trapped in an ELEVATOR" in case of power failure.
In addition to the above, bell and cranking device to be provided with hand wheel connected with motor shaft for manual lowering of elevator to the nearest landing level.

14.00.12 **OVER SPEED GOVERNOR AND GOVERNOR ROPES:**

Governor shall be located where there is sufficient room for their proper operation and where they cannot be struck by the Lift car or counter weight in the event of over run. Each governor shall be marked with tripping speed in terms of a car speed in m/sec and the motor control and brake control circuit shall be opened before or at the time the governor trips. Governor ropes shall not be less than 8 mm in diameter and shall be of steel or phosphor bronze and of suitable construction. The ropes shall run clear of the governor jaws during normal operation of the Lift. The Governor has to be compatible for operation with microprocessor based control system or resistance based control system.

14.00.13 **LEVELLING DEVICE:**

The Lift shall be provided with a two way automatic levelling device. The levelling device shall take care of overrun and under run of the car and rope

stretch, such that car floor is within 6.0 mm from the landing level at all floors while in operation. Aprons of sufficient depth shall be fitted to the car floor to ensure that no space is permitted between the threshold and the landing while the care is being levelled to floor.

14.00.14 **MACHINE ROOM AND OVERHEAD STRUCTURES:**

All the overhead machinery shall be supported on beam to be furnished by the contractor. The machinery support beam shall rest on top of or be designed to be framed into the contractor's structural steel frame for the boiler house.

The Lift drive controller and all other apparatus and equipment of Lift installation, except such apparatus and equipment which function in the machine room shall be located at the top of the Lift well. Adequate machine room and hoist way lighting shall be provided by the Elevator vendor. The maximum loads transmitted by the single heaviest equipment both during erection and maintenance of the Lift to the machine room floor and other structures like guides etc. shall be furnished by the Elevator vendor within 15 days of placing the award letter. Sound reducing materials below machines in machine room shall be provided.

Machine room shall be provided with Industrial type vitreous enamelled reflector - 2 X 40 W (for min. 100 Lux) Fluorescent Lamp

14.00.15 **TERMINAL STOPPING AND FINAL LIMIT SWITCHES:**

The Lift shall be equipped with upper and lower normal terminal limit switches arranged to stop the car automatically within the limit of the top car clearance and bottom run by from any speed attained in normal operation. Such limit switches shall act independently of the operating device, the final limit switches and buffer.

Final limit switches shall be provided to stop the car automatically within the top and bottom clearance independent of normal operating device and the terminal limit switches. The final limit switch shall act to prevent movement of the car under power in both directions of travel and shall after operating, remain open until the Lift car has been moved by a hand operating mechanism within the limits of normal travel.

14.00.16 **INDICATORS:**

The Lift shall be provided with position indicator and call indicator inside the Lift car to show the position of the Lift car with reference to the floor numbers and the landing from which the call is being received. Up and down travel direction and position indicators shall be of standard construction. Audio annunciation also shall be provided inside the car.

14.01.00 **ELECTRICAL EQUIPMENT AND CONTROLS:**

14.01.01 **OPERATION AND INTERLOCKS:**

The operation of the Lift shall be simplex, selective, collective, and automatic, with or without operator. The Lift operation shall conform to the following requirements.

a) The operation of the Lift shall be through a push button station located inside the car.

b) The Lift shall not move unless the car door, landing door and all other protected openings connected with the control circuit are closed.

c) Two push buttons, one for upward and the other for downward movement at each intermediate landing and one push button at each terminal landing shall be shall be provided in the landing floors in order to call the car.

d) The landing doors shall be interlocked so that the landing door at any floor shall not open when the Lift is not on that floor.

e) Push button shall be fixed in the car for holding the doors open for any length of time required.

14.01.02 **LIFT DRIVE:**

The Lift drive shall be equipped with automatic electro-hydraulic thruster brakes. The Lift shall be driven by a drive suitable for method of control offered by the Elevator vendor. No friction gearing or clutch mechanism shall be used for connecting the main driving gear to the sheaves.

14.01.03 **ELECTRIC MOTORS**:

Motors shall be suitable for frequent starting. S4 duty class as per IS-4722 & IS-12824 with CDF 40% and maximum 150 starts per hour at 50 Deg. C ambient and with IP 54 protection class. Motor pull out torque shall be at least 275% of rated torque. Motor shall be of TEFC type. Motor insulation shall be class F or superior with temperature rise limited to class B.

14.01.04 **CONTROLLERS:**

The controllers shall be designed to start, accelerate, stop and reverse the Lift when the appropriate push buttons are pressed. It shall be arranged so as to provide maximum convenience to the operator. Contact finger buttons shall be easy to adjust and replace. The speed control device shall be such as to give

smooth, easy and accurate speed control. The Lift controls shall be housed in dust and vermin proof enclosures. The controls shall be wired with stranded copper conductor cables. All equipments mounted shall be neatly labelled as per wiring diagram. Ventilating louvers are to be provided in the panels.
The electrical controllers shall be provided with enclosure conforming to IP-54. The contactors, relays, resistors etc. used in the total system shall be of open type construction and design. **Vendor shall furnish the size of controller panel (Length x Depth x Height) without fail in the offer.**

14.01.06 **CABLES AND INTERNAL WIRING:**

All cables (both power and control) shall be armoured, XLPE insulated & FRLS PVC sheathed.
Wiring shall be done as required to interconnect all Elevator electrical equipment including all power wiring from the main supply source in the machine room. 1100 V grade Power cables shall be multi core, stranded Cu conductor with XLPE insulation, FRLS type ST2 inner sheathed, galvanised steel wire armoured and overall extruded FRLS, Type ST2 PVC sheath.

The trailing cables shall conform to IS 4289. All other cables shall conform to latest edition of IS:7098, IS:1554 & IS:5831.

14.0107 **Cabling and Earthing**:

Earthing shall be carried out as per IS 3043 and Indian Electricity Rules. The Lift structures, motor, frames, metal cases and all electrical equipment including conduit, cable armouring and guards shall be properly bonded and earthed by two separate and distinct connection. The Elevator vendor shall provide 25 x 3 mm GI flat for control panel and 50 x 6 mm GI flat earth bus in the machine room and connect all earth points to the same. The earth bus will be connected to the station earth mat by the owner.

15.00.00 **OTHER REQUIREMENTS:**

15.00.01 Electric high speed door operators for the opening and closing of the car doors and landing doors shall be furnished and installed. The car and landing doors shall be mechanically connected and shall move simultaneously in opening and closing. The car door and landing door shall be power closed and shall be controlled in opening and closing by oil cushioning mechanism built into the gear unit. Necessary lockable switches shall be provided in the Lift machine room to control the operation of the door. Should the electric power fail, it must be possible for the doors to be manually opened from within the car.

15.00.02 Overload relays shall be provided to protect the drive motor against overload or a power failure. Suitable protection shall be provided on the controller to protect the Lift equipment from phase reversal, low voltage.

15.00.03 Complete set of special tools and tackles required shall be supplied along with Lift. Each tool and tackle shall be stamped so as to be identified easily for its use and size. Tools shall be supplied in a steel tool box. **(The list of tools and tackles shall be furnished along with the offer).**

15.00.04 Other requirements:

1. Fire extinguisher (suitable for electrical fire) shall be provided along with elevator.

15.00.05 **Spares:**

The vendor shall furnish the List of start up, mandatory and recommended spare parts and include separately in the offer with item wise price in the schedule of spare parts. Purchaser reserves the rights to finalise the quantities of spare parts and effect price adjustment on the basis of unit rates quoted. The spares ordered by the purchaser shall be delivered at site to suit the commissioning of the respective units. The vendor shall indicate in the schedule of spare parts the delivery period from the date of acceptance of the offer for the spares. The vendor shall also indicate in the schedule of spare parts, the details of fast, slow and medium moving spares.

The spares recommended above with unit prices shall be at least for three years normal consumption for operation of the plant. The vendor shall also indicate the service expectancy for these spare parts under normal operating conditions before the replacement is necessary.

All the spares supplied under this contract shall be strictly interchangeable with the parts for which they are intended for replacement. The spares shall be treated and packed for long storage under the climatic conditions prevailing at site (e.g.) small items shall be packed in sealed transparent plastic bags with dissector packs as necessary. Each spare part shall clearly be marked or labelled on the outside of the packing in single case. The general description of the contents shall be shown on the outside of such cases. All cases, containers and other packages shall be marked suitably and numbered for the purpose of identification.

All cases, containers and other packages are liable to be opened for such examination as may be felt reasonable by the purchaser. The vendor shall bear in mind the shipment of the plant having ball or roller type bearings for which the following special provisions shall apply:

i) If temporary transit bearings are fitted to such plant, then, additionally, two complete sets of service bearings shall be included and shipped with such plant.

ii) If the item of the plant is shipped with service bearings in position, then additionally one complete set of service bearings shall be included and shipped with such plants. In either or both of the above provisions, the cost of the additional sets of bearings shall be included in the offer.

iii) If replacement of any bearing is required due to damages during shipment or other causes, the spare bearings shall be used to replace at free of charge.

The price of spares will have to be kept optional. As & when requirement arises the same will be utilised by BHEL.

16.00.00 **Acceptance:**

After erection, the performance of the Lift shall be tested for ascertaining the conformity with the specification and upon satisfactory completion of the tests, the Lift will be taken over. **The responsibility for obtaining commissioning and handing over protocol signed by the customer lies with the Elevator vendor.**

17.00.00 **Quality ASSURANCE AND TESTING:**

17.00.01 **For NTPC Contracts:**

a. Vendor shall prepare Quality plan in the NTPC Reference Quality Plan format (copy enclosed). Such a QP shall be discussed by the vendor with NTPC/QA/Noida/Delhi and obtain approval for the same for a fixed period of time.

b. For the required projects, such a NTPC approved Reference QP shall be submitted by the vendor to BHEL after order placement to get specific approval for the relevant project from NTPC/QA through an endorsement form.

c. The RQP (Reference Quality Plan) shall be prepared based on QP approved by NTPC earlier.

d. Elevators are subject to inspection by BHEL & NTPC and inspection call shall be given 15 days in advance.

e. Materials can be despatched only after obtaining CHP clearance & MDCC clearance from NTPC.

f. QP shall contain the type test requirements as per relevant standard and vendor shall submit type test certificates carried on similar type and valid within 5 years from the date of enquiry.
Vendor has to give compliance for the above requirement.

17.00.02 **For Non-NTPC Contracts with BHEL Inspection:**

a. Vendor shall prepare Quality plan in the BHEL standard Quality Plan format (copy enclosed).. Such a QP shall contain all the required quality checks right from the raw material stage through In process, Assembly, Testing & Final inspection. Reference can be drawn from earlier approved QP. The same shall be submitted to BHEL for review & approval for a fixed period of time.

b. For the required projects, such a BHEL approved QP shall be submitted by the vendor to BHEL after order placement for giving specific approval for the relevant project with due endorsement.

c. Such a QP shall form part of PO.

d. Elevators are subject to inspection by BHEL and inspection call shall be given 15 days in advance.

e. Vendor shall submit the routine & type test certificates along with inspection call.

f. The validity of type test certificates shall be not earlier than 5 years from the date of enquiry.

17.00. **For Non-NTPC Contracts with BHEL & Customer Inspection:**

a. All the points covered under sl.no. 17.00.02 are applicable for this category.

b. The QP will be approved by customer & elevator will be subject to inspection by customer. Any additional points indicated by customer have to be carried out by the vendor.

Vendor to give compliance for both NTPC & Non NTPC Contracts

18.00.00 Documentation:

18.00.01 Once the rate contract is finalized, vendor to visit BHEL(T) for discussion and for preparation of standard elevator GA drawings and datasheets as applicable for all elevators covered under rate contract. Standard drawings to be prepared as per BHEL boiler layout requirements in A0 size, discussed and finalised with BHEL(T). Once finalized and signed by BHEL(T) and vendor, the same will be used for the period of entire rate contract.
For customers such as NTPC where customer approval required, a separate exercise to be taken up with along BHEL(T) by vendor by visiting customer works and finalizing standard elevator drawings for the period of rate contract.

Once the drawings are standardized, purchase orders will be released by BHEL(T) indicating the standardized drawings numbers and applicable variants

such as landing levels, capacity and travel height. Based on the PO, vendor shall manufacture and inspection will be carried out.

No other separate contract-wise drawing approvals will be entertained.

18.00.02 O&M Manuals:
Vendor to furnish standard O&M manuals for each capacity of elevator, immediately after the release of first purchase order for BHEL's further use. (One hard copy and two copies of CD-ROM, once for the entire rate contract) The O&M manual prepared shall be such that the same shall be usable along with the relevant standard drawing submitted already.

However, project wise O&M manuals along with project-wise details, if any, has to be updated by vendor and handed over to site (Customer & BHEL/Site, after commissioning of elevator) in necessary copies in the format as desired by customer.

LIST OF Elevator Variants

Sl.no.	No. of landing levels	Capacity	Height	Options
1.	12	3000 kg	80 m	Addition / deletion in landing levels to be quoted. Increase/ decrease in per metre travelling length to be quoted.
2.	12	2000 kg	65 m	
3.	05	1000 kg	40 m	
4.	12	16 passenger	80 m	

5. Unit Rate for additional landing levels and the travel height shall be indicated in the offer.
6. Extra price for fire resistant landing doors to be quoted as optional price (1 hour as per BS:476 (Part 20 & 22))
7. Extra price for having 0.75 m/s speed for goods elevator in place of 0.55 m/s.
8. Price deletion for provision of un-armoured cable in place of armoured cables.
9. Extra price for car inside enclosure with SS sheet (SS 304) bright finish.
10. Emergency exit of adequate dimensions on the top of car.

429-024

PURCHASE / MM / FB
SUB DELIVERY - ENQUIRY - DEVIATION

Page	OF

SCHEDULE OF DEVIATION TO SUB - DELIVERY ENQUIRY No.		DATE	

DESCRIPTION			
SPECIFICATION		DRG. No.	
QUALITY PLAN			

DOCUMENT REFERENCE	BHEL ENQ. CALLED FOR	FIRM'S ALTERNATE OFFER

CERTIFIED THAT OTHER THAN THE ABOVE DEVIATIONS, WE ARE ACCEPTING ALL THE OTHER SPECIFICATIONS AND REQUIREMENTS IN FULL TO YOUR ENQUIRY

STATION :

DATE : SIGNATURE OF FIRM'S REPRESENTETIVE *FIRM SEAL*

NOTE: 1. Deviations should be taken only in the extreme case.
2. If necessary, use additional sheets with page control number.

TERMS AND CONDITIONS

1. a) **QUOTATIONS** : Each tender should be sent in double cover, inner cover should be sealed with tenderer's distinctive seal and superscribed with correct tender No. item of supply and due date of opening. The outer cover should only bear the address of this office and should not have any indication that a tender is within. Two or more quotation should not be sent in one cover but the quotation against each tender should be sent separately to avoid confusion. Tender should not be addressed to any individual's name but only by designation.

b) Tenders should be free from CORRECTION AND ERASURES. Corrections if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

c) Price should be nett F.O.R despatching station inclusive of risk in transit and remain valid for 60 days from the due date.

d) If any Sales Tax is payable as extra to the quoted price it should be specifically stated in quotations alongwith CST & TNGST No failing which the purchaser will not be liable for payment of Sales Tax. Our T.N.G.S.T No 3560005 Dt. 01-04-1995 CST No. 239383 Dt. 11.6.1991.

e) No revision of prices will be entertained after tenders are opened.

f) Manufacturer's Name, Trade Mark or Patent No. if any should be specified. Illustrative leaflets giving technical particulars are required alongwith quotation wherever necessary.

g) Products with I.S.I Certification marks will be preferred.

h) The purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any tender in part or full without assigning any reason whatsoever.

2. **SAMPLES** : Wherever possible, sample should be submitted separately whether specifically requested or not so as to reach the purchaser on or before the due date of the enquiry. They should be clearly marked with the enquiry No and the date on the outside cover to facilitate identification.

3. **PACKING AND MARKING:** The supplier shall arrange for securely protecting and packing the stores to avoid loss or damages during transit.

4. **TERMS OF PAYMENT** : Payment will be made within 30 days of satisfactory receipt of materials at site. Wherever required by the purchaser, the successful tenderer must send the operation and maintenance manuals, test certificates, drawings, etc., for the materials ordered. These should be sent immediately after despatch of the materials and a statement to that effect should be made in the invoice. Failure to comply with this provision will result in delay in payment of the bills. Goods despatched either by V.P.P or by the document presented through bank will not be accepted unless agreed to by the Purchaser.

The duplicate copy of the invoice meant for the transporters should accompany the material as stipulated under C.E. Rules 52A and 173C (or) 57GG. A photostat copy of the above Invoice for each delivery challan should be submitted alongwith the original bills routed through bank or submitted directly to BHEL Finance Department.

5. **SECURITY DEPOSIT** : For purchases over Rs. 5,000/- the successful tenderer/s may be requested to furnish a Bank Guarantee. Security Deposit for an appropriate value as may be determined by BHEL.

6. **LIQUIDATED DAMAGES/ PENALTY AND INTEREST ON ADVANCES FOR DELAY IN DELIVERY:**

If the supplier fails to deliver the raw material / equipment / components within the period specified in the contract the purchaser shall deduct Liquidated Damages a sum equivalent to 0.5 % of the price for each week of delay upto a maximum of 15% of the price of the delayed / undelivered goods. In addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advances. If the delay in delivery of a part contributes to delay in execution of total system, LD and interest on advances will be recovered on the total contract price / total advance paid .

7. **RISK PURCHASE** : Alternatively the purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefor. The supplier shall be liable for any loss which the Purchaser may sustain by reason of such risk purchases in addition to penalty at the rate mentioned in clause 6 above.

8. **PREFERENTIAL DELIVERY** : It should be noted if a contract is placed on a higher tenderer as a result of this invitation to tender in preference to the lowest acceptable offer in consideration of the earlier delivery, the seller will be liable to pay to the purchaser the difference between the contract rate and that of the lowest acceptable tender on the basis of final price F.O.R. destination, including all elements of freights, sales tax, duties and other incidents, incidental in case of failure to complete supplies in terms of such contract within the date of delivery specified in the tender and incorporated in the contract.

9. **MODVAT CREDIT** : If any Excise Duty is payable, the chapter head/sub-head reference and the rate of the duty should be quoted. If the tender is availing MODVAT credit for this inpute materials, the effect of proforma credit should be passed on to the purchaser. Tenderer under "MODVAT" shall be preferred.

10. **Purchase** : Preference will be given to CPSUs as per. Government Guidelines.

11. **GENERAL** : The purchaser reserves the right to split up the tender and place order for individual terms with different tenderers and also increase or decrease the quantity.

Any Other conditions which might have been quoted by the Seller and are in contravention to the terms prescribed in the order and which have not been spefcifically accepted in by Purchaser will not be applicable to the contract.