

# **NTPC LTD.**

(A Government of India Enterprise)

## **KAHALGAON FGD**

### **TECHNICAL SPECIFICATION FOR ELEVATORS**

**SPECIFICATION NO.: PE-TS-481-502-A001**



**BHARAT HEAVY ELECTRICALS LIMITED**

(A Govt. of India Undertaking)

**POWER SECTOR**

**PROJECT ENGINEERING MANAGEMENT**

**NOIDA, U.P**

**INDIA**



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**SECTION – A: SPECIFIC TECHNICAL REQUIREMENT**

**1.0 Brief Description and Use of Equipment/System**

Elevator(s) shall be provided for access to various operating floors / platforms for Gypsum dewatering building for Kahalgaon FGD to facilitate movement of goods and operation & maintenance (O&M) personnel.

**2.0 Scope of Equipment Supply and Services**

**2.0.1 Brief Scope:**

Design, Engineering, Manufacture, Inspection & Testing at manufacturer's works or at their sub-vendor's works, Painting, duly packed for transportation to site, delivery to site, storage and handling at site, Erection & Commissioning, carrying out trial run and Acceptance / functional tests at site & final painting and handling over of Passenger Elevators

**2.0.2 Codes & Standards:** IS: 14665 (Latest edition, all 5 parts).

**2.0.3 Technical Data sheet of Elevators:**

Sl. No	Building	No. of Elevators	Capacity (Kg)	No. of Landings	Landing levels	Total Travel	Type of Service
1	Gypsum De-Watering (GDW) Building	1	1000	2 (G+1)	0.0 m & 10.0 m	10.00 m	Passenger Cum Goods Elevator

Further, Bidder's scope for the Elevators shall include the following:

SN.	Description	Requirement (to be complied by bidder)
1	Hoist way size	As per IS: 14665 (Latest edition, all 5 parts).
2	Car size	
3	Car opening	
4	Rated Speed	1 m/s
5	Car entrance	One (1) on each floor
6	Method of Control	AC VVVF Control with automatic level adjustment.
7	Elevator Pit	Size: As per IS: 14665 (Latest edition all 5 parts).
8		Bare pit (i.e. without any RCC block / pedestal for buffer for CAR & CWT). Accordingly, MS structure & buffer required for elevator resting shall be provided by bidders.
9	Motor speed control	Microprocessor based Control with automatic level adjustment.
10	Logic control	Selective Collective Controller with variable voltage variable frequency drive and Microprocessor based software-controlled logic system. The control system shall be of field proven design and having satisfactory track record.
11	Machine room and elevator shaft.	Pressurized dust proof or Airconditioned machine room as per the requirement of lift manufacturers. Bidder to provide split Air Conditioner as per machine room area (not less than 2.5T Capacity).
12	Position of Machine Room	Directly above the elevator shaft.



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13	Method of operation of car and landing doors.	Power operated with automatic horizontal sliding center opening & closing car and landing doors.
14	Design, Construction and finish of car & car door	Car inside enclosure including inner side of door shall be of stainless steel plate of grade SS:304 of bright finish.
15	Car entrance and landing doors	As per BS:476 (Part 20 & 22)
16	Door construction	Hollow metal construction from 16 guage thick steel sheet spray painted.
17	Car Flooring	6 mm thick Checkered Plate flooring.
	Car roof	Car roof shall be covered with sheet metal and shall be provided with LED light fitting & a three pin plug 5/15A, socket with switch on top of lift car.
	Car & landing door	Protected by central opening horizontal sliding stainless steel door (Horizontal bi-parting door). The door of car and landing shall be interlocked in such a way opening & closing of two doors shall be simultaneous and the doors will open when the lift is in lading zone.
18	Controller and type	Selective Collective Controller with variable voltage variable frequency drive and Microprocessor based software-controlled logic system
19	Operation of elevator	Automatic simplex collective with and without attendant with provision for locking control in "auto" or "Attendant" position. Key type lock switch shall be provided. Push button shall be fixed in the car for holding the doors open for any length of the time required.
20	Signal / Indicators	Car position informer in car both visual and audio, hall position indicator at all floors, telltale lights at all floors, battery operated alarm bell and emergency light with suitable battery, charger & controls.
	(a) Type of construction	As per manufacturer's standard
	(b) Type of display	7 segment LED display.
	(c) Type of Indicators	Soft touch keys and digital luminous display in car operating panel and on all floors landings. (All fixtures in stainless steel face plates).
21	Fan, Lighting at Machine room, Shaft & pit.	One cabin fan, two LED light fittings on car roof. Lux level: 100 min.  LED lighting with a 5A, 3 pin socket & switches or as required by bidder during erection / maintenance purpose shall be provided at every 3 meters' interval in lift well/ hoist way. Light and fan in the Car enclosure shall be separate switch control.
21	Trailing cables	FRLS type.
22	Power supply: a) Power b) Lighting & fan	Two nos. 415 Volts, (+/- 10% variation), 3 Phase, 50 Hz (+3% to -5% variation), combined voltage variation 10%, 3 wire system supply at machine room will be provided by customer/ BHEL in the machine room. Other supply as required like control supply 110 V AC etc. need to be suitably derived by supplier.



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		Power supply for motors Air conditioner, switch sockets, illumination of shaft etc. to be derived and distributed by elevator supplier with MCCB/ MCB & Cables.
23	EPABX requirements	Internal telephone wiring and telephone hand set to be provided. The external connection shall be provided by Customer. Also, automatic rescue device shall be provided.
24	Elevator Features	
a)	Isolating cushion b/w car and car frame	Type of cushion shall be rubber pad or spring, as per manufacturer's standard.
b)	Three pin plugs with socket on car top	5/15A, 3 pin plug sockets with switch on top of lift car and inside shaft to take care maintenance requirement.
c)	Car frame	Material: Mild Steel Type of construction: Bolted
d)	Fire rating of Landing Door	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.
f)	Door hanger tracks	Yes, complete with accessories shall be provided.
g)	Safety shoes	Yes, complete with accessories shall be provided.
h)	Safety device for door operation	Full length Infrared light curtain along with pressure limiter as an extra mechanical safety to be provided.
i)	Handrails on three sides of car	Mirror finish stainless steel at suitable height.
j)	False ceiling	SS 304. (Thickness as per supplier's standard).
k)	Emergency stop switch	To be provided
l)	Braille switch	To be provided
m)	Floor announcement cum music system	To be provided
25	Control & Operation	
	(a) Type of control	Simplex / Duplex
	(b) Type of drive	Variable Voltage Variable Frequency Drive
25	Car operating panel	To be provided
	(a) Type of construction	Partial Height Car Operating Panel (COP), removable type from Car with SS face plate.
	(b) Push Buttons	Luminous type (IP 54).
27	Car position indicator	To be provided (both visual and audio) combined with direction arrows, overload warning indicator, battery operated alarm bell and emergency light and fan and handsfree speaker telephone set with suitable battery, charger and controls.
	(a) Type of construction	As per manufacturer's standard
	(b) Type of display	Seven (7) segment LED display.
28	Push button station and call registered tell-tale lights	Provided in each landing
	(a) Type of construction	Box type with SS face plate
	(b) Push Buttons	Luminous push buttons with IP 54
29	Apron / Fascia Plate	Yes (To be provided by supplier) as per IS 14665
30	Emergency Light	Required.
31	Terminal buffers,	Spring buffers for car and counterweight shall be provided



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	type and number	as per IS 14665.
32	Load plate	As per manufacturer's standard
33	Counter weight	Frame: Fabricated Steel Construction Fillers: Cast Iron
34	Guide rails	Guide rails complete with supporting brackets for the car and counter weights.
35	Limit Switches	To be provided, as per requirement
	a) Location	Bottom & top terminal
	b) Type	Electro-mechanical
	c) Operation	Cam Operated
36	Reverse phase relay and other protective devices	To be provided
37	Emergency safety devices	The lift shall be provided with safety device attached to the lift car frame and sustaining the lift car up at governor tripping speed with full rated load in car.
38	<b>Car Safety &amp; Governor</b>	
	a) Stopping distance	As per IS:14665
	b) Type and mode of operation of Over speed Governor device	Centrifugal action
	c) Tripping speed and design code	Conforming to IS: 14665 (Latest addition)
	d) Location	At machine room.
	e) Brakes	DCEM brakes.
39	<b>Motor details</b>	
	(a) Type	3 phase AC squirrel Cage Induction motor
	(b) Type of Duty	Lift Duty
	(c) Duty	S4 / S5
	(d) Duty Cycle	40%
	(e) Applicable standard	IS: 325
	f) No. of Starts per Hour	Elevator Motor shall be suitable for minimum of 150 Starts per hour.
	g) Direction of rotation	Both Clockwise & Anti-clockwise
	h) Class of Insulation	F, temp rise limited to class B. Motor shall be provided with thermal class 130 (B) or better insulation.
	i) Method of Starting	AC Variable Voltage Variable Frequency Drive
40	<b>Door Motor</b>	
	a) Equipment driven by Motor	Door
	b) Direction of rotation	Both Clockwise & Anticlockwise
	c) Type of enclosures	IP 54
41	Metallic Wire Mesh between Car & Counter Weight	To be provided
42	Fire Man Switch	To be provided
43	Sound Reducing	Isolation Rubber / other arrangement in the Machine shall



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	Material	be provided below machines.
44	Automatic Rescue Device (Battery Drive)	Automatic Rescue Device (ARD) with battery drive - Modern advanced electronic drive system of rescuing passenger trapped in an elevator shall be provided.
45	Ropes for hoisting	To be provided. Factor of safety for rope shall be 12 (min) or as per IS: 14665, whichever is higher.
46	Design seismic coefficient	According to IS: 1893 (an additional information for elevator building only)
47	Fire extinguisher	½ Kg CO <sub>2</sub> / other suitable Fire extinguisher along with fixing arrangement to be provided.
48	Ladder in pits	To be provided
49	Fixing/ Fasteners/ Embedment	All fixing materials require fixing rails, brackets, equipment including nuts and bolts. All steel embedment for fixing landing doors / indicators etc. to the elevator well shaft and fascia plate shall be supplied by the bidder.
50	Statutory requirement	All prevailing requirement(s) of statutory and regulatory body shall be included by bidder in their scope. Bidder shall be responsible for obtaining all necessary approval from statutory and regulatory body and lift inspector. However, Purchaser will furnish required information, as and when required.
51	Operational requirement	(i) Selective collective, automatic operation with or without operator through illuminated push button station located inside the lift car. (ii) Power operated with automatic opening/closing car and landing doors. (iii) Two push buttons, one for upward movement and the other for downward movement at each intermediate landing, and one push button at each terminal landing shall be provided in order to call the car. (iv) Push buttons shall be fixed in the car for holding the doors open for any length of the time required. (v) Fireman's switch shall be provided for each elevator.

**2.0.4 Commissioning and Start-up Spares:**

Bidder to include in the main supply.

**2.0.5 Exclusion**

- 1) Complete civil works for hoist way, machine room, pit complete with the side enclosure (Brick / RCC), interconnecting platform (if any) and monorail beam.

Minor civil work including grouting for foundation bolts and supporting structure/ beams at RCC pedestals in the machine room, as required shall be taken care of by bidder during installation of elevator.

- 2) Trap door along with fixing arrangement and Electric hoist with travelling trolley of 3T capacity to facilitate handling of equipment in the machine room.



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- 3) Power supply cable (AC 415 V, 3 Ph, 50 Hz) up to machine room level. Further cabling (all cables including power, control and instrumentation as per tender specification) shall be provided by the bidder.
- 4) Supply & fixing of Shaft reduction channel, if any.

**2.0.6 Terminal Points & Other Requirements:**

- 1) BHEL / Customer will provide the elevator shaft complete with foundation and brick walls around the elevator shaft together with overhead machine room. The machine room will be provided with RCC floor slab with necessary pockets for anchor bolts and slots.
- 2) Dummy landing/s, as required in case travel between two consecutive landings is more than 10 m, shall be considered by bidder in their offer.

**2.0.7 List of Tools & tackles for Elevator (Bidder to include in Main Supply)**

Sl. No.	Description	Qty.	Remarks
1	Spanner of all sizes required for maintenance	1 Set	
2	Adjustable Spanner	1 No.	
3	Allen Key set all sizes required for maintenance	1 Set	
4	Screw driver set	1 No.	
5	Cutting plier	1 No.	
6	Grease gun	1 No.	
7	Nose plier	1 No.	
8	Grip plier	1 No.	
9	Hook spanner	1 No.	
10	Box spanner	1 No.	
11	Oil can	1 No.	
12	Measurement Taps	1 No.	
13	Paint brush 1/4,1/2,3/4 inch	1 No. of each	
14	Line tester	1 No.	
15	Multimeter	1 No.	
16	Soldering iron	1 No.	
17	Torch Light	1 No.	
18	Knife cutter	1 No.	
19	Steel rule	1 No.	
20	Wire Striper	1 No.	
21	Tube Spanner Combination	1 No.	
22	Hammer 1/2 Kg	1 No.	
23	Dial wrench	1 No.	

**2.0.8 List of Mandatory Spares for Elevator (Refer Price Schedule)**

One (1) Set (as per list below) of Mandatory Spares each for Elevators of FGD Control Room Building and GDW Building. Bidder to supply total two (2) Sets.

SN.	Description	Total qty
1	Friction block	2 nos.
2	Guide roller	20% of total population or 3 Nos. of each type whichever is higher
3	Contactors	2 nos.



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4	Control transformer	1 no. of each type
5	Time device	2 nos. of each type
6	Rectifiers	4 nos. of each type
7	Overcurrent relay	2 nos. of each type
8	Auxiliary relays	3 nos. of each type
9	Resistor	3 nos. of each type
10	Fuses of each rating	20% of the total population
11	Limit switches	3 nos.
12	Push button	3 nos. of each type
13	Contact device (if applicable)	3 nos. of each type
14	Brake motor	2 nos. of each type
15	Transmitters	2 nos. of each type
16	Switches of each type	3 nos.
17	Receiver	2 nos. of each type
18	Bearings of each type & size	2 nos.
19	Roller of each type	3 nos.
20	Worm gear spares	
20.1	'O' rings	3 sets*
20.2	Sealing ring	3 sets*
21	Spares for brake	
	a) Fan	2 nos. of each type
	b) Magnetic coil	3 nos. of each type
	c) Brake disc	2 sets*
	d) Brake pad	2 sets*
22	Bushing (for door front)	2 sets*
23	Pinion	2 nos. of each type
24	Elevator Motor with VVVF drive	1 no. of each type

\* One set means one complete replacement for one equipment.

### **3.0 Painting / Details of Special Treatment of Elevator:**

All the elevator components shall be given special corrosion resistant treatment. Painting of all equipment's / items within the battery limit.

<b>SN.</b>	<b>Components description</b>	<b>Specified requirements</b>
1	Machine	Anti- corrosive epoxy paint
2	Car & counter weight	Anti- corrosive epoxy paint
3	Car & counterweight buffers	Anti- corrosive epoxy paint
4	Fish plates	Anti- corrosive epoxy paint
5	Buffer pedestals (structural)	Anti- corrosive epoxy paint
6	Brackets & rail fasteners	Anti- corrosive epoxy paint
7	Brake adjusting screw & coupling fasteners	Zinc passivated
8	Brackets	Anti-corrosive epoxy paint.
9	Controller cabinet	Anti- corrosive epoxy paint as per industry standard
10	Hall buttons	Dust proof with SS hardware.
11	Car operating panels (COP)	Dust proof contact & button with aluminum face plate and SS hardware. Main face plate S.S.
12	Governor	Cover & casting epoxy painted. Other component



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		zinc plated.
13	Governor tension frame	Hot dipped galvanized and anti-corrosive epoxy paint with MS shaft for sheave.
14	Car frame, level brace rods and counter weight frame	Anti- corrosive epoxy paint
15	Safety equipment (Linkage)	Zinc plated
16	Safety switch & car gate switch	IP:65, Dust proof heavy zinc plated.
17	Guide shoe	Zinc plated
18	Filler weights	Anti- corrosive epoxy paint
19	Rope fasteners	Zinc passivated and chromate dipped.
20	Hoist/ Governor rope	Greased, Self-lubricating
21	Hall position and car position indicator.	Dust proof with stainless steel enclosure and face plate.

**4.0 Degree of Protection (DOP) of various equipment:**

SI. No.	Equipment	Degree of Protection
1	Ac Motor	IP 54
2	Control Panel	IP 65
4	Hall Button Fixture	IP 54
5	Position Indicator	IP 54
6	Car Operating Panel (COP)	IP 54
7	Car Position Indicator	IP 54
8	Landing Operating Panel (LOP)	IP 54
9	Safety Operating Switch (Car)	IP 65
10	Brakes	IP 54

**5.0 Input Drawings by BHEL:**

SI. No.	Drawing/ Document Title	Drawing No.
1.	Engg. Input Drawing for 680 KG Capacity Elevator for ESP Control Room	PE-DG-491-502-A001
2.	Engg. Input Drawing for 1000 KG Capacity Elevator for Gypsum Dewatering Building	PE-DG-491-502-A002

**6.0 Master Drawing List (MDL) and Submission Schedule:**

Preparation of all necessary drawings / data sheets / documents / calculations as required for obtaining necessary local administration permits / approval from statutory authority and make arrangement for inspection and tests required thereby for necessary approval on behalf of the customer. Fees (as required) for obtaining approval from statutory bodies shall also be included in the scope of work of the bidder.

All drawings shall be prepared as per BHEL's title block and bear BHEL's drawing No. and customer / consultant's drawing no; which will be forwarded to the successful bidder during detail engineering stage. Bidder to submit revised drawings complete in all respects incorporating all comments. Any incomplete drawing submitted shall be treated as non-submission with delays attributable to bidder's account.



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SI. No.	BHEL Doc No.	Drawing Title	Time**
1	PE-V0-481-502-A001	TECHNICAL DATA SHEET OF GDW BUILDING ELEVATOR	2
2	PE-V0-481-502-A002	GA, M/C ROOM LAYOUT, SCOPE & BOM AND DIMENSIONAL DETAILS OF GDW BUILDING ELEVATOR	2
3	PE-V0-481-502-A005	O&M MANUAL FOR ELEVATOR	10
4	PE-V0-481-502-A006	WIRING DIAGRAM & POWER DISTRIBUTION SCHEMATIC	4
5	PE-V0-481-502-A007	QUALITY PLAN FOR ELEVATORS	2

\*Except SI No. 4 & 5, other drawings will be in Approval category and considered in delay analysis.

\*\* Schedule of Submission in No. of weeks from date of LOA/ PO.

Refer GCC for modalities of Engineering Documents Submission.

Every repeat submission by Supplier: Within one (1) week.

Response time by BHEL: Within three (3) weeks after receiving of drawing.

Delay beyond the stipulated duration shall be considered in delay analysis.

After final acceptance of individual equipment/ system by the BHEL/ Customer, the bidder will update all original drawings and documents for the equipment/ system to "as built" conditions and submit to BHEL/ Customer.

The number of copies/prints/CD-ROMs/manuals to be furnished for various types of document is given in the table below:

SI. No.	Description of Drgs. / Docs.	No. of Prints	No. of Portable Hard Disk
1	<b>Drawings/ Documents</b>		
1.1	First submission and submission with major changes	4	-
1.2	Final (Directly to site)	6	2
1.3	"As Built" (Directly to site)	6	2
2	Operation & Maintenance manual		
	i) First Submission	1 set	
	ii) Final Submission (Directly to site)	4 sets	2

**7.0 Electrical Specification:**

**i) Electrical scope between BHEL and Bidder is enclosed as Annexure-1.**

**ii) Electric Motor**

The driving motors shall be squirrel cage induction type conforming to IS: 325 and suitable for variable voltage variable frequency (VVVF) operation at 415 V (+/- 10% variation), 3 Phase, 3 wire, 50 Hz (+3% to -5% variation) supply. For the purpose of design of equipment/systems, an ambient temperature of 50 °C and relative humidity of 95% (at 40 deg C) shall be considered. The equipment shall operate in a highly polluted environment. Motors shall be provided with class F insulation & temp rise



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limited to class 130 (B). Protection class for motor shall be IP 54.

**iii) Controls**

The control shall be variable voltage and variable frequency type and shall provide smooth and constant acceleration and retardation under all conditions of operation. Suitable control panels shall be provided in the machine room. The lift will be automatically stopped by upper and lower terminal switches. The elevators will have an emergency stop switch, limit switches and other safety devices according to statutory rule.

**iv) Cables and Wirings**

All the cables except trailing cables shall be as per IS:1554-1 or IS-7098-I. the PVC outer sheath of these cables shall be flame retardant, low smoke (FRLS) type with the following FRLS properties.

- (i) Oxygen index of min. 29 (as per IS:10810 Part-58)
- (ii) Acid gas emission of max. 20% (as per IEC-754-I)
- (iii) Smoke density rating shall not be more than 60% (as per ASTM D 2843)

The circular trailing cables shall be either in accordance with IS 4289 Part-I (elastomer insulated) or IS 4289 Part-II (PVC insulated). The flat type trailing cables if offered shall be in accordance with IEC 60227-6. The voltage grade shall be 1100V.

All wiring / cabling between the equipments in the lift machine room and that between the machine room and equipment in the lift well and at the landing shall be wired in HDP conduits / galvanised steel conduits to be supplied by the bidder. Alternatively, armoured cables may be used.

**v) CAR ELECTRICAL ACCESSORIES**

The following accessories shall be provided:

- 1) LED light fittings for illumination level of 100 lux on car floor.
- 2) Portable light and alarm bell with battery and charger ventilation fan with control.
- 3) Car control station with position indicator inside the car and at landing platforms (both visual and audio).
- 4) Emergency stop switch.
- 5) 5/15A, 3 pin plug socket with switch on top of lift car.
- 6) Hand free speaker telephone set connected to plant network.
- 7) AUTOMATIC RESCUE DEVICE (ARD)-(BATTERY DRIVE) :
- 8) Contractor to provide a modern Advanced electronic drive system of "RESCUING Passenger Trapped in a ELEVATOR".
- 9) EMERGENCY SAFETY DEVICES : 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 at governor tripping speed with full rated load in car.

**vi) OPERATIONAL REQUIRMENTS:**

- a. Contractor shall provide car operating panel with luminous buttons, car position indication in car (both visual and audio) combined with direction arrows, overload warning indicator, battery operated alarm bell and emergency light and fan & hands free speaker telephone set with suitable battery, charger & controls.
- b. Contractor shall provide emergency indicator to indicate the location of elevator in case of elevator being stuck up between the floors through automatic flashers (both audio & visual).
- c. Contractor shall provide electronic door detector (Infra red curtain type).



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- d. Digital hall position indicator at all floors, tell lights at all floors shall also be provided by the Contractor.
- e. For facilitating the movement of visually & hearing impaired persons, hall lantern and car arrival chimes shall be provided
- f. All fixtures shall be in stainless steel face plates.
- g. Push buttons shall be fixed in the car for holding the doors open for any length of the time required.
- h. All other safety/protection/operation interlocks as required by IS:14665 (latest edition).

**vii) Earthing**

The elevator structures and all electrical equipments, including metal conduits shall be effectively earthed with the earth conductors provided in the machine room as per IS: 3043.

**8.0 Performance/ Functional Guarantees / Tests:**

Trial operation, commissioning, performance/ demonstration guarantee tests shall be carried out at site as follows:

- A. Rated capacity of the Elevator.
- B. Travel and hoist Speed of the Elevator.
- C. Accurate positioning of the Elevator.
- D. Over Load test of the Elevator as per IS:14665 (Latest edition)

**9.0 Quality and Inspection:**

Quality Plan has been provided in this specification for reference. Bidder shall submit the Quality Plan for BHEL/ Customer approval after award of the contract during detailed engineering stage without any commercial & delivery implication to BHEL.

**10.0 Packing, Transportation and Site Handling:**

The complete material shall be supplied in suitable lockable sealed container. All elevator material will be packed in wooden box except guide rail and the wooden box will be placed in the container for dispatch. Site handling is in bidder's scope and preservation of elevator components shall be taken care by bidder suitably.

**10.0 List of makes of components of Elevators:**

SN.	Item	Name of Supplier	Place	Remarks
1.	WIRE ROPES	USHA MARTIN	RANCHI	
		BHARAT WIRE ROPE	MUMBAI.	
2.	TRAILING CABLE	GEBUR & GRILLER- AUSTRIA		
		DAETWYLER (THELMA) CABLES	SWITZERLAND	
		LAPP	GERMANY	
		UNIVERSAL	-	
		INCABSTEP	-	
3.	BUFFER SPRINGS	INDUSTRIAL STEEL SPRING	-	
		ALL INDIA STEEL SPRING MANUFACTURING COMPANY	-	
		KOLKATA SHAW COMPANY	KOLKATA	
		SUPER INDIA SPRINGS	KOLKATA	



**KAHALGAON FGD  
ELEVATORS  
TECHNICAL SPECIFICATION**

**SPECIFICATION No: PE-TS-481-502-A001**

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SN.	Item	Name of Supplier	Place	Remarks
		MESCO SPRING.	MUMBAI.	
4.	GEAR INTERNALS	PREMIMUM ENERGY TRANSMISSION LTD	PUNE	
		SICOR S.P.A.	ITALY	
		OEM		
5.	DRIVER MOTOR	SIEMENS	MUMBAI	
		ABB	FARIDABAD	
		BHARAT BIJILI	-	
		CGL	-	
		KIRLOSKER ELECTRIC CO LTD	-	
		OEM	-	
		NGEF		
		MARATHON		
		GE POWER		
		RAJINDRA ELECT INDUSTRIES		
LAXMI HYDRAULICS PVT. LTD.				
6.	STAINLESS STEEL	SAIL	-	
		MINOX METAL	-	
		JINDAL	-	
7.	CR SHEET	ARCELOR MITTAL/ NIPPON STEEL	-	
		TATA STEEL BSL LIMITED	-	
8.	CABLES	DELTON	-	
		NICCO	-	
		UNIVERASL	-	
		FINOLEX	-	
		CCI	-	
		MACROTHREM	-	
		VARSHA CABLES	-	
		KEI.	-	
		PARAMOUNT	-	
POLYCAB	-			
9.	RELAYS	SIEMENS	-	
		SCHNEIDER TELEMCHANIQUE	-	
		SALZER	-	
		SCHNIDER ELECTRIC	-	
10.	CONTACTORS	SIEMENS	-	
		L&T	-	
		GE	-	
		SCHNEIDER TELEMCHANIQUE	-	
11.	TRANSFORMER S	SHARP ELECTRONICS	-	
		MELCON CONTROLS	CHENNAI	
		LOGITECH	-	
		GUNHAWA ELECTRIC CO LTD.	-	
12.	INVERTOR (V3F)	YASKAWA	GERMANY	
		TOSHIBA	JAPAN.	
13.	T GUIDES	SAVERA	CHINA	



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SN.	Item	Name of Supplier	Place	Remarks
		D.D HITECH	-	
14.	CAR DOOR OPERATOR	WITTUR GMBH	AUSTRIA	
		FERMATOR	-	
		OEM	-	
15.	INFRARED DOOR CURTAIN	MEMCO	UK	
		WECO	-	
		TLJONES	-	
16.	BATTERY (LEAD ACID)	EXIDE		
		HBL POWER SYSTEM	HYDERABAD	
		AMAR RAJA	TIRUPATI	
		AMCO SAFT INDIA LTD	BANGALORE.	

**Note:**

1. The sub-vendor list above is indicative and is subject to BHEL/ Customer approval during detailed engineering stage without any commercial & delivery implication to BHEL.

Bidder to propose sub vendor within 4 weeks of placement of LOA. Thereafter, no request for additional sub-vendor shall be entertained.


2. In case of assembled imported elevator, makes of BOIs shall be subject to BHEL/ Customer approval during detail engineering stage without any commercial implication at contract stage.
3. Dealers are not acceptable for any item of the package. Bidder shall procure all items including plates, structural etc. from approved sub vendor only.

**ANNEXURE-1: STANDARD ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR**

<b>S. NO</b>	<b>DETAILS</b>	<b>SCOPE SUPPLY</b>	<b>SCOPE E&amp;C</b>	<b>REMARKS</b>
1	Isolating Switch	Vendor	Vendor	BHEL will provide two number 415 V (3ph, 4W) supply feeder only up to isolating switches for elevators. Any other voltage level (AC/DC) required will be derived by the vendor. Motor starter shall be part of elevator control panel.
2	Power cables, control cables, screened control cables and any special cables (if required) between equipment supplied by vendor.	Vendor	Vendor	Cable from supply feeder to isolating switch shall be in BHEL scope.
3	Cabling material (cable trays, accessories, cable tray supporting system, conduits etc).	Vendor	Vendor	Local cabling from nearby main route cable tray (BHEL scope) to equipment terminal (vendor's scope) shall be through 100/ 50 mm. cable trays/ conduits/ Galvanised steel cable troughs, as per approved layout drawing during contract stage.
4	Equipment Earthing	Vendor	Vendor	All equipment metallic enclosures / frames, metal structure etc. shall be grounded at two points each to the nearest grounding points / risers provided by BHEL.
5	Motors	Vendor	Vendor	Makes shall be subject to customer/ BHEL approval at contract stage.
6	Cable glands and lugs for equipment supplied by vendor	Vendor	Vendor	<ol style="list-style-type: none"> <li>1. Double compression Ni-Cr plated brass cable glands</li> <li>2. Solder less crimping type heavy duty tinned copper lugs for power &amp; control cables.</li> </ol>
7	<ol style="list-style-type: none"> <li>a) Input cable schedules (C &amp; I)</li> <li>b) Cable interconnection details for above</li> <li>c) Cable block diagram</li> </ol>	Vendor Vendor Vendor	- - -	Cable listing for Control and Instrumentation Cable in enclosed excel format shall be submitted by vendor during detailed engineering stage.
8	Equipment layout drawings	Vendor	-	
9	Electrical Equipment GA drawing	Vendor	-	For necessary interface review.



**QUALITY ASSURANCE PLAN**

		MANUFACTURING QUALITY PLAN M/S (_____)	PROJECT : PACKAGE: ITEM: ELEVATOR BHEL REF. NO.:				Q.P/FQP. NO & REV: DATE: PAGE: 1 of 4 JOB NO:						
1	2	3	4	5	6	7	8	9	10				11
Sr. No.	COMPONENT & OPERATION	CHARATERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMATE OF RECORD	AGENCY				REMARKS
									D	VE	M	B	
<b>A. Boughtout Items :</b>													
1	Raw materials, Round Hexagon & Structural. Type : EN-8/EN-8D to EN-9,B and En-24	A: Chemical Composition B: Mechanical Properties C: Dimensional Checks	Major Major Major	Analysis Hardness Measurement	Sample Sample 100%	IS/BS : 970 IS/BS : 970 DRG.	IS/BS : 970 IS/BS : 970 DRG.	O.S.L/ T.C QA REG. D.I.R/Q.C.R		V V V	V V w	V V V	
2	Raw material Rounds, En-8, EN-9, EN-24	Crack Detection	Major	Ultrasonic testing	100%	ASTM-388	ASTM -388	QA/FMT/03		V	W	V	
3	Casting : a. C.I. Graded Castings	A: Chemical Composition B: Mechanical Properties C: Dimensional Checks D: Blow Holes	Major Major Major Major	Analysis Hardness on traction sheave Measurement Visual	Sample Sample Sample 100%	IS-vendor DRG vendor-DRG IS : 210 vendor-DRG —	AS PER DRG. vendor-DRG IS : 210 vendor-DRG -	S.T.C S.T.C QA/FMT/02 QA/REG	√ √ - -	V V - W	V V W -	V V - -	
4	Suppliers Item : a. Manufactured Items b. Moldings Rubber Items ( ABSORBER ) c. Springs (Buffer) d. Guide Rail. e. Wire rope	Dimensional Check A: Dimensional Checks B: Hardness A: Dimensional Check B: Spring Constant compression. A.Chemical Test. B. Dimension check. A: Dimensional Check B: Mechanical Properties.	Major Major Major Major Major Major Major	Measurement Measurement Compression Test Measurement Compression Analysis Measurement Measurement of O.D/ Const. Measurement	100% 100% Sample 100% Sample Sample Sample Correlate S.T.C	vendor/DRG. vendor-DRG. vendor-DRG. vendor-DRG. vendor-DRG. vendor- DRG vendor-DRG. IS/2365 & IS : 2266	vendor/DRG. vendor/DRG. vendor-DRG. vendor-DRG. vendor-DRG. vendor -DRG vendor-DRG. IS/2365 & IS : 2266	D.I.R QA/FMT/02 QA/FMT/02 QA/FMT/02 S.T.C S. T.C QA/FMT/02 QA/FMT/02 S.T.C	 - - - √ √ - √	 - - - V V - V	 W W W V W W - V	 - - - V V - V	
*V= Verification as appropriat. *M= Manufacturer/Sub contractor. *W=Witness , *VE= Manufacturer/ sub contractor Vendor. *S.T.C= Supplier Test Certificate, *B =BHEL/Nominated inspection agency. *O.S.L = Out Side Lab, *D.I.R=Daily inspection register. *R.Q.C = Rvendedoript Quality Control (vendor) . *Q.C.R = Qua;ity Control Register (vendor) . *T.C. = Test Certificate, *D.I.R = Daily inspection register. * D = Documents. *U.E.R. =Ultra Sonic Examination Record .			MANUFACTURER SEAL AND SIGN		CONTRACTOR SIGN AND SEAL .		NAME & SIGN OF APPROVING AUTHORITY & SEAL						
1	2	3	4	5	6	7	8	9	10				11

Sr. No.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
									D	VE	M	B	
	f. Power & control (PVC)cable	a- FRLS , b- Insulation resistance.	Major do	Electrical do	Sampling do	IS - 694 do	IS - 694 do	S.T.C do	√ √	V V	V V	V V	
5	Raw material for motor. (1) Enameled wire.  (2) Copper base (Flat)	a) Dimension Check b) High voltage test  Chemical check	Major Major Major	Measurement Elect. Analysis	Sample One Sample each roll Sample	vendor -STD IS:4800 Cu=min 99.5%	vendor -STD IS:4800 Cu=min 99.5%	D.I.R D.I.R O.S.L / T.C		V V V	W W V	V V V	
6	Finished Manufactured Components	Plating thickness control	Major	Measurement	Sample	vendor-STD.	vendor-STD.	vendor-STD		V	W	V	
<b>B. Inspection During mfg.</b>													
1	Machine Shop :	A: Dimensional Check B: Crack detection Motor bodies C: Surface check	Major Major Major	Measurement D.P. Test Visual	100% 100% 100%	vendor-DRG. vendor-STD. vendor-STD.	vendor-DRG. vendor-STD. vendor-STD.	QA/FMT/01 - -		- - -	W W W	- - -	
2	Fabrication Shop :	Dimensional Checks of critical items Welding	Major minor	Measurement Visual	100% Sampling	vendor-DRG. do	vendor-DRG. do	Q.C.R .		- .	W W	- .	Welding by approved welder
<b>C. Assembly Inspection.</b>													
1	Winding gear.	A- Back lash of gears & Maching contact. B- Vibration . C- Noise level. D- Visual .	Major Major Major Oil leakage	Measurement Measurement Measurement Visual	100% 100% 100% 100%	vendor INSP NORMS vendor INSP NORMS vendor INSP NORMS vendor INSP NORMS	vendor INSP NORMS vendor INSP NORMS vendor INSP NORMS vendor INSP NORMS	QA/FMT/11 do do do		V V V V	W W W W	- - - -	
*V= Verification as appropriat. *M= Manufacturer/Sub contractor. *W=Witness , *VE= Manufacturer/ sub contractor Vendor. *S.T.C= Supplier Test Certificate, *B =BHEL/Nominated inspection agency. *O.S.L = Out Side Lab, *D.I.R=Daily inspection register. *R.Q.C = Rvendoript Quality Control (vendor) . *P =Perform. *Q.C.R = Qua;ity Control Register (vendor) . *T.C. = Test Certificate, *D.I.R = Daily inspection register. *D = Documents. *U.E.R. =Ultra Sonic Examination Record .			MANUFACTURER SEAL AND SIGN		CONTRACTOR SIGN AND SEAL .		NAME & SIGN OF APPROVING AUTHORITY & SEAL /HPGCIL						

1	2	3	4	5	6	7	8	9	10				11
Sr. No.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
									D	VE	M	B	
2	Motor Assembly :	A-Winding Insulation test. B-Insulation Resistance C-Motor testing for elect. Pmt. D-Vibration measurement & noise level	Major Major Major Major	High Volt. Test Measurement Elect. Measurement	100% 100% 100% 100%	IS :325-96 1.5 KV for 5 SEC > 10 mega ohms IS : 325 vendor - Norms	IS :325-96 1.5 KV for 5 SEC. > 10 mega ohms IS : 325 vendor -Norms	D.I.R QA/FMT/13 Test report Test report Test report		V V V V	W W W W	V V V .	
3	Speed Governor Assembly :	Tripping speed Easy Run test	Major	Function Check	100%	IS : 9878 LCH -112	IS : 9878 LCH - 112	T.C IN Pant.		V	W	V	
4	Controller Assembly / VVVF Unit.	1. Visual Inspection 2. Electrical Checks (Routine Test). 3. Functional Checks 4. Pretreatment in seven tank for sheet & paint thickness.	Major do do Major	Visual Electrical Function Measurement + Visual	100% 100% 100% Sampling	vendor Norms do do do	vendor Norms do do do	T.C do do vendor - FMT.		V V V V	W W W W	V V V V	
*V= Verification as appropriate. *M= Manufacturer/Sub contractor. contractor Vendor. *W=Witness , *VE= Manufacturer/ sub Supplier Test Certificate, *B =BHEL/Nominated inspection agency. *S.T.C= *O.S.L = Out Side Lab, *D.I.R=Daily inspection register. *R.Q.C = Rvendoript Quality Control (vendor) . *P =Perform. *Q.C.R = Qua;ity Control Register (vendor) . *T.C. = Test Certificate, *D.I.R = Daily inspection register. *D = Documents. *U.E.R. =Ultra Sonic Examination Record .			MANUFACTURER SEAL AND SIGN		CONTRACTOR SIGN AND SEAL.		NAME & SIGN OF APPROVING AUTHIRITY & SEAL.						

1	2	3	4	5	6	7	8	9	10				11
Sr. No.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
									D	VE	M	B	
5	Mechanical assembly :	Cage assembly .	Major	Measurement	100%	Appd. L/o DRG. vendor-INSP. Norms	Appd. L/o DRG. vendor-INSP. Norms	QA/FMT/15		V	W	V	
6	Painting	Parts & Components	Major	Cross Hatch Test	Sampling	vendor-INSP. Norms	vendor-INSP. Norms	QA / REG.		V	W	V	
			Major	Powder Coating Thickness Test	Sampling	vendor-INSP. Norms	vendor-INSP. Norms	QA / REG.		V	W	V	
6	Electrical Assembly	1- Break assembly .	Minor	Function check	Sampling	vendor- NORMS	vendor - NORMS	TC		V	W	V	
*V= Verification as appropriat. *M= Manufacturer/Sub contractor. *W=Witness , *VE= Manufacturer/ sub contractor Vendor. *S.T.C= Supplier Test Certificate, *B =BHEL/Nominated inspection agency. *O.S.L = Out Side Lab, *D.I.R=Daily inspection register. *R.Q.C = Rvondript Quality Control (vendor) . *P =Perform. *Q.C.R = Qua;ity Control Register (vendor) . *T.C. = Test Certificate, *D.I.R = Daily inspection register. *D = Documents. *U.E.R. =Ultra Sonic Examination Record .			MANUFACTURER SEAL AND SIGN	CONTRACTOR SIGN AND SEAL.	NAME & SIGN OF APPROVING AUTHORITY & SEAL								



**KAHALGAON FGD  
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TECHNICAL SPECIFICATION**

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**DRAWINGS / DOCUMENTS TO BE SUBMITTED WITH THE BID**

Bidder shall submit the following drawings / documents along with their bid:

- a) PQR documents
- b) Un-priced copy of price format indicating quoted/ not quoted against each row/column
- c) Signed/ Stamped copy of Compliance cum Confirmation Certificate
- d) No deviation certificate

OFFER WILL BE CONSIDERED AS INCOMPLETE IN ABSENCE OF ANY OF ABOVE DOCUMENTS. DOCUMENT OTHER THAN ABOVE, IF ANY, SUBMITTED WITH THE OFFER WILL NOT FORM PART OF CONTRACT AND WILL NOT BE CONSIDERED FOR BID EVALUATION.

**KAHALGAON FGD****ELEVATORS****TECHNICAL SPECIFICATION**

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**COMPLIANCE CUM CONFIRMATION CERTIFICATE**

The bidder shall confirm compliance with following by signing / stamping this compliance certificate (every sheet) and furnish same with the offer.

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions, other than those mentioned under "exclusion and those resolved as per 'Schedule of Deviations', with regard to same.
- b) There are no other deviations w.r.t. specifications other than those furnished in the 'Schedule of Deviations'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the 'Schedule of Deviations'
- c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL / CUSTOMER approval & customer hold points for inspection / testing shall be marked in the QP at the contract stage. Inspection / testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc. This is within the contracted price without any extra implications to BHEL after award of the contract.
- d) All drawings/ data-sheets / calculations etc. submitted along with the offer shall not be taken cognizance off.
- e) The offered materials shall be either equivalent or superior to those specified in the specification & shall meet the specified / intended duty requirements. In case the material specified in the specifications is not compatible for intended duty requirements then same shall be resolved by the bidder with BHEL during the pre-bid discussions, otherwise BHEL / Customer's decision shall be binding on the bidder whenever the deficiency is pointed out.  
For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.
- f) The commissioning spares shall be supplied on 'As Required Basis' & prices for same included in the base price itself.
- g) All sub vendors shall be subject to BHEL / CUSTOMER approval in the event of order.
- h) Guarantee for plant/equipment shall be as per relevant clause of GCC / SCC / Other Commercial Terms & Conditions
- i) In the event of order, all the material required for completing the job at site shall be supplied by the bidder within the ordered price even if the same are additional to approved billing break up, approved drawing or approved Bill of quantities within the scope of work as tender specification. This clause will apply in case during site commissioning, additional requirements emerges due to customer and / or consultant's comments. No extra claims shall be put on this account
- j) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL's / Customer's / Consultant's office for across the table resolution of issues and to get documents approved in the stipulated time.
- k) As built drawings shall be submitted as and when required during the project execution.
- l) The bidder has not tempered with this compliance cum confirmation certificate and if at any stage any tempering in the signed copy of this document is noticed then same shall be treated as breach of contract and suitable actions shall be taken against the bidder.
- m) Successful bidder shall furnish detailed erection manual for each of the equipment supplied under this contract at least 3 months before the scheduled erection of the concerned equipment / component or along with supply of concerned equipment / component whichever is earlier.
- n) Document approval by customer under Approval category or information category shall not absolve the vendor of their contractual obligations of completing the work as per specification requirement. Any deviation from specified requirement shall be reported by the vendor in writing and require written approval. Unless any change in specified requirement has been brought out by the vendor during detail engineering in writing while submitting the document to customer for approval, approved document (with implicit deviation) will not be cited as a reason for not following the specification requirement.
- o) In case vendor submits revised drawing after approval of the corresponding drawing, any delay in approval of revised drawing shall be to vendor's account and shall not be used as a reason for extension in contract completion.

LOAD TITLE	RATING (KW)		UNIT (U)/STN (S)	Nos.		VOLTAGE CODE*	FEEDER CODE**	EMER. LOAD (Y)	CONT.(C)/INTT.(I)	STARTING TIME >5 SEC (Y)	LOCATION	BOARD NO.	CABLE		BLOCK CABLE DRG. No.	CONTROL CODE	REMARKS	LOAD No.
	NAME PLATE	MAX. CONT. DEMAND (MCR)		RUNNING	STANDBY								SIZE CODE	NOs				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

**GYPSUM DEWATERING BUILDING ELEVATOR**

ELEVATOR MOTOR	16.5		S	1	0	D	S	-	C		Gypsum Dewatering Building Elevator Machine Room							
SPLIT AIR-CONDITIONER FOR GYPSUM DEWATERING BUILDING ELEVATOR M/C ROOM AND LIGHTING FOR ELEVATOR M/C ROOM & SHAFT AND MAINTENANCE AND INSTALLATION REQUIREMENT	7		S	1	0	D	S	-	C		Gypsum Dewatering Building Elevator Machine Room							

Note:

- 1) No other single phase or 3 phase supply shall be provided for elevator erection / operation etc.
- 2) Only two (3 phase) supply feeders per elevator shall be provided one feeder shall be dedicated to elevator motor and other 3 phase supply feeder shall be provided by BHEL for air conditioner, machine room and shaft lighting and maintenance / installation requirement. Bidder to consider CT in their scope for stepping down the voltage as per their requirement.

*Bidder to note: Feeder of indicated rating shall be provided by BHEL. If motor rating is lesser than the provided feeder rating, bidder shall provide protection against over current*

**NOTES:** 1. COLUMN 1 TO 12 & 18 SHALL BE FILLED BY THE REQUISITIONER (ORIGINATING AGENCY); REMAINING COLUMNS ARE TO BE FILLED UP BY PEM (ELECTRICAL)  
2. ABBREVIATIONS : \* VOLTAGE CODE (7):- (ac) A=11 KV, B=6.6 KV, C=3.3 KV, D=415 V, E=240 V (1 PH), F=110 V (DC): G=220 V, H=110 V, J=48 V, K=+24V, L=-24 V  
: \*\* FEEDER CODE (8):- U=UNIDIRECTIONAL STARTER, B=BI-DIRECTIONAL STARTER, S=SUPPLY FEEDER, D=SUPPLY FEEDER (CONTACTER CONTROLLED)



**LOAD DATA (ELECTRICAL)**

JOB NO.	481	ORIGINATING AGENCY		PEM (ELECTRICAL)	
PROJECT TITLE	KAHALGAON FGD	NAME	DATA FILLED UP ON		
SYSTEM / S	ELEVATORS	SIGN.	DATA ENTERED ON		
DEPTT. / SECTION	MAUX / MH	SHEET 1 OF 1	REV. 00	DE'S SIGN. & DATE	Page 22 of 22