



# भारत हेवी इलेक्ट्रिकल्स लिमिटेड

(भारत सरकार का उपक्रम)

## BHARAT HEAVY ELECTRICALS LIMITED

(A Govt. of India Undertaking)

TCN - 03

Ref: PSER:SCT:MUZ-M1237:TCN-03

Date: 02-09-2011

Sub	Tender change notice (TCN) 03.	
Job	Design, engineering, manufacturing, supply, erection, Testing, commissioning etc of TG hall EOT Crane for 2x195 MW KBUNL, Muzaffarpur TPS, Bihar.	
Ref	1.0	Tender no PSER:SCT: MUZ-M1237:11.
	2.0	BHEL's NIT, vide reference no PSER:SCT:MUZ-M1237:2482, dated 09-08-11.
	3.0	BHEL's TCN-01, vide reference no PSER:SCT:MUZ-M1237:TCN-01, dated 23-08-2011.
	4.0	BHEL's TCN-02, vide reference no PSER:SCT:MUZ-M1237:TCN-02, dated 29-08-2011.
	5.0	All other pertinent issues till date.

With reference to above, following points/ documents, relevant to tender, may please be noted and complied with while submitting offer.

- 1.0 Specification no. PE-TS-358-501-A001 of Volume-IF of the tender document shall be superseded by new version of Project Specific Technical Specification no. PE-TS-358-501-A001 as per enclosed Annexure-A
- 2.0 Drawing for 'Stator Handling Arrangement' as per enclosed Annexure-B.
- 3.0 Revised 'No deviation certificate' as per enclosed Annexure-2. Bidder shall submit no deviation certificate as per enclosed format only.
- 4.0 All other terms & conditions shall remain unchanged.

In case offer has already been sent, bidder may take back the offer & submit new offer or submit supplementary offer.

Thanking you,

Yours faithfully,  
for BHARAT HEAVY ELECTRICALS LTD

ENGR(SCT)

Encl

1.0 As above.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)

POWER SECTOR EASTERN REGION, DJ-9/1, SECTOR-II, SALT LAKE CITY, KOLKATA - 700 091

फैक्स/Fax : (033) 23211960

फोन/Phone : बोर्ड/EPABX : 23211691, 23211798, 23211796

**FORMAT FOR NO DEVIATION CERTIFICATE**  
**(To be submitted in the bidder's letter head)**

BHARAT HEAVY ELECTRICALS LIMITED,  
Power Sector - Eastern Region,  
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,  
Kolkata – 700 091

Sub	No Deviation Certificate.	
Job	Design, engineering, manufacturing, supply, erection, Testing, commissioning etc of TG hall EOT Crane for 2x195 MW KBUNL, Muzaffarpur TPS, Bihar.	
Ref	1.0	Tender no PSER:SCT: MUZ-M1237:11.
	2.0	BHEL's NIT, vide reference no PSER:SCT:MUZ-M1237:2482, dated 09-08-2011.
	3.0	BHEL's TCN-01, vide reference no PSER:SCT:MUZ-M1237:TCN-01, dated 23-08-2011.
	4.0	BHEL's TCN-02, vide reference no PSER:SCT:MUZ-M1237:TCN-02, dated 29-08-2011.
	5.0	BHEL's TCN-03, vide reference no PSER:SCT:MUZ-M1237:TCN-03, dated 02-09-2011
	6.0	All other pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)

**KANTI BIJLEE UTPADAN NIGAM LIMITED**  
(A JOINT VENTURE COMPANY OF NTPC AND BSEB)

**2 X 195 MW MUZAFFARPUR THERMAL POWER PROJECT**  
**STAGE II**

**VOLUME - II B**

**PROJECT SPECIFIC TECHNICAL SPECIFICATION**


**FOR**

**DOUBLE GIRDER EOT CRANES ABOVE 50T CAPACITY**  
**(TG HALL EOT CRANES)**

**SPECIFICATION NO:- PE-TS-358-501-A001**



**BHARAT HEAVY ELECTRICALS LIMITED**  
**POWER GROUP**  
**PROJECT ENGINEERING MANAGEMENT**  
**NEW DELHI (INDIA)**

	<b>Title</b> <b>TECHNICAL SPECIFICATION FOR</b> <b>TG HALL 125/25 T (DOUBLE GIRDER)</b> <b>EOT CRANE</b> <b>2 X 195 MW Muzaffarpur TPP – Stage II,</b>	Specification no.: PE-TS-358-501-A001
		Rev. 00
		Date: April 2011
		Sheet 1 of 1

### INDEX

S.N.	DESCRIPTION	PAGES
1.0	<i>Annexure – 1 (documents required with offer)</i>	1
2.0	<i>Project Information</i>	1
3.0	Specific Confirmation	3
4.0	Technical Data Sheet	13
5.0	Technical requirement (Annexure-II)	10
6.0	List of Mandatory Spares	1
7.0	Painting Specification	7
8.0	Crane Clearance Diagram Drg. No (PE-DG-358-501-A001) Rev 00	1

Note:

- 1.0 Data Sheet, technical requirement (annexure-II) and painting specification attached with Technical Specification PE-TS-358-501-A001 will be applicable for this Project. All other technical specification will be as per Standard Technical Specification no. PE-TS-STD-501-A001 (Rev 03). **In case of conflict between Technical data sheet and Technical requirements (annexure – II), the Technical requirements (Annexure-II) would be followed.**

### Annexure-1

#### **VENDOR HAS TO SUBMIT ONLY FOLLOWOING DOCUMENTS ALONG WITH THE OFFER, FOR TECHNICAL EVALUATION OF THE BID:-**

- 1.0 Specific confirmation / Comments from the bidder as per BHEL Format.
- 2.0 'NO DEVIATION CERTIFICATE' – Clearly mentioning that bidder has considered 'No - Deviation' from the technical specification provided by BHEL.

OR

DEVIATION Sheet, indicating clause wise technical deviation, if any

- 3.0 Un-price format, duly mentioned 'Quoted' against each Sl. no. below each column.

Note1:- Any other standard document/ details furnished by the bidder i.e. Data sheet / Crane clearance diagram/ GA Drawing/ QAP etc. shall not be taken in to consideration for evaluation.

Note 2:- Bidder to note that if bidder did not submit the document mentioned in Sl. No. 1.0, 2.0, and 3.0 along with their offer then their offer is liable to be rejected.

# 2X195MW MUZAFFARPUR TPP

## SALIENT FEATURES OF SITE

Location	Kanti Village, Muzaffarpur District, Bihar
Nearest Railway Station	Kanti Railway Station at a distance of 13 km from Muzaffarpur
Site Elevation	57 m from Mean Sea Level
Access Road	Muzaffarpur-Motihari section of NH. No28
Nearest Airport/ Airstrip	Patna
Latitude of site	26° 11' 40" North
Longitude of site	85° 18' 13" East
Average Annual Rainfall	1233.44 mm
Annual Mean Max Temperature	44 °C
Annual Mean Min Temperature	06 °C
Water	Burhi Gandak
Languages Spoken in Region	Hindi
Calorific Value	3500 Kcal/Kg

SPECIFIC CONFIRMATION / COMMENTS REQUIRED FROM BIDDER		
	<b>TITLE: Double Girder EOT Cranes above 50T and up to 150T capacity (For TG Hall)</b>	<b>SPECIFICATION: PE-TS-358-501-A001</b>
	<b>PROJECT: 2 X 195 MW Muzaffarpur TPP - Stage II</b>	<b>VOLUME-II B      SECTION-C      REVISION:00</b>
		<b>DATE: April 2011      No. of SHEETS: 3</b>
S.N.	DESCRIPTION	REPLY / COMMENTS BY BIDDER
1.00	MECHANICAL	
1.01	Bidder to confirm that the <b>Data sheet -A / B attached along with Technical Specification No. PE-TS-STD-501-A001 Rev. 03 and Data sheet A i.e Differences in Technical data sheet w r t Standard technical data sheet attached in Project Specific Technical Specification PE-TS-358-501-A001</b> are acceptable without any deviation. <b>Bidder to confirm the same.</b>	CONFIRMED / NOT CONFIRMED
1.02	In case of any deviation, the same has been furnished in the separate Deviation schedule attached along with the Technical Specification. Bidder to note that deviation mentioned elsewhere will not be taken cognizance of in any case. <b>Bidder to confirm the same.</b>	CONFIRMED / NOT CONFIRMED
1.03	Bidder to confirm that there is no deviation from the QAP attached along with the Standard Technical Specification (PE-TS-STD-501-A002 Rev. 03) . Further, QAP for cranes is subject to customer approval during contract execution stage. In case of any additiona test required to be carried out on any of the crane component, if commented by customer, will have to be complied by bidder without any commercial implication. <b>Bidder to confirm</b>	CONFIRMED / NOT CONFIRMED
1.04	Bidder to confirm that there is no deviation from the Crane Clearance Diagram for TG Hall EOT Crane (PE- DG -358-501-A001 Rev 00) attached with the Project Specific Technical Specification (PE-TS-358-501-A001). <b>Bidder to specifically note that in no case any deviation from the Crane Clearance diagrams given by BHEL shall be accepted. Bidder to confirm the same.</b>	CONFIRMED / NOT CONFIRMED

1.05	Bidder to confirm that there is no deviation from the makes of various sub vendors items as given in annexure-I "Makes of Sub-vendors Items" , volume II-B, section-C of Standard Technical Specification (PE-TS-STD-501-A001 Rev. 03). <b>Bidder shall confirm the compliance</b>	CONFIRMED / NOT CONFIRMED
1.06	The material offered is equal or better in grade than specified. <b>Bidder shall confirm the compliance</b>	CONFIRMED / NOT CONFIRMED
1.07	Bidder to note and confirm that there will be no price implication for variation in Span, Lift and Baylength upto $\pm 500$ mm. <b>Bidder to confirm</b>	CONFIRMED / NOT CONFIRMED
1.08	Bush as a antifriction bearing shall not be used. <b>Bidder shall confirm the compliance</b>	CONFIRMED / NOT CONFIRMED
1.09	<b>Bidder to confirm</b> the compliance to the attached Painting Specification and Color Coding Procedure. ( Annexure B & C)	CONFIRMED / NOT CONFIRMED
1.10	Bidder to confirm that in case of award of order, <b>Hook drawing</b> shall be submitted to BHEL within one week of receiving the LOI. Bidder also to submit Unpriced Purchase Order copy of Hook within 15 days from LOI . <b>Bidder to confirm</b>	CONFIRMED / NOT CONFIRMED
1.11	Bidder to confirm that in case of award of order, Motor Sizing calculations shall be submitted within 15 days time of receiving the LOI by the bidder. <b>Bidder to confirm the same.</b>	CONFIRMED / NOT CONFIRMED
<b>2.00</b>	<b>ELECTRICALS</b>	
<b>2.01</b>	<b>CABLES</b>	
a	All CONTROL AND POWER cables shall be as per BHEL specification. <b>Bidder shall confirm the compliance</b>	CONFIRMED / NOT CONFIRMED
b	Cable required between isolating switch / change over switch and DSL included in the scope. <b>Bidder to confirm the same.</b>	CONFIRMED / NOT CONFIRMED
<b>2.02</b>	<b>MOTORS</b>	
a	Class of insulation of Sq. cage motors shall be "F" and the temperature rise to limited to class "B" . <b>Bidder shall confirm the compliance</b>	CONFIRMED / NOT CONFIRMED

b	Motor size shall be subjected to the approval of motor calculation. <b>Bidder shall confirm the compliance</b>	CONFIRMED / NOT CONFIRMED
c	The successful bidder shall submit the data sheet -C of LV motors and power & control cables during detailed engineering and the same is subjected to customer approval without any cost implication on account of the same. <b>Bidder shall confirm the compliance</b>	CONFIRMED / NOT CONFIRMED
d	Bidder to confirm that there is no technical deviation on "Electrical portion of Technical specification" and "Data sheet of Electrical portion". <b>Bidder to confirm the same.</b>	CONFIRMED / NOT CONFIRMED



**TECHNICAL SPECIFICATION  
FOR DOUBLE GIRDER EOT CRANES  
2 X 195 MW MUZAFFARPUR TPP  
DATA SHEET A  
(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 1 of 13

**DATA SHEET FOR TG HALL EOT CRANE WITH VVVF DRIVES**

\* Information's are to be furnished by bidder during contract stage

Sr. No.		DESCRIPTION	TECHNICAL PARTICULARS
1.0.0		General	
1.1.0		Name of manufacturer	*
	a.	EOT Crane	*
	b.	Crane motors	*
	c.	Runway conductors	*
1.2.0		Weight of equipments	
	a.	Bridge assembly	*
	b.	Trolley assembly	*
	c.	Total crane weight	*
	d.	Total weight of the gantry rail	*
	e.	Total weight of DSL	*
	f.	Total weight of all the equipments under this specification	*
1.3.0		Design, fabrication and testing of the crane confirm to standard / code number	IS: 3177-1999/800/807
1.4.0		Number of cranes	Two (2) nos. 125/25 T
1.5.0		Crane classification	Mechanism Class: M5 <b>Electrical services: M7 of IS 3177.</b>
1.6.0		Suitable for outdoor or indoor duty	Indoor
1.7.0		Capacity and lift	
1.7.1		Main hoist	
	a.	Rated SWC – tonnes	<b>125 T</b>
	b.	Test load SWC – tonnes	Rated SWC and over load test : 125% of SWC
1.7.2		Aux. hoists	



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 2 of 13

	a.	Rated SWC – tonnes	<b>25T</b>	
	b.	Test load SWC – tonnes	Rated SWC and over load test : 125% of SWC	
<b>1.8.0</b>		<b>Span</b>	<b>As per crane clearance diagram</b>	
<b>1.9.0</b>		<b>Operation from</b>	Cabin + Pendant Push Button + RADIO REMOTE CONTROL	
<b>2.00</b>		<b>CRANE PERFORMANCE</b>		
<b>2.1.0</b>		Crane speed with full load	<b>Full speed M/Min</b>	<b>Creep speed M/Min</b>
	a.	Main hoist	<b>1.60</b>	10% to 100%of main speed ( thru' VVVF drives)
	b.	Aux. hoist	<b>7.50</b>	10% to 100%of main speed ( thru' VVVF drives)
	c.	Trolley travel (CT)	<b>15.0</b>	10% to 100%of main speed ( thru' VVVF drives)
	d.	Longitudinal bridge travel (LT)	<b>30.0</b>	10% to 100%of main speed ( thru' VVVF drives)
<b>2.2.0</b>		Acceleration values	LT motion (bridge travel)	CT motion (trolley travel)
			As per IS: 3177	As per IS: 3177
<b>2.3.0</b>		<b>Lift in Metres</b>		
	a.	Main Hoist	<b>As per Crane clearance diagram</b>	
	b.	Aux Hoist	<b>As per Crane clearance diagram</b>	
<b>2.4.0</b>		Hook Approaches		
	a.	Main hook (cabin end)	<b>As per Crane clearance diagram</b>	
	b.	Aux. Hook (cabin-end)	<b>As per Crane clearance diagram</b>	
	c.	Main hook (other end)	<b>As per Crane clearance diagram</b>	
	d.	Aux. Hook (other end)	<b>As per Crane clearance diagram</b>	
<b>2.5.0</b>		<b>Hand Rail Pipes</b>	32 mm NB Medium class of IS: 1161 having top and bottom rail at height of 1100 mm and 600 mm and vertical post spacing not exceeding 1500 mm with provision of kick plate (100 mm high and 6mm thick), <b>(Access walkways of not less than 800mm with hand-railing of height of 1100 mm along the both side of bridge girder and cross over walkways)</b>	
<b>3.0.0</b>		<b>COMPONENT DETAILS</b>		
<b>3.1.0</b>		<b>Trolley</b>		



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 3 of 13

	a.	Type	Fabricated	
	b.	Method of fabrication	Fusion welded	
	c.	Material	IS: 2062 Gr. A up to 20mm thickness, Grade B Normalized for thickness above 20mm. High steel alloy steel confirming to IS: 8500 is also acceptable.	
	d.	Centre to centre distance of wheels (on the same rails)	*	
	e.	Whether jacking pads for lifting trolley provided or not	Yes	
<b>3.2.0</b>		<b>Rope drums</b>	<b>Main hoist</b>	<b>Aux. Hoist</b>
	a.	Dimensions in mm length and diameter (PCD)	*	*
	b.	Material (Indicate IS)	Seamless pipe ASTM -106 or fabricated Fe410w IS: 2062 & stress relieved	
	c.	Flange / flangeless	Flanged	
	d.	Numbers provided	One for each hoist	
	e.	Number of grooves	*	*
	f.	Type of grooves	Identical Right hand and Left hand	
	g.	Diameter on bottom of grooves	During detailed engineering	During detailed engineering
<b>3.3.0</b>		<b>Rope details</b>		
	a.	Construction	Extra flexible plough steel , 6 x 36 / 6 x 37 construction	
	b.	Grade	During detailed engineering	
	c.	Standard conforming to	IS: 2266	
	d.	Diameter in mm	*	*
	e.	Breaking strength	*	*
	f.	Tensile designation	*	*
	g.	Factor of safety	5.25 as per IS	5.25 as per IS
	h.	Type of core	Fibre	Fibre
	i.	Number of falls	*	Min. 4
	j.	Length of rope	*	*
<b>3.4.0</b>		<b>Sheaves details</b>	<b>Main hoist</b>	<b>Aux. Hoist</b>
	a.	Material	Fe 410 WA IS: 2062 Gr. A or B/ CS Gr. 280-520 IS: 1030	



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 4 of 13

	b.	Diameter of main sheaves in mm on Root	*	*		
	c.	Diameter of Equalizing sheaves (in mm) on Root	Should not be less 62% of calculated main sheave diameter	Should not be less 62% of calculated main sheave diameter		
	d.	Type of guards provided	Fabricated from Sheet steel			
<b>3.5.0</b>		<b>COUPLINGS &amp; SHAFTING</b>				
<b>3.5.1</b>		Coupling details (between motor and gear box)	Main hoist	Aux. Hoist	Cross Travel	Long Travel
	a.	Type	Flexible geared Type			
	b.	Size & Torque rating	*			
	c.	Guards and enclosures	Provided			
<b>3.5.2</b>		Coupling details (between gear box and wheels)	Cross Travel (CT)		Long Travel (LT)	
	a.	Type	Flexible geared type			
	b.	Size & Torque rating	*			
	c.	Guards and enclosures provided	Yes			
<b>3.5.3</b>		Coupling details (between gear box and rope drum)	Main hoist		Aux. Hoist	
	a.	Type	Flexible Built-in gear couplings			
	b.	Size	*			
	c.	Guards and enclosures provided	Yes			
<b>3.5.4</b>		<b>Shafting (Output)</b>	<b>Cross Travel</b>		<b>Long Travel</b>	
	a.	Diameter in mm	*		*	
	b.	Factor of Safety	As per IS: 3177-1999			
	c.	Number of support bearings	*		*	
	d.	Type of support bearing	*		*	
	e.	Arrangement of lubrication	Group lubrication			
	f.	Type of lubricant	Grease			
	g.	Max unsupported length of shaft in mm	*		*	



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 5 of 13

<b>3.6.0</b>		<b>Gear box details</b>				
<b>3.6.1</b>		<b>Hoist Motions</b>	<b>MH</b>	<b>MH Micro</b>	<b>AH</b>	<b>AH micro</b>
	a.	Type of mounting of gear box	Horizontal / Vertical			
	b.	Classification	Suitable for M5 duty			
	c.	Total number of reductions	3	NA	3	NA
	d.	Type of gears	Helical	NA	Helical	NA
	e.	Reduction ratio	*			
	f.	Type of lubrication (grease / splash / pump lubrication)	Splash Lubrication			
	g.	Hardness (BHN) – gear	*			
	h.	Hardness (BHN) – pinion	*			
	i.	Difference in Gear and pinion hardness	Min 20 BHN			
	j.	Materials (gear/pinions)	Main Gears En 9/ 55C8/ IS2707 Gr. 1 or 2 Pinions En 19/ EN 24. Hardness conforming to IS: 3177			
	k.	Castings	Fabricated Fe 410w IS: 2062 & stress relieved			
	l.	Noise level	85 db	85 db (VVVF)	85 db	85 db(VVVF)
	m.	Standard conforming to	IS: 4460 / AGMA			
<b>3.6.2</b>		<b>Travel Motions</b>	<b>CT</b>	<b>CT micro (VVVF)</b>	<b>LT</b>	<b>LT micro(VVVF)</b>
	a.	Type of mounting gear box	Vertical			
	b.	Classification	M5 duty			
	c.	Total number of reduction	3	NA	3	NA
	d.	Type of gears	Helical	NA	Helical	NA
	e.	Reduction ratio	*	NA	*	NA
	f.	Type of lubrication (grease / splash / pump lubrication)	Splash Lubrication			
	g.	Hardness (BHN) – gear	*			
	h.	Hardness (BHN) – pinion	*			



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 6 of 13

	i.	Difference in Gear and pinion hardness	Min 20 BHN	
	j.	Materials (gear / pinions)	Main Gears En 9/ 55C8/ IS2707 Gr. 1 or 2 Pinions En 19/ EN 24. Hardness conforming to IS: 3177	
	k.	Castings	Fabricated Fe 410w IS: 2062 & stress relieved	
	l.	Standard conforming to	IS: 4460 / AGMA	
<b>3.7.0</b>		<b>Wheels details</b>	<b>Cross travel</b>	<b>Long travel</b>
	a.	Material	C 55 Mn 75 IS:1570 / EN 9 (55 C 8)/IS:2707 Gr.3	
	b.	Hardness	300 – 350 BHN	
	c.	Depth of hardness	10 mm (min)	
	d.	Tread diameter in mm	*	*
	e.	Tread width in mm	*	*
	f.	Process of hardening	Volume hardening	
	g.	Type	Double flanged straight tread	
	h.	Numbers provided	4 nos.	8 nos.
	i.	Specification conforming to	IS: 3177	
	j.	Arrangement of lubrication	Group Lubrication	
<b>3.8.0</b>		<b>Lifting hooks</b>	<b>MH</b>	<b>AH</b>
	a.	Type	Ramshorn ( as per IS:5749)	Shank Type as per IS 15560
	b.	Material	EN 3A-BS 970 Class 2 IS: 1875	
	c.	Standard conforming to	IS: 5749	IS: 15560
	d.	Hook can rotate	Yes	
	e.	Safety latch on hook provided	Yes	
	f.	Locking device on swivelling hook required or not	Provided	
<b>3.9.0</b>		<b>Buffers</b>	<b>Cross travel</b>	<b>Long travel</b>
	a.	Type	Spring loaded type. To be designed to bring the loaded crane to rest from speed of 50% of the rated speed. (to be fitted to each end of carriage assembly and crab.)	
	b.	Numbers provided	4	4
	c.	Details of end stop	Fabricated Fe 410w IS: 2062	



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 7 of 13

3.10.0	Brakes					
3.10.1	Hoist Motions	MH	MH micro(VVVF)	AH	AH micro (VVVF)	
a.	Type of brake (ac / dc / thruster)	AC Electro-Hydraulic Thruster operated				
b.	Diameter of brake in mm	*	NA	*	NA	
c.	Torque rating Kg. M	*				
d.	Number provided per motor	2				
e.	Braking capacity	150%				
f.	Braking torque actually required	*				
g.	Material					
	• Brake liners	Ferodo liners				
	• Drum	CS IS : 1030 / CL 4 IS : 1875				
	• Springs	As per manufacturers standard				
h.	Braking distance in mm	*	NA	*	NA	
3.10.2	Travel Motions	CT	CT micro	LT	LT micro	
a.	Type of brake (ac / dc / thruster)	AC Electro-Hydraulic Thruster operated				
b.	Dia of brake in mm	*	NA	*	NA	
c.	Torque rating Kg.M	*				
d.	Number provided per motor	2				
e.	Braking capacity	125%				
f.	Braking torque actually required	*				
g.	Material					
	• Brake liners	Ferodo liners				
	• Drum	CS IS : 1030 / CL4 IS : 1875				
	• Springs	As per manufacturers standard				
	• Thrusters	*				
h.	Braking distance in mm	*	NA	*	NA	
3.11.0	Drive system for hoisting					



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 8 of 13

	a.	Arrangement of drive from motor to rope drum (main)	Through geared coupling and gear box				
	b.	Arrangement of drive from motor to rope drum (creep speed)	Through VVVF Drive				
<b>3.12.0</b>		<b>Bearings</b>	<b>Crane hook</b>	<b>Trolley wheels</b>	<b>Rope drum</b>	<b>Gear box</b>	<b>Any other assembly</b>
	a.	Type	Antifriction ball / roller bearings				
	b.	Number provided for each	As per assembly requirements				
	c.	Method of lubrication	Centralised Grease lubrication with hand operated grease pump for all bearings.				
	d.	Bearing life	10,000 working hours.				
<b>3.13.0</b>		<b>Bridge girder</b>					
	a.	Type & Quantity	Box type – 2 nos. Material: IS 2062 Gr. A / B				
			Trolley stops of spring type to be mounted independently on bridge rails to prevent trolley from running off.				
	b.	Size	*				
	c.	Vertical Deflection	Span / 900				
	d.	Type of connection to end carriage	By fitted bolts				
	e.	Width	*				
	f.	Length	*				
<b>3.14.0</b>		<b>Rails</b>					
	a.	Type / section	Rails sections as per IS: 3443 Grade 50 C 12. Joint to be butt-welded by thermit welding & fusion welding .(CR-100)				
	b.	Standard conforming to	IS: 3443				
	c.	Weight per metre	*				
	d.	Material	Grade 50 C12, as per IS 3443				
	e.	Top width in mm	*				
	f.	Height in mm	*				
<b>3.15.0</b>		<b>Type of platform required on the bridge</b>	Chequered plate platform 6mm thick as per IS : 3502				
	a.	Position of access point	From cabin				
	b.	Emergency escape	Rung Ladder at ends				



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 9 of 13

	c.	Type of access platform to cabin	By Rung Ladder			
	d.	Length	Full span length			
	e.	Provided on both side	Yes			
	f.	Width of platform	*On panel side: During detailed Engineering *On drive end side: During detailed Engineering (Min. 750mm clear space from electrical panels / equipments from the trolley on panel side and Min. 750 mm on drive end side from the trolley on drive end side)			
			<b>A distinct type alarm with conspicuous warning lights on either side of the crane bridge to indicate overloading of crane.</b>			
<b>3.16.0</b>		<b>Type of operators cabin</b>				
	a.	Type of construction	Open type to be located at B-row column.			
	b.	Area and minimum clear height	2500/1850 mm with a head room of 2000mm.			
	c.	Warning Gong	Foot operated Brass gong suspended outside the cabin and operated from inside. Suitable for 240 V AC of noise level 95 dBA at 3.5 m			
	d.	Seating arrangement	Revolving type chair			
	e.	Position of controllers	In front / side of operator's chair			
<b>3.17.0</b>		<b>End carriage span (wheel base)</b>	As per IS 807 (latest edition)			
<b>3.18.0</b>		<b>Motors</b>				
<b>3.18.1</b>		<b>Hoist Motions</b>	<b>MH</b>	<b>MH micro</b>	<b>AH</b>	<b>AH micro</b>
	a.	Type	SC, suitable for Inverter duty as per IS 325, IS 3177.	NA	SC, suitable for Inverter duty, as per IS 325, IS 3177.	NA
	b.	Enclosure	TEFC	NA	TEFC	NA
	c.	Numbers furnished	One per motion			
	d.	Voltage, phase and frequency	415V $\pm$ 10%, 3 Ph, 50 Hz $\pm$ 5% Combined voltage & frequency variation= 10% absolute			
	e.	Class of protection	IP – 55			



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 10 of 13

	f.	Rated capacity (KW)	Selected motor rating should have minimum margin of 15% over maximum continuous load demand including voltage and frequency variation, temperature rise and other factor. Motor nameplate rating at 50 °C shall have at least 15% margin over the input power requirement of driven equipment at rated duty point.			
	g.	Duration factor/duty	40 % CDF / S-4			
	h.	Speed (rpm)	*			
	i.	Class of insulation	Class 'F' for sq. cage motors with temp rise limited to that of class B			
	j.	Number of starts/ hour	150 starts / hr			
	k.	Contactors for motor	*			
	l.	Overload protection for motors provided	Yes			
	m.	Space heater requirements	For motors of rating 30 KW and above			
<b>3.18.2</b>		<b>Travel Motions</b>	<b>CT</b>	<b>CT micro</b>	<b>LT</b>	<b>LT micro</b>
	a.	Type	SC, suitable for Inverter duty	NA	SC, suitable for Inverter duty	NA
	b.	Enclosure	TEFC	NA	TEFC	NA
	c.	Numbers furnished	1	NA	2	NA
	d.	Voltage, phase and frequency	415V $\pm$ 10%, 3 Ph, 50 Hz $\pm$ 5% Combined voltage & frequency variation = 10% absolute			
	e.	Class of protection	IP – 55			
	f.	Rated capacity (KW)	Selected motor rating should have minimum margin of 15% over maximum continuous load demand including voltage and frequency variation, temperature rise and other factor. Motor nameplate rating at 50 °C shall have at least 15% margin over the input power requirement of driven equipment at rated duty point.			
	g.	Duration factor/duty	40 % CDF / S-4			
	h.	Speed (rpm)	*			
	i.	Class of insulation	Class 'F' for sq. cage motors with temp rise limited to that of class B			
	j.	Number of starts/ hour	150 starts / hr			
	k.	Contactors for motor	*			



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 11 of 13

	i.	Overload protection for motors provided	Yes			
<b>3.18.3</b>		Space heater requirement	For motors of rating 30 KW and above			
<b>3.19.0</b>		<b>Limit switches</b>	<b>Main hoist</b>	<b>Aux. hoist</b>	<b>Cross Travel</b>	<b>Long Travel</b>
	a.	Type	Rotary gear + Gravity		Two way lever type	
	b.	Number provided	1 + 1	1 + 1	1	1
	c.	Rating of contacts	*			
	d.	Material of contacts	Double break Silver Cadmium			
	e.	Control voltage	110V			
<b>3.20.0</b>		<b>Power conductors (DSL)</b>				
	a.	Type	LT: PVC shrouded conductor bus bar. CT: Festoon Cable arrangement			
	b.	Size	*			
	c.	Material	*			
	d.	Numbers	*			
	e.	Length	Suitable for bay length			
			(voltage drop should not exceed 2% , along the extreme ends of Bay length and from along the power cable from Isolator switch to DSL)			
<b>3.21.0</b>		<b>Protective Panel</b>				
	a.	Make	OEM			
	b.	Size	*			
	c.	Material	Sheet steel 2 mm size			
	d.	Numbers and location	One number located on Plate form			
<b>3.22.0</b>		<b>Control panel</b>				
	a.	Make	OEM			
	b.	Size	*			
	c.	Material	Rolled sheet steel 2mm size			
	d.	Numbers and location	One each for MH, AH, CT and LT located on bridge platform			
	e.	Degree of protection	IP 54			
<b>3.23.0</b>		<b>Master Controllers</b>	<b>Main Hoist</b>	<b>Aux Hoist</b>	<b>Cross Travel</b>	<b>Long Travel</b>



**TECHNICAL SPECIFICATION**  
**FOR DOUBLE GIRDER EOT CRANES**  
**2 X 195 MW MUZAFFARPUR TPP**  
**DATA SHEET A**  
**(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 12 of 13

	a.	Number of steps	5	5	4	4
	b.	Voltage & current rating	10 A, 415 V			
	c.	Type	Heavy duty type having DOP IP54			
	a.	Speed control	Thru' VVVF with minimum 6 pulse design			
	b.	Starting torque of VVVF	Up to 400 % typical with / without encoder			
	c.	Starting current	Less than 150 % of rated torque.			
	d.	Temperature	VVVF system shall be capable of withstanding upto 50 ° C without derating.			
<b>3.25.0</b>		<b>Additional Operation</b>	<b>Through Radio remote control</b>			
	a.	Type	Microprocessor based digital technology			
	b.	Communication	Should communicate up to 100 m approx.			
	c.	Operation	Main controls thru' single joystick movement or double joystick movement type stepped control with spring return. The Micro control should be toggle switch or push control type.			
	d.	Local unit	One local unit ( receiver side ) with selector switch for operation either from cabin or radio remote unit.			
<b>3.26.0</b>		<b>Cable</b>	EPR insulated, copper conductor trailing cables, as per IS: 9968, on the bridge			
	a.		Extruded PVC insulated, copper/Aluminium conductor, 1100 Volt grade power cables, this shall include cable lengths between changeover switch & DSL and isolating switch & DSL.			
	b.		<b>Extruded PVC insulated, copper conductor 1100Volt grade control cables.</b>			
	c.	Size	Min 2.5 mm <sup>2</sup> for copper 16 mm <sup>2</sup> for Aluminium	Min.	Min 2.5 mm <sup>2</sup> (Stranded minimum – 7 strands)	
	d.	Voltage grade	1100 V			
	e.	Voltage drop	Cable from main isolating switch (1.5M above operating floor) to motor terminal shall be so sized that the voltage drop does not exceed 2% of rated voltage.			
<b>3.27.0</b>		<b>Earthing</b>				
	a.	Material of earthing	G.I / Copper			
	b.	Earthing as per specification	Yes			
<b>3.28.0</b>	a.	<b>Contactors</b>	AC 4 duty for reversing application. AC 3 duty for non reversing application			
	b.	<b>Switches</b>	AC 23 for motor application, AC 22 for other application.			
	c.	<b>Fuses</b>	HRC			
	d.	<b>Overload relay</b>	Temperature compensated bi metallic with single phasing preventer.			



**TECHNICAL SPECIFICATION  
FOR DOUBLE GIRDER EOT CRANES  
2 X 195 MW MUZAFFARPUR TPP  
DATA SHEET A  
(WITH VVVF DRIVES)**

SPECIFICATION NO. PE-TS-358-501-A-001

VOLUME II - B

SECTION -D

REV. 00

DATE: A

Page 13 of 13

<b>3.29.0</b>		<b>Power supply</b>	Two (2) nos. 415 V , 3 phase, 4 wire supply at operating floor at centre of bay length with change over switch.
<b>3.30.0</b>		<b>Transformer</b>	
	a.	Quantity	2 X 100 % for Control and 1 no for Lighting
	b.	Voltage Rating	Control 415/110V, Lighting 415/0-24-240V
	c.	KVA rating	20% over loading to be considered while sizing the rating
<b>3.31.0</b>		<b>Illumination</b>	
	a.	In cabin	40W florescent tube + Bulk head fitting with 60W incandescent lamp – 1 each 2 nos. 24V - 5A - 3 pin industrial socket
	b.	Over Bridge	4 nos 100 W Bulk-head fittings with incandescent lamps and 4nos. 24V - 5A - 3 pin industrial socket
	c.	Under bridge	4 nos 250 W HPSV lamps
	d.	For inspection of crane components	One (1) portable 40 W hand lamp with min. half span length flexible cable for inspection of crane components
<b>3.32.0</b>		<b>Fire Extinguisher</b>	
	a.	Type and size	4.5 kg CO <sub>2</sub> type
	b.	Location	One in cabin and Three on bridge
<b>3.33.0</b>		<b>Ventilation</b>	One (1) no. electric fan in cabin.
<b>3.34.0</b>		<b>Whether tandem operation required</b>	<b><u>Yes.</u></b>
<b>3.35.0</b>		<b>Lifting beam and string for tandem operation</b>	<b><u>Lifting beam and Sling for Tandem operation required.( Suitable anti collision device of two cranes along with stoppers at the gable ends.), The two Cranes operating in conjunction with suitable swivelling arrangement.</u></b>

**Important Notes:**

- 1. A suitable indicating device to indicate the difference in the lifts of the two cranes, which shall be limited to 500mm shall be provided on the lifting beam.**
- 2. A suitable indicating device shall be provided in the Cabin, which indicates the difference in the lifts of the two cranes, which shall be limited to 500mm.**
- 3. Bidder shall be required to load test the lifting beams and slings at its works before dispatch of lifting beam at site, in line with customer approved Quality Plan for lifting beam during contract execution stage.**

CLAUSE NO.	TECHNICAL REQUIREMENTS		
<p><b>7.00.00</b></p> <p>7.01.00</p>	<p><b>TURBINE HALL EOT CRANE:</b></p> <p>(a) Rating</p> <p>(i) Capacity : Two (2) nos. of turbine hall EOT cranes each having a capacity with 5% margin over single heaviest piece / equipment (including lifting beam and slings etc.) to be handled in the turbine hall or 115 T whichever is higher. EOT crane capacity shall also take care of erection of generator stator by tandem operation of EOT cranes.</p> <p>(The turbine hall EOT crane/cranes shall be provided with necessary facilities such as lifting beam with swiveling arrangement and slings for erection as well as maintenance of the equipment provided in AB bay.)</p> <p>(ii) Auxiliary Hoist capacity : Not less than 25 Tonne</p> <p>(iii) Crane span (i.e. centre to centre of rail tracks) : To suit the span of turbine hall</p> <p>(iv) Total height of crane : Top most level of the crane with respect to the top of runway rail level not to exceed 4.5 m.</p> <p>(v) Main/Aux. Hook levels (above operating floor level &amp; below ground floor level) : To suit handling requirements of equipment.</p> <p>(vi) Top of rail elevation : To be confirmed by the vendor</p>		
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 64 OF 82</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS		
	<p>(vii) Approximate max. full load speeds</p> <ul style="list-style-type: none"> <li>– Main Hoist : 1.6 m/min</li> <li>– Auxilliary Hoist : 7.5 m/min.</li> <li>– Trolley travel : 15.0 m/min.</li> <li>– Crane travel : 30.0 m/min.</li> </ul> <p>(viii) Creep speed of main hook and auxiliary hook : 10% of the maximum speed</p> <p>(ix) Creep speed for cross travel and long level : 10% of the maximum speed</p> <p>(b.) Type</p> <p>Electrically operated indoor traveling type.</p> <p>(c.) Applicable codes</p> <ol style="list-style-type: none"> <li>(1.) Design and duty of crane structure, main hoist, auxiliary hoist, cross travel, long travel in accordance with class M5 of IS: 3177 (latest edition).</li> <li>(2.) All other structure of cranes in accordance with IS-807.</li> <li>(3.) Main hook Ramshorn type conforming to IS: 5749 (latest edition) and auxiliary hook shank type conforming to IS 15560 (latest edition)</li> </ol> <p>(d.) Bridge structure</p> <ol style="list-style-type: none"> <li>(1.) Vertical deflection caused by safe working load and weight of trolley in central position not to exceed 1/900 of the span.</li> <li>(2.) Trolley stops of spring type to be mounted independently on bridge rails to prevent trolley from running off.</li> </ol>		
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 65 OF 82</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS		
	<p>(e.) Buffer</p> <ol style="list-style-type: none"> <li>(1.) Suitable buffer to be fitted to each end of carriage assembly and crab.</li> <li>(2.) Buffers to be designed to bring the loaded crane to rest from a speed of 50% of the rated speed.</li> </ol> <p>(f.) End trucks, wheels and axles</p> <p>To be designed in accordance to IS: 3177 (latest edition)</p> <p>(g.) Bridge and trolley drive Mechanism</p> <ol style="list-style-type: none"> <li>(1.) One drive at each end of bridge.</li> <li>(2.) One drive for trolley drive.</li> </ol> <p>(h.) Operator's cabin and platform</p> <ol style="list-style-type: none"> <li>(1.) Open type for indoor service to be located at B-row column.</li> <li>(2.) The area of cabin to be 2500/1850 mm with a head room of 2000 mm.</li> <li>(3.) A foot operated electric warning horn of double bell type suitable for 240 V AC. of noise level 95 dBA at 3.5 m.</li> <li>(4.) One brass gong suspended outside the Cabin and operated from inside.</li> <li>(5.) A distinct type alarm with conspicuous warning lights on either side of the crane bridge to indicate overloading of crane.</li> <li>(6.) Adequate carbon dioxide gas cylinders of 4.5 Kg.</li> <li>(7.) One non oscillating ventilating fan.</li> <li>(8.) Suitable inspection cages to accommodate two persons to facilitate inspection of down shop lead.</li> <li>(9.) Access walkways of not less than 800 mm with hand railing of height of 1100 mm along the both side of bridge girder and cross over walkways.</li> </ol>		
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 66 OF 82</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS		
	<p>(i.) Drums</p> <p>To be in accordance with IS-3177 (latest edition).</p> <p>(j.) Lifting tackles</p> <p>(1.) Main hook of Ramshorn type conforming to IS: 5749 (latest edition).</p> <p>(2.) Auxiliary hook of shank type conforming to IS 15560 (latest edition).</p> <p>(3.) Wire rope of extra flexible plough steel and of 6/36 or 6/37 construction conforming to IS: 2266 (latest edition).</p> <p>(k.) Bearings and lubrication</p> <p>(1.) The type of bearings for various parts as per IS: 3177 (latest).</p> <p>(2.) Bearing life not less than 10,000 working hours.</p> <p>(3.) Centralised grease lubrication with hand operated grease pump for all bearings as per bidder's standard proven practice.</p> <p>(l.) Guarding</p> <p>(1.) Suitable guard to push forward or off the rail track any object placed across.</p> <p>(2.) Suitable guards to live electrical wirings downshop lead.</p> <p>(3.) Other guarding as per relevant standard.</p> <p>(m.) Safety</p> <p>(1.) Suitable anti-collision device of two cranes along with stoppers at both the gable ends.</p> <p>(2.) To meet the requirement of factory act.</p> <p>(n.) Runway/trolley Rails and rail joints</p> <p>Rails to be as per relevant Indian Standard and joints to be butt welded by thermit welding or fusion welding.</p>		
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 67 OF 82</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS		
	<p>(o.) Brakes</p> <p>Brakes to be as per IS 3177. The Capacity of hoisting motion brakes to be 150% of torque transmitted to the brake drum with full load and that of cross travel and long travel to be 125% of motor rated torque before deaerating.</p> <p>(p.) Common lifting beam for generator stator</p> <ul style="list-style-type: none"> <li>i. Suitable common lifting beam for lifting generator stator by means of two cranes operating in conjunction with suitable swiveling arrangement.</li> <li>ii. A suitable indicating device to indicate the difference in the lifts of the two cranes, which shall be limited to 500 mm shall be provided on the lifting beam. The level difference indication shall be visible from ground level.</li> <li>iii. A limit switch shall be provided to give alarm at both the cabins to enable the crane operators to control the level difference within 500mm.</li> </ul> <p>The bidder shall furnish the GA drawing of the beam designed and proposed to be furnished by him showing all the dimensions, constructional details, details of crane hooks to the beam etc alongwith the bid. The design calculation for the lifting beam shall be submitted for approval before taking up the fabrication.</p>		
7.02.00	<p><b>Motors</b></p> <p>Three phase Squirrel Cage Induction motors to be operated from VFD system shall be suitable for speed range and torque without exceeding temperature rise limits as specified elsewhere in this specification. These motors shall be provided with VPI insulation and insulated bearing on one side and shall be suitable for Inverter duty.</p> <p>Motors shall conform to latest revision of IS 325 ,IS 3177 and motor subsection of this specification.</p>		
7.03.00	<p><b>Controls</b></p> <ul style="list-style-type: none"> <li>i). Speed control of EOT crane shall be through Variable Voltage Variable Frequency System (VVVF) with minimum 6 (six) pulse design.</li> <li>ii) Necessary input &amp; output devices to be provided to reduce harmonics, as per IEE519, at supply side of the drive at the switchgear.</li> </ul>		
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 68 OF 82</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS		
	<p>iii) All necessary protections e.g. Input Phase Loss, Earth Fault, Over Voltage, Output Short Circuit, Load Loss, Input Transient Protection, Overload etc to be provided.</p> <p>iv) VVVF system shall be capable of generating suitable starting torque (upto 400% typical) with / without encoder, however starting current shall not exceed 150% of the rated torque.</p> <p>v) VVVF system shall be capable of withstanding upto 50 deg C ambient temp without derating</p> <p>vi) Provision for controlling the motion from operator cabin as well as remote control shall be available.</p> <p>vii). Squirrel cage Induction motor with VPI insulation shall be provided With VVVF system.</p> <p>viii) Protective Panel</p> <p>Provided with isolating switch, power contactor control and indication to switch ON/OFF power to starter panels, control and lighting transformer.</p> <p>ix) Starter Panel</p> <p>Separate VVVF system panels to be provided for CT, LT and hoist motion (main and auxiliary drives).</p> <p>a) Contactors: AC 4 duty for reversing application AC 3 duty for non-reversing application</p> <p>b) Switches: AC 23 for motor application, AC 22 for other application.</p> <p>c) Fuses: HRC</p> <p>d) Overload relay: Temperature compensated, bimetallic with single phasing preventor.</p> <p>x) Panel shall be fabricated out of 1.6 mm thick rolled sheet steel. IP 52 degree of protection. Paint shade shall be RAL 9002 for front &amp; rear and RAL 5012 for side covers. Space heaters to be provided.</p>		
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 69 OF 82</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS		
7.04.00	<p>Radio remote Control of EOT Crane:</p> <ul style="list-style-type: none"> <li>i) The equipment should have facility to control EOT crane by radio frequency based wireless remote unit. The equipment should be supplied with transmitter unit, receiver unit, encoder unit, decoder unit, interface panel, coupling system, battery unit and any other control gear if required.</li> <li>ii) The equipment should be based upon the microprocessor based digital technology with almost nil hard wiring.</li> <li>iii) The remote unit should communicate up to the distance of approximately 100 meters.</li> <li>iv) The system has to integrate with the control system of crane, which operates at 110 V AC, Single phase.</li> <li>v) The remote unit should have transmitter which can be mounted on shoulder by suitable belt. Main controls can be of single joystick movement or double joystick movement type stepped control with spring return. The Micro control should be toggle switch type or push control type.</li> <li>vi) Frequency allotment of radio remote unit from Govt. of India, Deptt. of Telecommunication or any other agency shall be the responsibility of supplier.</li> <li>vii) The transmitter and receiver unit should have its own frequency and address code with each system having its own security code so that one particular set becomes unique and there is no interference from any other remote unit device. A microprocessor should check all security codes. The processor should have its own watchdog circuit. The receiver FM band should be sufficiently narrow to allow only passing of desired frequency and valid command. Any error should shut down the system immediately.</li> <li>viii) The remote unit should have safety key to prevent any unauthorized operation. All the crane operations should stop at once the communication break down occurs.</li> <li>ix) On local unit (receiver side), the system should be provided with one selector switch so that EOT crane can be operated either from Operator cabin or radio remote unit.</li> <li>x) In case tandem operation is envisaged, a suitable selector switch shall be provided in the cabin for selection of Tandem/normal operation.</li> </ul>		
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 70 OF 82</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS		
7.05.00	<p>xi) The receiver unit along with I/O interface unit should be able to bear the vibrations and shocks encountered in normal usage of EOT crane.</p> <p>xii) The system should have very fast response time</p> <p><b>Power Supply</b></p> <p>(a) Incoming numbers: Employer shall provide two (2) numbers 415 volts, 3 phase, 4 wire supply at operating floor near A-row column at centre of bay length. Bidder shall provide a changeover switch in enclosure to receive above power supply.</p> <p>(b) Down shop Lead (DSL):</p> <p>(i) Shall conform to IS: 282 and shall be sized to</p> <ul style="list-style-type: none"> <li>- Cater to all cranes working simultaneously with 40% cyclic duration factor for load.</li> <li>- Limit voltage drop at motor terminals within 2% at extreme positions.</li> </ul> <p>(ii) DSL shall be sized with a margin of 10% over load requirement.</p> <p>(iii) Protective cover over DSL to be provided.</p> <p>(iv) Two (2) numbers isolating switches in enclosure shall be provided at extreme ends of operating floor for disconnecting supply to DSL while maintaining the crane.</p> <p>(v) DSL shall be located on 'A' -row side.</p> <p>(c) Transformers</p> <p>Dry type, with insulation class B or better. Following transformers shall be provided.</p> <p>(i) Control Transformers : 2x100%, 415V / 110V</p> <p>(ii) Lighting Transformers: One 415V/240V</p> <p>(iii) Hand lamp : One 415V/24V</p>		
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 71 OF 82</p>

CLAUSE NO.	TECHNICAL REQUIREMENTS																		
7.06.00	<p><b>Illumination</b></p> <p>HPSV lamps under the bridge. Florescent lamp over the bridge and inside the cabin.</p>																		
7.07.00	<p><b>Cables</b></p> <p>(a.) EPR insulated, copper conductor trailing cables, as per IS: 9968, on the bridge.</p> <p>(b.) Extruded PVC insulated, copper/Aluminium conductor, 1100 Volt grade power cables. This shall include cable lengths between changeover switch &amp; DSL and isolating switch &amp; DSL.</p> <p>(c.) Extruded PVC insulated, copper conductor 1100 volt grade control cables.</p>																		
7.08.00	<p><b>Mechanical overload protection</b> - to be provided for hoist mode.</p>																		
7.09.00	<p><b>Maximum Span/Depth Ratio For Girder :</b></p> <p>(a.) Plate girders : 18</p> <p>(b.) Lattice girders : 12</p>																		
7.10.00	<p><b>Materials</b></p> <table border="1" data-bbox="376 1205 1482 1912"> <tbody> <tr> <td data-bbox="376 1205 451 1402">(i)</td> <td data-bbox="456 1205 643 1402">Structural steel plates rolled section</td> <td data-bbox="647 1205 715 1402">:</td> <td data-bbox="719 1205 1482 1402">Mild steel, grade 'B' of IS 2062 in 100% killed, normalised and ultrasonically tested quality or high strength steel of IS 8500 as appropriate</td> </tr> <tr> <td data-bbox="376 1408 451 1597">(ii)</td> <td data-bbox="456 1408 643 1597">Nuts &amp; Bolts</td> <td data-bbox="647 1408 715 1597">:</td> <td data-bbox="719 1408 1482 1597">As per IS: 1363, IS: 1364 and IS: 1367. High Tension Friction grip bolts as per IS: 3757. High Tension Friction grip nuts as per IS: 6623.</td> </tr> <tr> <td data-bbox="376 1603 451 1792">(iii)</td> <td data-bbox="456 1603 643 1792">Electrodes</td> <td data-bbox="647 1603 715 1792">:</td> <td data-bbox="719 1603 1482 1792">Radiography quality, covered electrodes with heavy covering as per IS: 814 and relevant requirements of ASME Sec. IX and IIC. Bare Electrodes as per IS: 7280 and flux wire combination as per IS: 3613.</td> </tr> <tr> <td data-bbox="376 1798 451 1912">(iv)</td> <td data-bbox="456 1798 643 1912">Chequered plates</td> <td data-bbox="647 1798 715 1912">:</td> <td data-bbox="719 1798 1482 1912">IS : 3502 (Minimum 6 mm thick O/P)</td> </tr> </tbody> </table>			(i)	Structural steel plates rolled section	:	Mild steel, grade 'B' of IS 2062 in 100% killed, normalised and ultrasonically tested quality or high strength steel of IS 8500 as appropriate	(ii)	Nuts & Bolts	:	As per IS: 1363, IS: 1364 and IS: 1367. High Tension Friction grip bolts as per IS: 3757. High Tension Friction grip nuts as per IS: 6623.	(iii)	Electrodes	:	Radiography quality, covered electrodes with heavy covering as per IS: 814 and relevant requirements of ASME Sec. IX and IIC. Bare Electrodes as per IS: 7280 and flux wire combination as per IS: 3613.	(iv)	Chequered plates	:	IS : 3502 (Minimum 6 mm thick O/P)
(i)	Structural steel plates rolled section	:	Mild steel, grade 'B' of IS 2062 in 100% killed, normalised and ultrasonically tested quality or high strength steel of IS 8500 as appropriate																
(ii)	Nuts & Bolts	:	As per IS: 1363, IS: 1364 and IS: 1367. High Tension Friction grip bolts as per IS: 3757. High Tension Friction grip nuts as per IS: 6623.																
(iii)	Electrodes	:	Radiography quality, covered electrodes with heavy covering as per IS: 814 and relevant requirements of ASME Sec. IX and IIC. Bare Electrodes as per IS: 7280 and flux wire combination as per IS: 3613.																
(iv)	Chequered plates	:	IS : 3502 (Minimum 6 mm thick O/P)																
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>		<p>TECHNICAL SPECIFICATION SECTION - VI PART-B, BOOK 2 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>A-03 STEAM TURBINE AND AUXILIARY SYSTEMS</p>	<p>PAGE 72 OF 82</p>															

CLAUSE NO.	TECHNICAL REQUIREMENTS
------------	------------------------

(v)	Hand rail pipes	:	32 mm NB Medium class of IS : 1161 having top and bottom rail at height of 1050 mm and 600 mm and vertical post spacing not exceeding 1500 mm with provision of kick plate(100 mm high and 6 mm thick).
(vi)	Crane Rails	:	As per IS: 3443 Grade 50 C 12.

7.11.00

**Minimum thickness of Structure Members:**

- (c.) Load Carrying members : 8 mm
- (d.) Tubes with both ends sealed : 4.9 mm (6 SWG)
- (e.) Tubes with unsealed ends : 8 mm
- (f.) Chequered plate : 6 mm O/P

8.00.00

**PRECOMMISSIONING ACTIVITIES**

The pre-commissioning activities including some of the important checks & tests for certain major equipment/ systems are mentioned under respective equipments, although it is the Contractor's responsibility to draw up a detailed sequential & systematic list of checks / tests and various activities / procedures connected with pre-commissioning of the complete facilities with all systems, sub-systems and equipment supplied and installed by him and get the same approved by the Employer.


9.00.00


**COMMISSIONING OF FACILITIES**


Upon completion of pre-commissioning activities/test the Contractor shall initiate commissioning of facilities. During commissioning the Contractor shall carryout system checking and reliability trials on various parts of the facilities.

Contractor shall carry out these checks/tests at site to prove to the Employer that each equipment of the supply complies with requirements stipulated and is installed in accordance with requirements specified. Before the plant is put into initial operation the Contractor shall be required to conduct test to demonstrate to the Employer that each item of the plant is capable of correctly performing the functions for which it was specified and its performance, parameters etc. are as per the specified/approved values. These tests may be conducted concurrently with those required under commissioning sequence.

<b>2 x 195 MW Muzaffarpur Thermal Power Project, - TG HALL EOT CRANE</b>		
<b>LIST OF MANDATORY SPARES</b>		
<b>S.No.</b>	<b>Item</b>	<b>Quantity</b>
1	2	3
<b>A</b>	<b>MECHANICAL</b>	
1	Bearings for long travel wheels	1 set
2	Bearings for cross travel wheels	1 set
3	Bearings for Gear Boxes for each type of Hoist (both main and aux. hoist)	1 set
4	Brake Liner for all the brakes (both main and aux. hoist)	1 set
5	Hydraulic thruster for Brakes (both main and aux. hoist)	1 set
6	Oil Seals (both main and aux. hoist)	1 set
7	Brake springs for all brakes (both main and aux. hoist)	1 set
8	Wire Rope for Aux. hook	1 no.
<b>B</b>	<b>ELECTRICAL</b>	
1	Solenoid Coils for Brakes	2 sets
2	MCBs/MCCBS/Fuse links for the whole crane	1 set
3	Contactors and overload Relays for motors of EOT Cranes	1 set of each type, size & rating
4	Timers of each type, size & rating	1 set
5	Limit Switches for	
(i)	Main Hoist	1 set
(ii)	Aux. Hoist	1 set
(iii)	Cross Travel	1 set
(iv)	Long Travel	1 set
6	Master Controller for Aux. Hoist	1 set
7	VVVF Drive for MH,AH,CT&LT	1 no. of each type & rating
<b>C</b>	<b>Total price of Mandatory Spares</b>	
<b>Note:</b>		
1	"One (1) Set" and "One (1) set of each type & size" is defined as 100% requirement for one crane for the entire crane of similar size & capacity.	
	100% of total population of each type, size and rating is defined as 100% requirement for each crane.	
2	If both cranes are of same capacity, the total quantity for both cranes shall be 100% quantity required for one crane.	

CLAUSE NO.	TECHNICAL REQUIREMENTS			
<b>13.00.00</b>	<b>SPECIFICATION FOR SURFACE PREPARATION &amp; PAINTING</b>			
13.01.00	Surface preparation methods and paint/primer materials shall be of the type specified herein. If the contractor desires to use any paint/primer materials other than that specified, specific approval shall be obtained by the contractor in writing from the employer for using the substitute material.			
13.02.00	All paints shall be delivered to job site in manufacturers sealed containers. Each container shall be labelled by the manufacturer with the manufacturer's name, type of paint, batch number and colour.			
13.03.00	Unless specified otherwise, paint shall not be applied to surfaces of insulation, surfaces of stainless steel/nickel/ copper/brass/ monel/ aluminum/ hastelloy/lead/ galvanized steel items, valve stem, pump rods, shafts, gauges, bearing and contact surfaces, lined or clad surfaces.			
13.04.00	All pipelines shall be Colour coded for identification as per the NTPC Colour-coding scheme, which will be furnished to the contractor during detailed engineering..			
<b>13.05.00</b>	<b>SURFACE PREPARATION</b>			
13.05.01	All surfaces to be painted shall be thoroughly cleaned of oil, grease and other foreign matter. Surfaces shall be free of moisture and contamination from chemicals and solvents.			
13.05.02	<p>The following surface schemes are envisaged here. Depending upon requirement any one or a combination of these schemes may be used for surface preparation before application of primer.</p> <p>SP1 Solvent cleaning</p> <p>SP2 Application of rust converter (Ruskil or equivalent grade)</p> <p>SP3 Power tool cleaning</p> <p>SP4 Shot blasting (shot blasting shall be used as surface preparation method for hot worked pipes prior to application of primer)</p> <p>SP4* Shot blast cleaning/ abrasive blast cleaning to SA21/2 (near white metal) 35-50 microns</p> <p>SP5 Phosphating</p> <p>SP6 Emery sheet cleaning/Manual wire brush cleaning.</p>			
<b>13.06.00</b>	<b>APPLICATION OF PRIMER/PAINT</b>			
13.06.01	The paint/primer manufacturer's instructions covering thinning, mixing, method of application, handling and drying time shall be strictly followed and considered as part			
<b>MUZZAFFARPUR THERMAL POWER PROJECT</b> <b>STAGE-II (2X195 MW)</b> <b>MAIN PLANT PACKAGE</b>	<b>TECHNICAL SPECIFICATION</b> <b>SECTION-VI</b> <b>PART-B, BOOK-1 OF 2</b> <b>BID DOCUMENT NO.: CS-0350-108-2</b>	<b>SUB-SECTION-IIM-04</b> <b>PCP</b>	<b>PAGE</b> <b>26 OF 31</b>	

CLAUSE NO.	TECHNICAL REQUIREMENTS			
<p>13.06.02</p> <p>13.06.03</p> <p>13.06.04</p> <p>13.06.05</p> <p>13.06.06</p>	<p>of this specification. The Dry film thickness (DFT) of primer/paint shall be as specified herein.</p> <p>Surfaces prepared as per the surface preparation scheme indicated herein shall be applied with primer paint within 6 hours after preparation of surfaces.</p> <p>Where primer coat has been applied in the shop, the primer coat shall be carefully examined, cleaned and spot primed with one coat of the primer before applying intermediate and finish coats. When the primer coat has not been applied in the shop, primer coat shall be applied by brushing, rolling or spraying on the same day as the surface is prepared. Primer coat shall be applied prior to intermediate and finish coats.</p> <p>Steel surfaces that will be concealed by building walls shall be primed and finish painted before the floor is erected. Tops of structural steel members that will be covered by grating shall be primed and finish painted before the grating is permanently secured.</p> <p>Following are the Primer/painting schemes envisaged herein:</p> <p>PS3                -Zinc Chrome Primer (Alkyd base) by brush/Spray to IS104.</p> <p>PS3*               -Zinc Chrome primer (Alkyd base) by dip coat.</p> <p>PS4                -Synthetic Enamel (long oil alkyd) to IS2932.</p> <p>PS5                -Red oxide zinc phosphate to IS-12744.</p> <p>PS9                -Aluminum paint to IS 2339.</p> <p>PS9*               -Heat resistant Aluminum paint to IS-13183 Gr.-I (for temperature above 400 °C) and to IS-13183 Gr.-II (for temperature 200 °C- 400 °C)</p> <p>PS13               -Rust preventive fluid by spray, dip or brush.</p> <p>PS14               -weldable primer-Deoxaluminat or equivalent.</p> <p>PS16               -High Build Epoxy CDC mastic `15' .</p> <p>PS17               -Aliphatic Acrylic Polyurethane CDE134 ,%V=40.0(min.)</p> <p>PS18               -Epoxy based TiO2 pigmented coat</p> <p>PS19               -Epoxy based Zinc phosphate primer (92% zinc in dry film (min.), %VS=40.0(min.).</p> <p>PS20               -Epoxy based finish paint.</p> <p>All weld edge preparation for site welding shall be applied with one coat of weldable primer.</p>			
<p>MUZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION-VI PART-B, BOOK-1 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>SUB-SECTION-IIM-04 PCP</p>	<p>PAGE 27 OF 31</p>	

CLAUSE NO.	TECHNICAL REQUIREMENTS			
13.07.00	<p>For internal protection of pipes/tubes, VCI pellets shall be used at both ends after sponge testing and ends capped. VCI pellets shall not be used for SS components and composite</p>			
<p>MUZZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</p>	<p>TECHNICAL SPECIFICATION SECTION-VI PART-B, BOOK-1 OF 2 BID DOCUMENT NO.: CS-0350-108-2</p>	<p>SUB-SECTION-IIM-04 PCP</p>	<p>PAGE 28 OF 31</p>	



13.08.00 Primer/Painting Schedule

Sl. No	Description	Surface Preparation	Primer Coat			Intermediate Coat			Finish Coats			Total Min. Painting DFT (Microns)	Colour Shade	
			System	Coat	Min. DFT / coat (Microns)	System	Coat	Min. DFT/ Coat (Microns)	System	Coat	Min. DFT/ Coat (Microns)			
1.	All insulated Pippings, fittings/ components, Pipe clamps, Vessels/Tanks, Equipments etc.	SP3/SP4	PS 5	2	25	-	-	-	PS 4	1	25	75	As per NTPC Colour shade/ coding scheme	
2.	All un-insulated Piping, fittings/ components, Pipe clamps, Vessels/Tanks, Equipments etc.	Design temperature <95 °C	SP3/SP4	PS 5	2	25	-	-	-	PS 4	3	35		155
		Design temperature 95 °C-200 °C	SP3/SP4	PS 9	1	20				PS 9	1	20		40
		Design temperature > 200 °C	SP3/SP4	PS9*	1	20	-	-	-	PS9*	1	20		40
3	Constant Load Hanger (CLH), Variable Load Hanger (VLH) and other supports	SP4*	PS19	1	40	-	-	-	PS17	1	30	70		
4.	Valves													


	<b>Cast</b>	Design temperature <95 °C	SP1/SP2/SP3	PS4/PS9	1	40	Polyamid Epoxy	1	100	PS 17	1	40	180
		Design temperature 95 °C-200 °C	SP1/SP2/SP3	PS9	1	20	-	-	-	PS9	1	20	40
		Design temperature > 200 °C	SP1/SP2/SP3	PS9*	1	20				PS9*	1	20	40
	<b>Forged</b>	Design temperature <95 °C	SP1 & SP5	PS13 / Phenolic fortified alkyd	1	40	Polyamid Epoxy	1	100	PS17	1	40	180
		Design temperature 95 °C-200 °C	SP1 & SP5	PS9	1	20	-	-	-	PS9	1	20	40
		Design temperature > 200 °C	SP1 & SP5	PS9*	1	20				PS9*	1	20	40
5.	All Structural Steel components	Outside TG building and in SG envelope	SP4*	Inorganic Ethyl Zinc Silicate	1	75	PS18	1	75	a))Epoxy coat b)Final coat of paint PS17	2 1	35 30	250

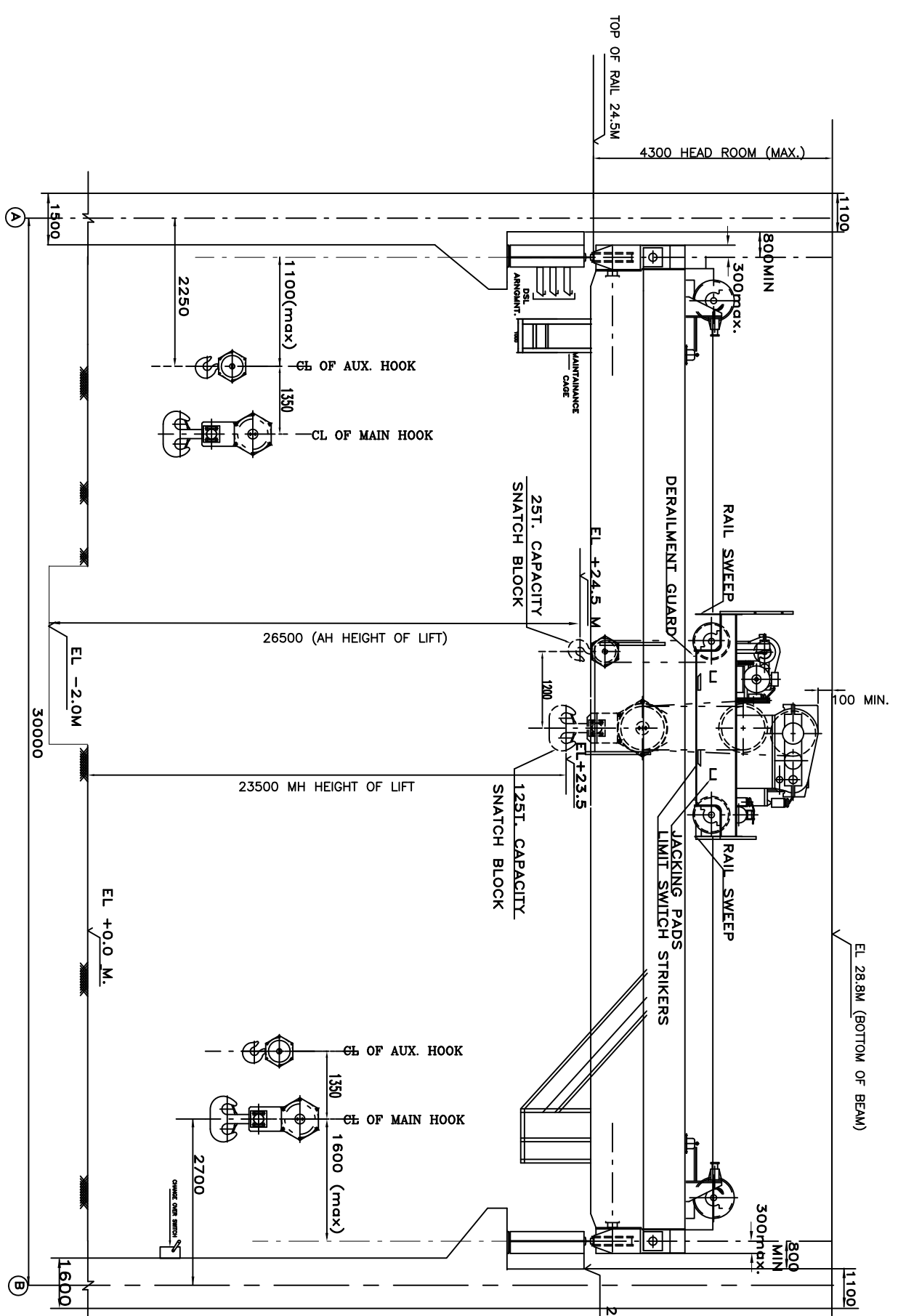


		Within TG building	SP4*	-do-	1	35	PS18	1	35	a)Epoxy coat	2	25	150	
										b)Final coat of paint PS17	1	30		
6.	Weld Edges		SP6 (Hand cleaning by wire burshing)	PS13 (Weld able primer)	1	25	-	-	-	-	-	-	-	
\$ The first 2 finished coats (total min.DFT of 70 microns) shall be done at shop and the 3 <sup>rd</sup> finish coat (min.DFT 35 Microns) shall be applied at site.														

**14.00.00 Testing Requirements:**

The detailed testing requirements for power cycle piping and its components are given in the subsection for Quality Assurance (QA). The requirements pertaining to testing given in this subsection if in variance with that given in QA subsection, then the more stringent of the two shall be followed.

CLAUSE NO.	TECHNICAL REQUIREMENTS		
9.01.01	The cabinets shall be designed for front access to system modules and rear access to wiring and shall be designed for bottom entry of the cables.		
9.01.02	The cabinets shall be totally enclosed, free standing type and shall be constructed with minimum 2 mm thick steel plate frame and 1.6 mm thick CRCA steel sheet or as per supplier's standard practice for similar applications, preferred height of the cabinet is 2200 mm. The cabinets shall be equipped with full height front and rear doors. The floor mounting arrangement for other cabinets shall be as required by the Employer and shall be furnished by the Contractor during detailed engineering.		
9.01.03	Cabinet doors shall be hinged and shall have turned back edges and additional bracing where required ensuring rigidity. Hinges shall be of concealed type. Door latches shall be of three-point type to assure tight closing. Detachable lifting eyes or angles shall be furnished at the top of each separately shipped section and all necessary provisions shall be made to facilitate handling without damage. Front and rear doors shall be provided with locking arrangements with a master key for all cabinets. If width of a cabinet is more than 800 mm, double doors shall be provided.		
9.01.04	<p>Two spray coats of inhibitive epoxy primer-surface shall be applied to all exterior and interior surfaces. A minimum of 2 spray coats of final finish colour shall be applied to all surfaces. The final finished thickness of paint film on steel shall not be less than 65-75 micron for sheet thickness of 2 mm and 50 microns for sheet thickness of 1.6 mm. The finish colors for exterior and interior surfaces shall conform to following shades:</p> <p>(a.) Exterior:- As per RAL 9002 ( End panel sides RAL 5012), to be finalized during detailed engineering.</p> <p>(b.) Interior:- Same as above.</p> <p>Paint films which show sags, checks or other imperfections shall not be acceptable.</p> <p>As an alternative, single coat of anodic dip coat primer along with single textured powder coating with epoxy polyester meeting the thickness requirement is also acceptable.</p> <p>The Bidder shall furnish sufficient touch-up paint for one complete finish coat on all exterior factory painted surfaces of each item of equipment. The touch-up paint shall be of the same type and color as the factory applied paint and shall be carefully packed to avoid damage during shipment. Complete painting instructions shall be furnished.</p>		
9.01.05	Refer Subsection Basic Design Criteria, Part B, Section VI for grounding requirements.		
9.02.00	The technical specification covering panel fabrication details, wiring and termination details etc. shall be as described under Sub-Section INST CABLE of this specification.		
<b>MUZZAFFARPUR THERMAL POWER PROJECT STAGE-II (2X195 MW) MAIN PLANT PACKAGE</b>	<b>TECHNICAL SPECIFICATIONS SECTION-VI PART-B, BOOK-1 OF 2 BID DOCUMENT NO.: CS-0350-108-2</b>	<b>SUB-SECTION-IV:I-09 AUX. PLANT CONTROL SYSTEM</b>	<b>PAGE 12 OF 15</b>



FOR TENDER PURPOSE

KEY PLAN

DETAIL 'Y' DETAIL 'X'

- NOTES**
- 1) ALL DIMENSIONS ARE IN MM & ELEVATIONS IN METRES.
  - 2) HEAD ROOM (4300 mm) DISTANCE FROM TOP OF GANTRY RAIL TO BOTTOM OF ROOF INCLUDING 100 mm FOR CLEARANCE.
  - 3) DISTANCE BETWEEN CENTRELINE OF THE RAIL AND FACE OF THE COLUMN ABOVE THE BRACKET IS TO BE MAINTAINED AS 800MM (MIN).
  - 4) GROUND FLOOR IS CONSIDERED AS EL. +0.0 M. IN CASE GROUND FLOOR IS DIFFERENT FROM EL. +0.0 M THE ELEVATION OF CENTRELINE OF HOOK AND BOTTOM OF ROOF/BEAM SHALL CHANGE ACCORDINGLY.

JOB NO. 300		JOB NO. 300	
STATUS CONTRACT		STATUS CONTRACT	
DRG./REV. NO. INTERNAL		DRG./REV. NO. INTERNAL	
PROJECT SCALE			
REV.	DATE	ALT.	CHD.
02	10/21/08	VH	AMB
Revised in line with NTPC's comments vide mail dated 4/11/08			
PROJECT SCALE			
REV.	DATE	ALT.	CHD.
01	10/20/08	VH	AMB
Revised in line with NTPC's comments vide mail dated 8/11/08			
SUB-CONTRACTOR			
TITLE			
CRANE CLEARANCE DIAGRAM OF TG HALL			
125 / 25 T (DOUBLE GIRDER) E.O.T. CRANE			
DEPT. SCALE	BRANING NO.	DATE	REV. NO.
PR-DG-358-501-A001	PR-DG-358-501-A001	12/10/08	1

NTPC Drg. No. NATIONAL THERMAL POWER CORPORATION LTD. 2 X 195 MW MUZAFFARPUR TPP STAGE II

BHARAT HEAVY ELECTRICALS LTD  
POWER SECTOR  
PROJECT ENGINEERING MANAGEMENT  
NEW DELHI

DATE: 12/10/08

BY: GBC

CHK: GBC

APP: GBC

DATE: 12/10/08

