RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD

2X660 MW SURATGARH SUPER CRITICAL TPS, STAGE - V UNIT 7&8

PROJECT SPECIFIC TECHNICAL SPECIFICATION FOR CHAIN PULLEY BLOCKS

SPECIFICATION NO.: PE-TS-392-563-A001

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR- PROJECT ENGINEERING MANAGEMENT
NOIDA
INDIA

INDEX

1.0 SCOPE OF INQUIRY

1.1 The specification is intended to cover design, engineering, manufacture, inspection and testing at vendor's/ sub-vendor's works, painting, forwarding, proper packing and shipment and delivery at site as required on FOR site basis, performance and guarantee testing at vendor's works (as mentioned elsewhere in the specification) of **CHAIN PULLEY BLOCK** as per details in different sections / volumes of this specification for **2X660 MW SURATGARH SUPER CRITICAL TPS, STAGE - V UNIT 7&8.**

1.2 The contractor shall be responsible for providing all material, equipment & services, which are required to fulfil the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification, irrespective of whether it has been specifically listed herein or not. **Omission of specific reference to any component / accessory necessary for proper performance of the equipment shall not relieve the contractor of the responsibility of providing such facilities to complete the supply of CHAIN PULLEY BLOCK.**

1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material which in his judgement is not in full accordance herewith.

1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the drawing.

1.5 The general term and conditions, instructions to tenderer and other attachment referred to elsewhere are made part of the tender specification. The equipment materials and works covered by this specification is subject to compliance to all attachments referred to in the specification. The bidder shall be responsible for and governed by all requirements stipulated herein.

1.6 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information , ensure completeness of specification, to bring out any contradictory / conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Vol-III of the specification **within 10 days of receipt of tender documents.** In absence of any such clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of Purchaser/Customer shall prevail and shall be complied by the bidder without any commercial implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by Purchaser/ Customer as and when brought to their notice either by the bidder or by purchaser/ customer themselves. However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.

1.7 The bidder's offer shall not carry any sections like clarification, interpretations and /or assumptions.

1.8 Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule; otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification.

1.9 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection.

1.10 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder /vendor and Customer/ Purchaser/Employer will mean BHEL and /or **RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD.** including their consultant as interpreted by BHEL in the relevant context.

Miscellaneous Requirements

a) 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.

b) 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.

c) Bidder to note that the successful bidder, during detail engineering, will submit the drg/doc through web based Document Management System in addition to hard copies to be submitted as per dwg/ document distribution schedule. Bidder would be provided access to the DMS for drg/doc approval and adequate training for the same. Detailed methodology would be finalized during the kick-off meeting. Bidder to ensure following at their end

- *Internet explorer version – Minimum Internet Explorer 7*
- *Internet speed – 2 mbps (Minimum preferred)*
- *Pop ups from our external DMS IP (124.124.36.198) should not be blocked*
- *Vendor's Internal proxy setting should not block DMS application's link (http://124.124.36.198/wrenchwebaccess/login.aspx)"*

DMS user manuals to be used by BHEL PEM vendors for uploading, viewing, revising, commenting and tracking documents on PEM's DMS have been uploaded on PEM internet website (www.bhelpem.com) under the Vendor session.

For quick access bidder may refer the link
http://bhelpem.com/DMSManuals/DMSManuals.html

SECTION – B

PROJECT INFORMATION

1.0	Owner	Rajasthan Rajya Vidyut Utpadan Nigam Ltd., Jaipur
2.0	Consulting Engineer	TATA Consulting Engineers Ltd. 73/1, St. Marks Road, Bangalore – 560 001 Tel : 080 – 6622 6000 Fax : 080 – 22274874
3.0	Location of the plant	Prabat Nagar, Suratgarh Sriganganagar district, Rajasthan.
4.0	Latitude and longitude	Latitude : 29 deg. 10 min. N Longitude : 74 deg.01 min. E
5.0	Elevation above mean sea level	186 m (approximate)
6.0	**Climatic conditions**	
6.1	Temperatures : Monthly basis	
	Mean of daily max.	32.8 deg.C (in the month of May)
	Mean of daily min.	17.6 deg.C (in the month of Jan)
6.2	Temperatures : Annual basis	
	Mean of daily max.	32.3 deg.C
	Mean of daily min.	19.6 deg.C
	Highest temperature recorded	50 deg.C
	Lowest temperature recorded	(-) 2.8 deg.C
	Design Ambient Temperature for Electrical Equipment design	50 deg C
6.3	Relative humidity	Varies between 21% and 81%
6.4	Annual average rain fall	312 mm
6.5	Annual mean wind speed :	4 km / hr.
7.0	Wind load	

	Calculations for wind effect shall be in accordance with IS:875-1987(Part-3) taking into account the following:	
	a) Basic wind speed = 47 m/sec	
	b) Factor K1 = 1.07	
	c) Category of terrain = Category 2	
	d) K3 – as per IS 875	
8.0	Seismic data (As per IS: 1893 latest issue)	
	a) Zone	Zone II
	Designs & design coefficients shall be based on IS 1893:2002	
	Design condenser cooling water inlet temperature	33 Deg C
9.0	Auxiliary power supply:	
	Auxiliary electrical equipment to be supplied against this specification shall be suitable for operation on the following system:	
a)	For motors rated 160 kW and below.	415V AC, 3-phase, 3-wire effectively earthed.
b)	For motors rated above 160 kW and up to 1500 kW	6600V AC, 3-phase, 3-wire, 50 Hz, non-effectively earthed
c)	For motors rated above 1500kW	11000V AC, 3-phase, 3-wire, 50 Hz, non-effectively earthed
d)	For motor control centres	415V AC, 3-phase, 3/4-wire effectively earthed.
e)	DC motor starters, DC solenoids, DC alarm control and protection	220 V DC, 2-wire unearthed
f)	AC control & protective devices	110 V 1 phase, 50Hz, 2 wire AC supply. The single phase 110V AC supply shall be derived by VENDOR by providing 415V / 110 V Control transformers of adequate rating with MCCB / MCB on both the primary and secondary sides.
g)	Uninterrupted power supply	230 V, 1-phase, 50 Hz, 2-wire, AC

		supply (For all instrumentation and control system equipment and solenoid valves)

g) Lighting fixtures and space heaters — 240 V, 1 phase, 2 wire, 50Hz,solidly earthed system

h) Construction supply — 415 V, 3 phase, 4 wire, 50Hz AC supply with neutral lead solidly earthed.

i) The above voltages may vary as follows :

All devices shall be suitable for continuous operation over the entire range of voltage and frequency indicated below without any change in their performance.

AC supply	Voltage variation ± 10% Frequency variation ± 5% Combined voltage & frequency variation 10%
DC supply	Voltage variation +10% ,-15%

j) For instrument and control system of steam generator and steam turbine generator. — 230 V ± 5% AC UPS, 1-phase, 50 Hz, 2-wire. The 24 V DC required for control system shall be generated from this UPS.

10.0 All the electrical equipment shall be designed for 50^{o} C reference ambient temperature.

11.0 LOCATION :

The proposed power project shall be located in the state of Rajasthan, in Shriganganagar Distt. The proposed power project is located within 393 km from Jaipur 169 km from Bikaner and 367 Km from Delhi.

Major road distances of the project site are as follows:

Between	**Distance in KMs.**
Project - Suratgarh Junction	31 km (Nearest Railhead)
Project - Jaipur (State Capital)	393 km
Project - Delhi	367 km
Project – Jaipur	393 km (Nearest Airport in Rajasthan)
Amritsar	378 km (Nearest Airport)
Project – Bikaner	169 km

1.0 **PACKING**

1.1 All equipment and material shall be protected for ocean shipment, inland transport, and storage at the site, according to applicable Indian Standards (IS) and to the instructions given in this specification.

1.2 The PURCHASER/CONSULTANT may require inspecting and approving the packing before the items are despatched. However, the VENDOR/ CONTRACTOR shall be entirely responsible for ensuring that the packing is suitable for the mode of shipment and such inspection will not exonerate the VENDOR/CONTRACTOR from any loss or damage due to faulty packing.

1.3 The VENDOR/CONTRACTOR shall be responsible for any damage to the equipment and materials during transit due to improper and inadequate packing.

1.4 Any material found short upon opening the intact packing cases shall be supplied by the VENDOR/CONTRACTOR at no extra cost to the PURCHASER.

1.5 Only packages constructed out of sound material and of dimensions proportional to the size and weight of contents shall be used.

1.6 All packing cover and packing material shall become the property of the PURCHASER.

1.7 In the case of large and bulky equipment, the VENDOR/CONTRACTOR shall be responsible for ascertaining transport limitations and supply the equipment in the minimum number of components or sub-assemblies, within the framework of transport limitations.

1.8 For ocean transport, containers shall be used as far as possible. Dimensions of packages and kind of packaging must be chosen to fully utilise the size of containers.

1.9 All equipment shall be protected for the entire period of despatch, storage and erection, against corrosion, incidental damage due to vermin, sunlight, rain, high temperature, humid atmosphere, rough handling in transit and storage in open including possible delays in transit. Material and equipment shipped across the sea shall be packed to withstand without damage, the effects of saline atmosphere. All machined and plated parts shall be protected with anti-rust grease. Precautions shall be taken to protect shafts and journals where they rest on wooden or other supports likely to contain moisture. At such points, wrappings impregnated with anti-rust composition or vapour phase inhibitors shall be used. These shall have sufficient strength to resist chafing and indentation due to the movement, which is likely to occur in transit. The protective wrappings and impregnation shall last for a minimum period of three months or transport time whichever is more.

1.10 All openings in the equipment shall be tightly covered, plugged or capped to prevent foreign material from entering into the equipment.

1.11 The contents of the packages shall be sealed in thick polythene sheets. The inside walls of the packages shall be lined with waterproof material to protect

the equipment from damage due to dust and moisture.

1.12 Adequate provision of skids or pallets shall be made to keep the packages above the ground drain water. Crates and other large containers should have drain holes in the bottom to prevent collection of water within the packing. This is especially important where the cargo itself is subjected to condensation (cargo sweat).

1.13 Silica gel or approved equivalent moisture absorbing material in small cotton bags shall be placed and tied at various points on the equipment, wherever necessary.

1.14 All cases shall be provided with suitable cut-outs, closed by bolted wooden planks to facilitate inspection by custom authorities. Waterproof transparent papers shall be provided at the cut-out locations to prevent water ingress into the casing through the cut-out.

1.15 The contents of the package shall be punched on non-corrosive metal plate and nailed to the package on a prominently visible place. If the number of items in the package is too many, a typed list in transparent waterproof bag shall be kept inside a galvanised sheet steel pocket nailed on to the outside of package at prominently visible location.

Copies of the packing list, in triplicate, shall be forwarded to the PURCHASER prior to despatch. All items of material shall be clearly marked for easy identification against the packing list.

1.16 Fragile materials shall be securely braced within the package or otherwise amply fastened and packed to prevent shifting or rattling. Soft non-hygroscopic packaging materials shall be placed between the hard packing materials and the fragile equipment. Articles, which do not completely fill the selected package/ container, must be cushioned, braced, fastened or blocked to prevent damage to the article itself or destruction of the package. Inner bracing or blocking must be such that the content's weight is distributed over interior surfaces rather than concentrated at one or two points.

1.17 Components containing glass shall be carefully covered with shock absorbing protective material such as expanded polystyrene ('Thermo Cole').

1.18 All flanges, etc., which are prone to scratching shall be provided with either metal or wooden or plastic blanks bolted in place. Metal blanks should have a minimum thickness of 3 mm and wooden blanks should be made from two layers of wood, each of 10 mm thickness, nailed together with the grain of each layer located at right angles to one another.

1.19 Loose material, e.g. bolts, nuts, etc. shall be packed and sealed in polythene bags with proper tagging and packed in cases.

1.20 All spare parts shall be packed and treated for long storage conditions at site.

2.0 **MARKING**

2.1 All packages shall be clearly, legibly and durably marked with uniform block letters (preferably with waterproof paint) on at least three sides with:

(a) Purchaser's Name and destination address

(b) Purchase Order/Contract Number and Date

(c) Vendor's/Contractor's or Sub-Vendor's/Sub-Contractor's Name

(d) Consignment Serial Number

(e) Overall Dimensions

(f) Net and gross weights

(g) Sign showing 'side up'

(h) Sign showing 'fragile' marks in case of delicate equipment

(i) Sign showing slinging and sling position

(j) Any handling and unpacking instructions, if considered necessary

(k) Identification markings relating to the appropriate shipping documents

(l) In case of spare parts, each spare part shall be clearly marked and labelled on the outside of its packing with its description and catalogue/ part number and item number of main equipment to which it relates.

2.2 ERECTION MARKS

All equipment comprising multi part assemblies, e.g. steel frameworks, piping, etc., shall be marked with identifying numbers and/or letters corresponding to those of the approved drawings or material lists. These erection marks shall be clearly readable.

Colour banding to an approved code shall be employed to identify members of similar shape or type but of different strengths or grades.

3.0 TRANSPORT

3.1 No equipment or material shall be despatched without prior consent (acceptance certificate) of the PURCHASER/CONSULTANT or his representative. On receipt of the acceptance certificate, the equipment shall be packed up and made ready for despatch either on Free On Board (FOB), (Free Alongside Ship (FAS), Free On Road (FOR), Free On Truck, (FOT), Free Alongside Road (FAR), or free alongside Truck (FAT) basis as per the PURCHASE ORDER/CONTRACT. If it is on FOB basis, the VENDOR/ CONTRACTOR is responsible for loading the equipment on the board of ship. On FAS basis, another agency takes over from the VENDOR/CONTRACTOR

for loading. The same applies to FOR, FOT and FAR, FAT.

3.2 Depending upon the equipment and the mode of transport the VENDOR/ CONTRACTOR may propose to deliver the equipment in container or as Break Bulk i.e. in components or sub-assembly form.

3.3 In the event of VENDOR/CONTRACTOR proposing to deliver the equipment in Break Bulk form, he shall furnish full particulars of the quantity and approximate size of each item. All sub-assemblies shall be match-marked to facilitate assembly at site.

3.4 In case of ocean shipment, the VENDOR/CONTRACTOR shall send an advance 'Advice of Shipment' to the PURCHASER and site separately**,** so at to reach at least seven (7) days in advance for foreign supply and three (3) days in advance for domestic supply. This advice shall state the Cost including Freight and Insurance (CIF) value of the consignment, the details of the transport and the probable date of its departure and arrival. Copies of packing list shall also be sent along with the advance intimation.

3.5 The VENDOR/CONTRACTOR shall ship the equipment on behalf of the PURCHASER by the first available vessel belonging to a recognised shipping line. He shall ensure that the freight rates charged are not higher than the conference rates applicable to the shipping route at the time of shipment and all rebates and refunds available for such consignments are duly taken into account. The VENDOR/CONTRACTOR shall be responsible for the correct appraisal of freight rates (structural or machinery as the case may be), weights and volumes. In no case, the PURCHASER will pay any warehouse or wharf charges.

3.6 Immediately after the shipment has been effected, the shipping documents, comprising Bill of Lading, Freight Invoice, FOB/FAS/FOR/FOT/FAT/FAR Invoice, Packing List, Certificate of Origin, Letter to Insurers and Certificates of Inspection shall be issued by the VENDOR/CONTRACTOR in accordance with the instructions of the PURCHASER/CONSULTANT. These documents shall reach the PURCHASER before the arrival of ship. Responsibility for delays, loss or damages of shipping documents shall rest with the VENDOR/ CONTRACTOR.

3.7 In case of inland despatch by rail or truck, similar equivalent procedures as applicable to rail or truck transportation shall be adopted.

3.8 All Equipment manufactured by the VENDOR/CONTRACTOR shall be under his charge. The PURCHASER shall arrange for insurance coverage during shipment and till delivered at site, if necessary.

4.0 TRANSPORT OF ELECTRICAL EQUIPMENT AND INSTRUMENTATION ITEMS

4.1 Transformers rated 2000 kVA and less shall be shipped filled with oil. Transformers rated above 2000 kVA shall be shipped without oil but with the

tank filled with nitrogen or equivalent inert gas. A gas cylinder with suitable reducer connection and pressure gauge shall be supplied. These accessories shall become the property of the PURCHASER. The required quantity of oil shall be supplied separately in non-returnable drums.

4.2 Switchgear cubicles and instrument control panels shall be packed and shipped in separate and convenient sections. All withdrawable equipment like circuit breakers and circuit breaker arc-chutes shall be packed and shipped separately. All relays and panel-mounted instruments shall be packed and shipped separately with their operating mechanisms temporarily arrested from movement during transport.

4.3 Batteries shall be shipped to site in dry, uncharged condition. Appropriate quantity of acid of the correct specific gravity shall be shipped separately in non-returnable porcelain jars packed in steel wire baskets.

4.4 Cables shall be shipped on non-returnable drums, adequately braced, and with cable ends adequately sealed to prevent ingress of moisture.

SECTION -C

1.0 SCOPE OF WORK

1.1 The equipment to be furnished by the bidder for the chain pulley blocks of different capacity and lift as specified in Annexure-I along with all accessories.

1.2 The chain pulley blocks offered shall have technical parameters as per the Data Sheet A enclosed herewith.

1.3 Any equipment/accessories not specified herein but required to make the equipment complete and efficient shall also be under bidder's scope of work.

The following shall be in the bidder's scope of work.

a. Chain pulley blocks with/without traveling trolleys as per the Annexure-I.

b. Mandatory Spares as per Annexure-II.

c. Maintenance Tools and Tackles as given at 4.0

d. Painting of all the equipment. (as per painting procedure enclosed)

e. Packaging.

f. O&M manuals, drawings and documents etc.

g. Inspection & testing of Chain Pulley Block as per BHEL standard Quality Plan/Customer approved QAP. Prime inspection agency shall be BHEL / End Customer. Equipment being supplied shall be strictly in accordance with nomenclature & technical specification. Any additional testing requirement at any stage of inspection deemed necessary by Customer/BHEL shall be carried out without any commercial or technical implication.

2.0 TESTING AND INSPECTION

2.1 As per standard quality plan enclosed. Any additional hoisting arrangement / CHP (customer's hold point) deemed necessary by customer/BHEL during detailed engineering shall also be complied with.

2.2 Chain pulley block shall be completely assembled at manufacturers work and minimum following tests shall be conducted at works

i. Over load test

ii. Rated load test

iii. Other tests as per IS-3832.

2.3 The scope of inspection shall include but not limited to the following:

i. Material identification / co-relation for important items like hook, load chain, hand chain, wheels, ratchet and pawl etc.

ii. Hardness for pawl and ratchet

iii. Dye penetration test/ UT test for hooks

iv. Operational test including operational effort, velocity ratio etc.

v. Proof load test upto 1.5 times of working load limit.

vi. Dimensional check of hook

vii. Marking

3.0 WORKS EXCLUDED

3.1 Supply of monorail for traveling trolley of chain pulley blocks.

4.0 MAINTENANCE TOOLS AND TACKLES

A complete unused one set of special purpose maintenance tools & tackles and accessories along with detailed instructions for maintenance and manual operation shall be supplied. **Tools shall be of suitable sizes for maintenance of Chain Pulley Block of each type and capacity.** Each tool and wrench shall be stamped so as to be identified easy for its use and size. The tools shall be supplied in steel toolbox and with a copy of instruction manual. The items supplied shall be of the best quality, specially protected against rusting. The following shall be provided as minimum requirement.

i.	Adjustable spanner	One (1)
ii.	Wrench spanner	One (1)
iii.	Oil gun	One (1)
iv.	Set of Screw driver	Min 6 nos. (of different sizes suiting various types and capacities of Chain Pulley Blocks)
v.	2 lb hammer with wooden handle	One (1)
vi.	Grease Gun	One (1)

vii. Any other item required for maintenance shall also be provided.

5.0 DRAWINGS/DESIGN DOCUMENTS FOR SUBMISSION (during detailed engineering)

A. For Approval

a. G.A. drawing showing clearances, assembly, cross section details, materials of construction, lifts & approaches etc.

b. Quality plan

c. Test certificates & reports on various shop tests.

6.0 NO.OF DRAWINGS/DOCUMENTS FOR SUBMISSION (as per attachment in Volume III)

7.0 DEVIATIONS

7.1 If the offer submitted has got any deviations from technical specification in the tender document. Bidder shall tabulate the same in the 'Schedule of Deviations" furnishing full particulars of such deviations. Deviations are to be furnished with mention to specific clause numbers notes/ comments e.g. "Refer to forwarding letter" etc. is not acceptable.

7.2 If there are no deviations from the tender document, bidder shall indicate so.

7.3 Reasons/explanations for such deviations shall be furnished.

8.0 FUNCTIONAL TESTS

8.1 The chain pulley blocks along with other accessories shall be guaranteed for the rated capacity. The minimum following tests shall be conducted at works – Overload test, rated load test and other tests as per IS-3832. Pull on the hoist and trolley shall not increase during full load operation.

8.2 The bidder shall have full responsibility for the safe and efficient operation of the chain pulley blocks and traveling trolley with associated accessories as a single unit.

8.3 If the shop performance tests indicate the failure of any of the components to achieve the functional performance, the deficiency shall be made good at bidder's cost.

8.4 Performance tests shall be carried out each time after the rectification modification is carried out.

9.0 MAKE OF SUB-VENDOR ITEMS (*)

Following makes of bought out items shall be considered:

Steel	SAIL/IISCO/TISCO
Steel Forgings	Chowdhary/Western India Forgings/Hindustan Steel Forgings/Ruby Forgings or as approved by BHEL.
Hooks	Herman Mohata/Moozumdar & Moozumdar/Steel Forgings/ Karachiwala/Smriti/Nasik Forge.
Brakes	BHEL approved make

(*) The sub-vendor list is indicative and will be subject to customer approval during detail engineering of the package without any commercial implication on account of the same.

10.0 PAINTING SPECIFICATION

As per attached “Painting Requirements”.

11.00 Packing

Refer “Packing, Marking & Transport Instructions” in Volume IIB, Section-B.

SCOPE OF CHAIN PULLEY BLOCKS

ANNEXURE I BHEL DOC NO PE-TS-392-563-A001

2X660 MW SURATGARH STPP (STAGE-V, UNIT#7&8)						
S.No.	**AREA / EQUIPMENT DESCRIPTION**	**Type**	**QTY (nos)**	**CAPACITY (T)**	**LIFT RANGE (M)**	**PATH**
B	**Scope of Chain pulley blocks (CPB)**					
1	LPBP VALVE/ACTUATOR HANDLING (4), AHU Rooms (7), OVERLOAD VALVES BELOW TG DECK (2)	CPB with TT	13	1	6	Straight
2	AHU Rooms	CPB with TT	2	1	6	Curved
3	FOR HANDLING OIL BARREL IN CENTRAL LUBE OIL SYSTEM AT EL+0.0 M	CPB with TT	1	1	7.5	Straight
4	GENERAL PURPOSE MAINTENANCE	CPB without TT	2	2	10	NA
5	One (1) set of Maintenance Tools and Tackles		1 set			
6	Two (2) sets of Mandatory Spares - 1 for 1T (with TT) and 1 for 2T (without TT)		2 sets			
	Note					
1	***CPB: Chain Pulley Block TT: Travelling Trolley***					

List of Mandatory Spares – Annexure II

S. No.	Description	LOT	Total quantity required
1	Chain Pulley Block with Travelling Trolley for 1T		
1.1 a)	Bearing of each type and sizes used in Wheels	Sets	2
1.1 b)	Bearing of each type and sizes used in lifting hook	Sets	2
1.2	Load chain (Hoist) (7.5m)	Sets	2
2	Chain Pulley Block without Travelling Trolley for 2T		
2.1	Bearing of each type and sizes used in lifting hook etc.	Sets	2
2.2	Load chain (Hoist) (10m)	Sets	2

	MANUFACTURER'S NAME & ADDRESS :	**MANUFACTURING QUALITY PLAN** **ITEM :** Chain Pulley Block **QP No.:** PE-TS-392-563-A001 **REV**.:0, **Date.: 05.05.15, PAGE**: 1 OF 4	**PROJECT :** **2X660 MW SURATGARH SUPER CRITICAL TPS, STAGE - V UNIT 7&8** **PACKAGE : chain pulley blocks** **VOL IIB, SEC C**

Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									M	C	N	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			11.
1	**RAW MATERIAL & B/OUT ITEMS:**											
1.1	HOOKS	DIMENSIONS, CHEMICAL COMPOSITION. IDENTIFICATION & COMPLIANCE WITH TC. MECHANICAL, PHYSICAL PROPERTIES	MA MA MA	LAB ANALYSIS HARDNESS MECHANICAL PROPERTIES	One sample PER LOT	IS: 15560 Gr. M OR APPD. DRAWING	IS: 15560 Gr. M or APPD. DRG.	MFR's T.C. ✓	P	V	V	
1.2	LOAD CHAIN	- DIMENSIONS - BREAKING STRENGTH - PROOF LOAD	MA MA MA	MEASUREMENT -TENSILE TEST -TENSILE TEST	100 % 100% 100%	IS: 6216 OR APPD. DRAWINGS	IS: 6216 & APPD. DRGS.	MFR'S TC ✓	P	V	V	
1.3	RAW MATL. FOR GEAR/ RATCHET PAWL / RATCHET WHEEL	CHEMICAL COMPOSITION MECHANICAL	MA MA	LAB ANALYSIS HARDNESS	ONE SAMPLE PER LOT	BS 970/ DIN 17210/SAE/ IS	En 9 / En 3A 16MnCr5 /16Mn5Cr4	TC ✓ TC ✓	P P	V V	V V	TC or inspection report for components shall be given.

	LEGEND:	FOR CUSTOMER USE	
MANUFACTURER / CONTRACTOR SUB-CONTRACTOR	** M : MANUFACTURER / SUB-CONTRACTOR C : BHEL / NOMINATED INSPECTION AGENCY. N : CUSTOMER INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION		
SIGNATURE		REVIEWED BY	NAME & SIGN OF APPROVING AUTHORITY & SEAL

	MANUFACTURER'S NAME & ADDRESS :	**MANUFACTURING QUALITY PLAN** **ITEM :** Chain Pulley Block **QP No.:** PE-TS-392-563-A001 **REV**.:0, **Date.: 05.05.15, PAGE**: 2 OF 4	**PROJECT :** **2X660 MW SURATGARH SUPER CRITICAL TPS, STAGE - V UNIT 7&8** **PACKAGE : chain pulley blocks** **VOL IIB, SEC C**

Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
										M	C	N	
1.	2.	3.	4.	5.	6.	7.	8.	9.		10.			11.
1.4.	LOAD CHAIN WHEELS	- CHEMICAL COMPOSITION PHYSICAL PROPERTIES	MA MA	CHEMICAL MECHANICAL PROPERTIES	ONE SAMPLE PER LOT	IS 1865 OR APPD. DRG.	Gr 500/7 OR APPD. DRG.	MFR'S TC	✓	P	V	V	
1.5	BEARINGS	MAKE, TYPE, CATALOUGE NO.	MA	VISUAL	RANDOM	APP DRG / MFR"S CATALOGUE	APP DRG / MFR"S CATALOGUE	IR	✓	P	V	V	
1.6	HAND CHAIN WHEEL	CHEMICAL PHYSICAL PROPERTIES	MA	CHEMICAL MECHANICAL PROPERTIES	ONE SAMPLE PER LOT	AS PER DRAWING	AS PER DRAWING	IR/TC	✓	P	V	V	
1.7	HAND CHAIN	GRADE/ DIMENSION	MA	GRADE DIMENSION	ONE SAMPLE PER LOT	AS PER DRAWING	AS PER DRAWING	IR/TC	✓	P	V	V	
1.8	TROLLEY GEARS, PINION,WHEELS, AXLE	CHEMICAL & MECHANICAL	MA	LAB ANALYSIS,	100%	APPVD DRGS	APPVD DRGS	IR/TC	✓	P	V	V	
2	**IN PROCESS**												

	LEGEND:	FOR CUSTOMER USE	
MANUFACTURER / CONTRACTOR SUB-CONTRACTOR	** M : MANUFACTURER / SUB-CONTRACTOR C : BHEL / NOMINATED INSPECTION AGENCY. N : CUSTOMER INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION		
SIGNATURE		REVIEWED BY	NAME & SIGN OF APPROVING AUTHORITY & SEAL

	MANUFACTURER'S NAME & ADDRESS :	**MANUFACTURING QUALITY PLAN** **ITEM :** Chain Pulley Block **QP No.:** PE-TS-392-563-A001 **REV**.:0, **Date.: 05.05.15, PAGE**: 3 OF 4	**PROJECT :** **2X660 MW SURATGARH SUPER CRITICAL TPS, STAGE - V UNIT 7&8** **PACKAGE : chain pulley blocks** **VOL IIB, SEC C**

Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
										M	C	N	
1.	2.	3.	4.	5.	6.	7.	8.	9.		10.			11.
2.1	HOOKS	-PROOF LOAD,	MA	LOAD TEST	100 %	IS:15560	IS:15560	IR	✓	P	V	V	-UT FOR SHANK IF DIA. > 50 MM)
		-DPT /MPI AFTER	MA	DPT/MPI	100 %	ASTM E165	NO DEFECT	IR	✓	P	V	V	
		P / LOAD	MA	UT	100%	ASTM A388	20% DF Max., 80% BWE Min.	IR	✓	P	V	V	
2.2	RATCHET PAWL / RATCHET WHEEL	-HARDNESS	MA	HARDNESS	100%	IS:3832/ APPD DRG.	IS:3832/ APPD. DRG.	IR	✓	P	V	V	
		-SURFACE CRACK	MA	DPT	100 %	ASTM E165	NO DEFECT	IR	✓	P	V	V	
2.3	GEARS AND PINIONS	SURFACE HARDNESS HEAT TREATMENT, SURFACE CRACK, CASE DEPTH	MA	HARDNESS HT CHART, DPT FOR SURFACE CRACK	RANDOM ASTM E 165 FOR DPT	MFG STANDARD NO DEFECT	MFG STANDARD	IR IR	✓ ✓	P P	V V	V V	HT Chart to be provided
3.0	**FINAL INSPECTION**												
3.1	COMPLETE ASSEMBLY	OVERALL DIMENSION	MA	MEASUREMENT	100 %	IS:3832 /APPD DRG	IS:3832 /APPD DRG	IR	✓	P	W	W	
		PROOF LOAD TEST	CR	LOAD TEST	100%	-DO-	No cracks, flaws & other defects	IR	✓	P	W	W	
		LIGHT LOAD TEST	MA	LOAD TEST	100%	IS 3832 Cl NO 9.3.1	IS 3832	IR	✓	P	W	W	
		HEIGHT OF LIFT	MA	MEASUREMENT	100%	-DO-	-DO –	IR	✓	P	W	W	
		SWIVELING OF HOOK	MA	VISUAL	100 %	-DO-	-DO-	IR	✓	P	W	W	

MANUFACTURER / CONTRACTOR SUB-CONTRACTOR	LEGEND: ** M : MANUFACTURER / SUB-CONTRACTOR C : BHEL / NOMINATED INSPECTION AGENCY. N : CUSTOMER INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION	FOR CUSTOMER USE	
SIGNATURE		REVIEWED BY	NAME & SIGN OF APPROVING AUTHORITY & SEAL

	MANUFACTURER'S NAME & ADDRESS :	**MANUFACTURING QUALITY PLAN** **ITEM :** Chain Pulley Block **QP No.:** PE-TS-392-563-A001 **REV**.:0, **Date.: 05.05.15, PAGE**: 4 OF 4	**PROJECT :** **2X660 MW SURATGARH SUPER CRITICAL TPS, STAGE - V UNIT 7&8** **PACKAGE : chain pulley blocks** **VOL IIB, SEC C**

Sr. No.	COMPONENT / OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									M	C	N	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			11.
		EFFORT	MA	PULL ON CHAIN	100%	-DO-	-DO-	IR	✓	P	W	W	
3.2	PAINTING	-CLEANING - SHADE & DFT OF PAINT (Blue / Black)	MA MI	VISUAL VISUAL	AT RANDOM AT RANDOM	APPROVED DRAWING/ **SPECIFICATION**	APPROVED DRAWING/ **SPECIFICATION**	IR IR		P p	--- W	--- ---	
3.3	NAME PLATE	VERIFICATION	MA	VISUAL	100%			IR		P	V	---	
3.4	PACKING	-VERIFICATION	MI	VISUAL	100%	SPECS.	SPECS.	IR		P	---	---	
3.5	REVIEW OF QA DOCUMENTATION	VERIFICATION	MA	VISUAL	100%	APPD. QP	APPD. QP		✓	V	V	V	

CR – CRITICAL, MA – MAJOR , MI – MINOR

NOTE: BACK WALL ECHO SHALL BE ADJUSTED TO 100% OF FULL SCREEN HEIGHT IN SOUND (DEFECT FREE) AREA. DEFECT ECHO HEIGHT MORE THAN 20% OF SCREEN HEIGHT SHALL BE TREATED AS UNACCEPTABLE. BACK WALL ECHO SHALL NOT BE LESS THAN 80% OF SCREEN HEIGHT IN ANY CASE.
NOTE 2: RECORDS IDENTIFIED WITH TICK SHALL BE ESSENTIALLY INLCUDED IN QA DOCUMENTATION.

	LEGEND:	FOR CUSTOMER USE	
MANUFACTURER / CONTRACTOR SUB-CONTRACTOR	** M : MANUFACTURER / SUB-CONTRACTOR C : BHEL / NOMINATED INSPECTION AGENCY. N : CUSTOMER INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION		
SIGNATURE		REVIEWED BY	NAME & SIGN OF APPROVING AUTHORITY & SEAL

ISSUE NO. R3

TCE.M4-113-50	**TATA CONSULTING ENGINEERS LIMITED**	VOLUME III
ENQ.SPEC.NO. TCE.5750A-H-500-001 PART : B	**DATA SHEET -A** **CHAIN PULLEY BLOCK**	SECTION: D10 SHEET: 1 OF 2

GENERAL	1. DESIGNATION: CHAIN PULLEY BLOCK FOR **BY BIDDER**	DESIGN DATA (CONTD.)	20. TYPE OF TROLLEY: **MANUAL GEARED**
	2. NUMBER REQUIRED: **BY BIDDER**		21. HAND CHAINS LOCATION: THE HAND-CHAIN FOR THE HOISTING AND TRAVERSING MECHANISM SHALL BE WELL CLEAR OF THE HOOK AND BOTH CHAINS SHALL BE ON THE SAME SIDE
	3. TAG NOS.: **BY BIDDER**		22.
	4. LOCATION IN HAZARDOUS AREA: **NO**		23.
	5. HAZARDOUS AREA CLASSIFICATION: AS PER IS 5572 ZONE 0/1/2 **BY BIDDER**		24.
	6. LOCATION: **INDOOR**	MATERIALS AND CODES OF CONSTRUCTION	25. CHAIN PULLEY BLOCK: AS PER IS 3832/ BS 3243
	7. APPLICABLE STANDARD: **IS 3832/ BS 3243**		26. TROLLEY FRAME: ROLLED STRUCTURAL STEEL WITH SIDE PLATES EXTENDED BEYOND WHEEL FLANGES TO PROTECT WHEELS
	8. DUTY CLASS: **1 / 2**		27. TROLLEY WHEELS: HEAT TREATED CARBON STEEL/ LOW ALLOY STEEL/ GRADED CAST IRON. SINGLE FLANGED WITH TAPERED TREAD
	9.		28. LOAD CHAIN: ALLOY STEEL IS 3109/ IS 6216/ BS 1663/ BS 3114
DESIGN DATA	10. TYPE : **TROLLEY**		29. LOAD CHAIN WHEEL AND MAIN ARM: HEAVY DUTY MALLEABLE CASTING/ PRESSED SHEET STEEL
	11. CAPACITY: **BY BIDDER**		30. HAND CHAIN : AS PER IS 2429/ BS 6405
	12. RANGE OF LIFTING: **BY BIDDER**		31. HAND CHAIN WHEEL : PRESSED SHEET STEEL
	13. OPERATING FLOOR ELEVATION: **BY BIDDER**		32. SHAFTS AND AXLES : CARBON STEEL
	14. BOTTOM OF MONORAIL ELEVATION: **BY BIDDER**		
	15. MONORAIL TRACK: **STRAIGHT / CURVED**		
	16. RADIUS OF CURVATURE OF MONORAIL: **BY BIDDER**		
	17. MONORAIL BY: **BY BIDDER**		
	18. SIZE OF MONORAIL (IF PROVIDED BY PURCHASER) : **BY BIDDER**		
	19. TYPE OF CHAIN PULLEY BLOCK: **WORM / SPUR GEAR**		

REV.NO.	R0	R1		PPD. BY: HBS	JOB NO.	CLIENT: RRVUNL
DATE	NOV 09	MAY'12		CHD. BY: SMS	TCE.	PROJECT: 2 x 660 MW TPP AT
REV. BY				DATE: MAY'12	5750A	SURATGARH, RAJASTHAN

ISSUE R1

MATERIALS AND CODES OF CONSTRUCTION (CONTD.)	33. GEARS AND PINIONS : SPUR/ HELICAL AS PER IS 4460/ BS 436/ BS 721/ AGMA ATANDARDS	PAINTING	43. FINISH PAINT: REFER VOLUME - II
	34. LIFTING HOOK : HOOK WITH STANDARD DEPRESS SAFETY LATCH AND LOCK TO PREVENT HOOK FROM SWIVELING. HOOK SHALL BE FORGED ALLOY STEEL/ CARBON STEEL AS PER IS 15560 / BS 2903		44.
			45.
			46.
			47.
	35. BEARINGS: BALL OR ROLLER AS PER IS 5669/ IS 5692/ IS 5932/ IS 5935	TESTS AND INSPECTION	49. OVERLOAD TEST WITH 125 % OF SPECIFIED LOAD
	36. BRAKE: SCREW AND FRICTION DISC TYPE SELF ACTUATING LOAD PRESSURE BRAKE		50.
			51.
			52.
	37. LUBRICATION OF MOVING PARTS SHALL BE DONE MANUALLY BY HAND OPERATED GREASE PUMPS THROUGH RESPECTIVE GREASE NIPPLES		53.
			54.
			55.
			56.
			57.
	38.		58.
	39.		59.
	40.		60.
	41.		61.
	42.		62.

ISSUE NO. R6	SPECIFICATION NO. TCE.5750A-H-500-001 PART : B	**TATA CONSULTING ENGINEERS LIMITED** **DATA SHEET B** **CHAIN PULLEY BLOCKS**	VOLUME III SECTION: D10 SHEET: 1 OF 2

ENQUIRY / SPECIFICATION NO. TCE.

	SL. NO.	ITEM / BIDDER		
GENERAL	1.	DESIGNATION		CHAIN PULLEY BLOCK FOR
	2.	NUMBER OFFERED		
	3.	TAG NUMBERS		
	4.	CAPACITY	T	
	5.			
CHAIN PULLEY BLOCK	6.	MANUFACTURER		
	7.	MAKE		
	8.	MODEL NUMBER		
	9.			
	10.			
TROLLEY	11.	MANUFACTURER		
	12.	MAKE		
	13.	MODEL NUMBER		
	14.			
DIMENSIONS	15.	MONORAIL IF PROVIDED BY VENDOR: INDICATE BEAM SIZE MINIMUM/ MAXIMUM SUITABLE FOR TROLLEY MOVEMENT	mm	ISMB /ISMB
	16.	MONORAIL IF PROVIDED BY PURCHASER: IS SIZE SPECIFIED IN DATA SHEET A SUITABLE FOR TROLLEY MOVEMENT		YES/NO IF NO INDICATE SUITABLE SIZE ISMB
	17.	DISTANCE BETWEEN HIGHEST HOOK POSITION TO BOTTOM OF MONORAIL	mm	
	18.	IF MONORAIL IS CURVED, MINIMUM RADIUS TROLLEY CAN NEGOTIATE	mm	
	19.			
	20.			

NOTES TO BIDDER

1. DATA SPECIFIED IN DATA SHEET-A HAS NOT BEEN REPRODUCED IN DATA SHEET-B. IN CASE OF DEPARTURE FROM DATA SHEET-A, BIDDER SHALL BRING OUT THE SAME IN SCHEDULE OF DEVIATIONS, FAILING WHICH IT SHALL BE CONSTRUED THAT BIDDER COMPLIES WITH THE REQUIREMENTS STIPULATED IN DATA SHEET-A.

2. THIS DATA SHEET SHALL BE FILLED UP COMPLETELY AND A COPY SHALL BE ENCLOSED WITH EACH COPY OF THE BID.

SIGNATURE OF BIDDER	
DATE	

IISSUE NO. R6	SPECIFICATION NO. TCE.5750A-H-500-001 PART : B	TATA CONSULTING ENGINEERS LIMITED	VOLUME III
		DATA SHEET B CHAIN PULLEY BLOCKS	SECTION: D10 SHEET: 2 OF 2

ENQUIRY / SPECIFICATION NO. TCE.

	SL. NO.	ITEM / BIDDER		
MATERIALS OF CONSTRUCTION (CONTD.)	21.	IF CHAIN PULLEY BLOCK IS IN HAZARDOUS AREA:		
	21.1	TROLLEY WHEELS		
	21.2	LOAD CHAIN WHEEL AND MAIN ARM		
	21.3	HAND CHAIN WHEEL		
	21.4	GEARS AND PINIONS		
	22.			
	23.			
MISCELLANEOUS	24.	WEIGHT OF COMPLETE CHAIN PULLEY BLOCK AND TROLLEY ASSEMBLY	Kg	
	25.	WEIGHT OF CHAIN PULLEY BLOCK	Kg	
	26.	EFFORT REQUIRED TO LIFT THE LOAD	Kg	
	27.	WHEEL LOAD WITH IMPACT AND WITHOUT IMPACT	Kg	/
	28.	PRELIMINARY DIMENSIONED GENERAL ARRANGEMENT DRAWING OF CHAIN PULLEY BLOCK AND TROLLEY ALONG WITH WHEEL STOP DETAILS TO BE FURNISHED		WHETHER FURNISHED YES/NO
	29.			
	30.			

NOTES TO BIDDER

1. DATA SPECIFIED IN DATA SHEET-A HAS NOT BEEN REPRODUCED IN DATA SHEET-B. IN CASE OF DEPARTURE FROM DATA SHEET-A, BIDDER SHALL BRING OUT THE SAME IN SCHEDULE OF DEVIATIONS, FAILING WHICH IT SHALL BE CONSTRUED THAT BIDDER COMPLIES WITH THE REQUIREMENTS STIPULATED IN DATA SHEET-A.

2. THIS DATA SHEET SHALL BE FILLED UP COMPLETELY AND A COPY SHALL BE ENCLOSED WITH EACH COPY OF THE BID.

SIGNATURE OF BIDDER	
DATE	

PAINTING

13.0

13.0.1 This section defines the technical requirements for surface preparation selection and application of paints on equipment, vessels, machinery, piping, ducts etc. However, manufacturers shall follow their standard procedures for painting their equipment. The Bidder shall submit a detailed painting procedure for approval of OWNER / OWNER'S representative after the award of contract.

13.0.2 The following surface and material shall require painting:

a) All un-insulated carbon steel and alloy steel equipment like columns, vessels, drums, storage tanks, heat exchangers etc.
b) All un-insulated carbon steel and low alloy piping, fitting and valves (including painting of identification marks)
c) All pipe structural steel supports, walkways, platforms, hand rails, ladders etc.

13.0.3 The following surfaces and material shall not require painting:

a) Non-ferrous materials
b) Austenitic stainless steel
c) Plastic and / or plastic coated materials
d) Insulated surface of equipment and pipes except colour coating wherever required
e) Painted equipment like blowers, pumps, valves, etc., with finishing coats in good condition and with matching colour-code

13.1.0 **Codes and Standards**

13.1.0.1 Painting of equipment shall be carried out as per the specifications indicated below and shall conform to the relevant IS specification for the material and workmanship.

13.1.0.2 The following Indian Standards may be referred to carrying out the painting job.

IS : 5	:	Colours for ready mixed paints and enamels
IS : 1303	:	Glossary of terms relating to paints
IS : 2379	:	Colour code for identification of pipelines.
IS : 1477	:	Code of practice for painting of ferrous

metals in buildings (Parts I & II)

IS: 2524	:	Code of practice for painting of non-ferrous metals in buildings (Parts I & II)
IS : 2395	:	Code of practice for finishing of concrete, masonry and plaster surfaces (Parts I and II)
IS : 2338	:	Code of practice for finishing of wood and wood based materials (Parts I & II)
IS : 158	:	Ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water and heat resisting
IS : 2074	:	Ready mixed paint, air drying, red oxide zinc chrome, and priming.
IS : 104	:	Ready mixed paint, brushing, zinc chrome, priming
IS : 2932	:	Enamel, synthetic, exterior (a) undercoating (b) Finishing.
SIS : 55900	:	Swedish standard for blasting
IS: 14506	:	Epoxy Red oxide Zinc Phosphate Wieldable Primer, Two Component Specification
IS: 14209	:	Epoxy Enamel, Two Component, Glossy Specification
IS: 14589	:	Zinc priming paint, Epoxy based, Two-pack-specification

13.2.0 **SURFACE PREPARATION**

The surface shall be prepared in a manner suitable for coatings. Chemical de-rusters or rust converters shall not be applied. Acid cleaning is subject to approval of PURCHASER / PURCHASER'S representative.

13.2.1 **Blasting**

The surface of the part / component shall be blasted before the coating material is applied.
Unless otherwise specified in the documents, the surface shall satisfy the following requirements after blasting:
Primer paint shall be zinc silicate of approved brand. Dry film thickness of each primer coat shall be 15 – 25 μm

13.2.2 **Manual Rust Removal**

Manual rust removal shall be allowed for welded zones and for touching up installed components.

13.2.3 **Cleaning**

Removal of impurity

	Impurity	Removal
(a)	Dust, loose deposits	Vacuum-cleaning, brushing
(b)	Adhesive deposits	Power brushing
(c)	Oils, greasy impurities	Wet blasting, use of detergent additives by agreement
(d)	Salt deposits	Rinsing
(e)	Markings (e.g., felt tip pen)	Organic solvents to manufacturer's specifications e.g., Trichloro- trifluoro -ethane and solvents containing acetone (renew solvent and rag frequently).

13.3.0 **PROCESSING**

13.3.1 **General**

13.3.1.1 **Application Conditions**

The primer shall be applied to properly prepared surfaces only. The specifications of the coating material manufacturers shall be observed. The minimum temperature shall be $+5^0$C and the relative humidity shall not exceed 80%. The temperature of the work piece shall be at least 3 ^{0}C above dew point.

13.3.1.2 **Application Procedure**

The primer shall be applied by means of brush or by spray. The top coats shall be applied by means of brush, roller or by spray.
At points where coating application is interrupted, the individual layers shall be adequately stepped to ensure proper layer sequence when coating operations are resumed

13.3.1.3 **Touching Up**

Before each layer is applied, previous coating shall be touched up where necessary by way of rust removal and cleaning, according coating MANUFACTURER'S specifications. The final top coat shall be reapplied completely, if required.

13.3.1.4 **Uncoated Surfaces**

Moving parts of machines (e.g., stems, shafts, sliding and locating bearings), nameplates, instruments and sealing surface shall not be coated. Welds shall be left free of coating up to a distance of 30 mm on each side of the weld edge until erection and weld examinations, if any, have been completed.

13.3.1.5 **Bond Strength**

The pull-off stress determined using the pull-off test method for adhesion shall be not less than 1.5 N/mm^2, according to ISO 4624.

13.3.1.6 **Surface Conditions of Coating Surfaces**

The coating surface shall have a uniform film thickness, shade and gloss and shall be free from inclusions, sags and wrinkles.

13.3.1.7 **Coating Systems**

13.3.1.7.1 **General Requirements for Coating Systems**

Coating materials according to SSPC, BS 5493 or DIN 55 928 shall be used. Intermediate coats are to be pigmented with micaceous iron oxide. The materials shall be matched with each other so that they are compatible. Coatings deviating from this specification shall be subject to approval. Standards of surface preparation and painting shall give a time to first maintenance of 10 years.
The colour and gloss of top coats shall be in accordance with sub-clause suggested colour codes for painting (Sub-clause 13.10).

13.3.1.7.2 **Standard Coating System (External Coatings)**

a) **Steel Structures**

i. All steel structures shall receive two primer coats and two finish coats of painting. First coat of primer shall be given in shop after fabrication before dispatch to erection site after surface preparation as described below. The second coat of primer shall be applied after erection and final alignment of the erected structures. Two finish coats shall also be applied after erection.

ii. Steel surface which is to painted shall be cleaned of dust and grease and the heavier layers of rust shall be removed by chipping prior to actual surface preparation. The surface shall be abrasive blasted to Sa-2½ finish as per SIS05-5900. Primer paint shall be zinc silicate of approved brand. Dry film thickness of each primer coat shall be 40 microns.

iii. Finish paint shall be 2 coats of High built epoxy finish of approved brand. Dry film thickness of each finish coat shall be 90 microns. The undercoat and finish coat shall be of different tint to distinguish the same from finish paint. The total dry film thickness shall be 300 microns. All paints shall be of approved brand and shade as per the OWNER'S requirement.

iv. Joints to be site welded shall have no paint applied within 100 mm of welding zone. Similarly where Friction grip fasteners are to be used no painting shall be provided. On completion of the joint the surfaces shall receive the paint as specified.

v. Surfaces inaccessible after assembly shall receive two coats of primer prior to assembly. Surfaces inaccessible after erection including top surfaces of floor beams supporting gratings or chequered plate shall receive one additional coat of finish paint over and above number of coats specified before erection. Portion of steel member embedded / to be encased in concrete shall not be painted.

b) **Galvanised iron and steel requiring paint finish at site**
At site

Surface Treatment
Mechanical cleaning from contaminants by means of washing or steam jetting and sweep blasting with fine sand or etching (T-Wash).

Touch-up mechanical damages:
De rusting St 3 and application of high build epoxy primer DFT 80 μm.

Finish coating:
Analogous to standard painting scheme

13.3.1.7.2.1 **Painting of indoor components such as valves, pumps, motors, electrical parts, tanks etc.**

a) At works

Surface preparation:
Blasting according to SIS 055900: grade SA 2 ½. Depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer dry film thickness 15 – 25 μm, may be used.

Prime coat:
Two (2) layers of zinc phosphate epoxy, total dry film thickness 75 μm.

b) At site

Thorough cleaning to remove oil, grease, dirt and any other contaminants. De-rusting of all mechanical damages according to SIS 055900 Grade ST3. Touch up with dry film thickness 50 μm.

Finish coat:
Application of two finishing coats of Chlorinated rubber paint in approved shades at 30-40 microns DFT each coat in approved shades.

13.3.1.7.2.2 Remarks:
Equipment coated with a standard application system can be accepted if the quality of this application system is corresponding with the quality of the above mentioned system.

13.3.1.7.2.3 **Painting of Outdoors equipment (external surfaces) such as** piping**, valves, pumps, motors, electrical parts, tanks etc.**

Weather exposure, weather resistance, temperature up to 120^0C as per 13.7.1 and 13.7.3.

Surface Preparation:
Blasting according to SIS 055900: grade Sa 2 ½. Depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer dry film thickness 15-25 μm, may be used.

Prime Coat:
Two (2) layers of zinc phosphate epoxy, total dry film thickness 75 μm.

Intermediate Coat:
One (1) layer 2 pack high build epoxy polyamide Mio, dry film thickness 100 μm.

Finish Coat:
Application of two finishing coats of Chlorinated rubber paint in approved shades at 50 microns DFT each coat in approved shades.

13.3.1.7.2.4 **Special Coating System (External Coatings)**

Parts exposed to temperatures above 120^{0}C, up to 200^{0}C, not insulated

a) At works

Surface Preparation:
Blasting according standard SIS 55900 Grade Sa 2^1/2 and ISO 8501-1: 1988. Depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer, dry film thickness 15-25 μm, may be used

Prime coat
Inorganic ethyl zinc silicate, dry film thickness 75 μm.

b) At site

Pre-treatment:

De-rusting of all mechanical damages, according to ISO 8501-1: 1989, grade St 3 Touch-up with 1 pack inorganic ethyl zinc silicate, dry film thickness 50 μm.
Removal of all decontaminants from prime coat.

Intermediate Coat:
1 pack silicon acrylic, dry film thickness 35 μm.

Final coat
1 pack silicon acrylic, dry film thickness as 35 μm.

Total system dry film thickness 145 μm.
Final coat according to colour code.

Parts exposed to temperatures above 200^{0}C, up to 400^{0}C, not insulated

At works

Surface Preparation:

Blasting according to ISO 8501-1: 1988 grade Sa 2^1/2. Depending on

production flow, a weldable, inorganic ethyl zinc silicate shop primer, dry film 15-25 μm, shall be used.

Prime coat:

Inorganic ethyl zinc silicate, dry film of thickness 75 μm.

At site

Pre-treatment:
De-rusting of all mechanical damages, according standard Sa 21/2 to ISO 8501-1: 1988. Touch-up with coating system according to MANUFACTURER'S recommendations.

Insulated Parts, continuously exposed to condensing water or parts exposed to temperatures

For parts that are provided with insulation on site.

a) Insulated parts, exposed to condensing water

At works

Surface Preparations:

Blasting according standard Sa $2^1/2$ to ISO 8501-1: 1988. Depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer, dry film thickness 15-25 μm shall be used.
Prime coat:

Inorganic ethyl zinc silicate, dry film thickness 75μm.

b) Insulated parts exposed to temperatures
Parts, exposed to temperatures up to $<400^0$C at works

Surface Preparation:

Blasting according to standard Sa $2^1/2$ to ISO 8501-1: 1988. Depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer, dry film thickness 15-25 μm shall be used.

Parts, exposed to temperatures above 400^0C at works (Steam pipes, pressure tubes and parts for the HRSG, such as heating surfaces, heaters and super heaters reheaters, etc.)

Surface preparation:

Blasting according standard Sa 21/2 to ISO 8501-1: 1988.

Temporary primer:

Varnish.

c) Intermittent exposure due to condensing water / chemicals (Indoors)
At works

Surface Preparation:
Blasting according to standard Sa 21/2 to ISO 8501-1: 1988. Depending on production flow, a weldable, inorganic ethyl zinc silicate shop primer, dry film thickness 15-25 μm may be used.

Prime Coat:
Two layers of zinc phosphate epoxy primer total dry film thickness greater than or equal to 75 μm.

At site
Pre-treatment:

De-rusting of all mechanical damages, according standard Sa 3 to ISO 8501-1: 1988, touch-up with 2 pack high build epoxy with volume solid content of more than 85%, 75 μm.

Intermediate Coat:
2 pack high build epoxy, dry film thickness 80 μm.

Finish coat:

2 pack epoxy according to colour appearance, dry film thickness of 50 μm.

Total system dry film thickness 205 μm.

When exposed to weathering, weather resistance finish coat shall be applied.

d) Water exposure

Surfaces permanently or predominantly in contact with water.

At site / works

Pre-treatment:

Removal of all welding pearls.
Blasting according standard Sa 3 to ISO 8501-1: 1988.

Coat:

4 coats 2 pack coal-tar-epoxy, dry film thickness 125 μm each.
Total system dry film thickness 500 μm.
Touch-up after erection as required.

13.3.1.7.2.5 **Buried / underground piping system (except for sea water piping)**
Where pipelines are buried, underground protection shall be provided for the piping system as indicated in any one of the methods given below:
Coal tar primer, coal tar enamel, inner wrap of fibre glass, final outer wrap of enamel impregnated fibre glass. Total thickness of coating shall not be less than 4.0 mm.
With anti-corrosive tape of minimum 4 mm thick conforming to IS-10221 and AWWA C 203-93.

Pipe surfaces shall be cleaned by shot or sand blasting before application.

Tests to be carried out after application
Bond / Adhesion test
Holiday test

13.3.1.7.3 **INTERNAL COATINGS**

13.3.1.7.3.1 **Tanks (Internal Surfaces) as specified in relevant sections of specification**
Industrial, deionised, demineralised and potable water up to 60^0C pH range: 4.5 – 9.5.
Blasting according to ISO 8501-1: 1988, grade Sa $2^1/2$.

Prime coat:
Two layers of zinc phosphate epoxy primer total DFT greater than or equal to 75 μm.

Pre-treatment:
De-rusting of all mechanical damages, according to standard Sa 3 to ISO 8501-1:1998, touch up with 2 pack high build epoxy with volume solid content of more than 85%, 75 μm.

Intermediate coat:
2 pack high build epoxy, dry film thickness 80 μm.

Finish coats:
2 pack solvent free epoxy paint dry film thickness 150 μm per coat.
In case of service or potable water tanks, the coating material selected shall not taint the water.
QA / QC procedure, including pinhole inspection, for shall be submitted for approval by Owner / Owner's Representative.

13.3.1.7.3.2 **Rubber Lining of Pipes, Valves and Tanks as specified in relevant sections.**

At works

Pre-treatment:

Blasting according standard $2^1/2$ to ISO 8501-1: 1988.

Rubber lining:

Hard-rubber 5mm for DM water applications, thickness greater than or equal to 3 mm for others. In case of failure of rubber lining for both pipes and vessels, the rubber lining shall be replaced by COROCOAT

13.4.0 **Painting for Electrical Items**

13.4.1 All the steel work shall be thoroughly cleaned of rust, scale, oil, grease, dirt and scarf by pickling, emulsion cleaning, etc. The sheet steel shall be phosphated / oven dried and then painted with two coats of zinc rich primer paint. After application of the primer, two coats of finishing synthetic enamel paint shall be applied. The colour of the finishing coats inside shall be glossy white and exterior of the treated sheet steel shall be shade 631 of IS-5 / RAL 7032 for all switchboard/MCC/ Distribution boards, control panels, etc.

13.4.2 All electrical equipment shall be given tropical and fungicidal treatment and outdoor equipment shall be provided with rain hood to prevent entry of rain water into the equipment.

13.5.0 **Painting for I & C equipment: Epoxy coating required for all I&C equipment.**

13.5.1 **Suggested Colour Codes for Painting**

Sl. No.	Item / Service	Colour	IS–5	Colour (Band)	IS - 5

13.5.1	Structures, platforms, galleries, ladders and handrails.	Dark Admiralty Grey	632	-	-
13.5.2	Boiler casing, ducting	Nut Brown	413	-	-
13.5.3	Crane				
(a)	Crane structure	Golden Yellow	356	Black	-
(b)	Trolley and hook	Crimson	540	-	-
13.5.4	Pump motors, compressors	Light Grey	631	-	-
13.5.5	Tanks (without insulation and cladding)				
(a)	Outdoor	Aluminium	-	-	-
(b)	Indoor	Light Grey	631	-	-
13.5.6	Vessels and all other proprietary equipment (without insulation and cladding)	Light Grey	631	-	-
13.5.7	Switchgear	Light Grey	631	-	-
13.5.8	Control and relay panels	Light Grey	631/ 7078 of IS1650	-	-
13.5.9	Turbines	Light Grey	631	-	-
13.5.10	Generators and exciter	Light Grey	631	-	-
13.5.11	Transformers	Aluminium	-	-	-
13.5.12	Machinery guards	Signal red	537	-	-
13.5.13	Piping (Without insulation and cladding)				
(a)	Water System				

(i)	Boiler feed	Sea Green	217	-	-
(ii)	Condensate	Sea Green	217	Light Brown	410
(iii)	DM Water	Sea Green	217	Light Orange	557
(iv)	Soft Water	Sea Green	217	French Blue	166
(v)	Bearing cooling water	Sea Green	217	French Blue	166
(vi)	Potable and filtered water	Sea Green	217	French Blue	166
(vii)	Service and clarified water	Sea Green	217	French Blue	166
(viii)	Cooling water	Sea Green	217	French Blue	166
(ix)	Raw water	Sea Green	217	White	-
(b)	Air system				
(i)	Station air	Sky Blue	101	-	-
(ii)	Control air	Sky Blue	101	White	-
(c)	Oil system				
(i)	Light oil (HSD)	Light Brown	410	French blue	166
(ii)	Lubricating oil	Light Brown	410	Light grey	631
(iii)	Transformer oil	Light Brown	410	Light Orange	557
(d)	Gas system				
(i)	Fuel gas (Re-gassified LNG)	Canary Yellow			
(ii)	Carbon dioxide	Canary Yellow	309	Light grey	631
(iii)	Hydrogen	Canary Yellow	309	Signal red	537
(e)	Fire Services	Fire red	536	-	-
(f)	Effluent pipes	Black	-	-	-
(g)	Vacuum pipes	Sky Blue	101	Black	-
(h)	Drainage	Black	-	-	-

NOTES

1. This colour code basically refers to IS: 2379 for piping with necessary modifications.

2. Where band colour is specified, same shall be provided at 10 metre intervals on long uninterrupted lines and also adjacent to valves and junctions.

Note: Bidder shall furnish his painting specification to suit corrosive atmosphere of coastal area along with the bid. The specification shall in general be in line with the above requirements.

SECTION - D

CHAIN PULLEY BLOCK

1. GENERAL

1.1 This specification covers the design, manufacture, assembly, painting, inspection and testing at manufacturer's works of hand operated chain pulley block.

2. CODES AND STANDARDS

2.1 The design, manufacture, inspection and testing and performance of hand operated chain pulley blocks shall confirm to latest editions of the following standards : -

2.1.1 IS: 3832 Specification for hand operated chain pulley block OR BS 3243

2.1.2 IS 807:1976 Codes of Practice for Design, Manufacture, Erection and Testing (Structural Portion) of cranes and hoists.

2.1.3 IS: 3109(Part II) Calibrated load chain for pulley blocks and other lifting appliances

2.1.4 IS: 2429(Part II) Calibrated hand chain for pulley blocks and other lifting appliances

2.1.5 IS: 4460 Method for rating of machine cut spur and helical gears

2.1.6 IS 6216 : 1982 Short Link Chain, Grade T (8), Calibrated for Pulley Blocks and other Lifting Appliances

2.1.7 IS:15560: 2005 Point Hooks with Shank up to 160 Tonne - Specification

2.1.8 Material Specification IS or approved

3. EQUIPMENT

3.1 Chain Pulley Block – The block shall be so designed that all components shall withstand without failure, an application to the block of a load equal to at least four times the working load limit.

3.1.1 Frame

Frame shall be robust in design and of welded construction .The frame shall be selected in such a way that head room requirement is minimum. Frame shall maintain alignment under all expected conditions of services.

3.1.2 Chain

i. The load chain shall be electrically welded, accurately calibrated, and pitched arid polished conforming to IS: 6216 Grade 80(T8)/ IS 3109 (Part 2).

ii. The hand chain shall also be electrically welded, calibrated, pitched and polished and shall conform to IS: 2429 (Part II) Grade 30. The length of chain and link dimension shall be as per IS: 3832.

3.1.3 Hook

The forged hook shall be properly heat treated and so designed that in loaded condition, it is free to swivel without twisting the load chain. The hook shall conform to IS: 15560

3.1.4 Reduction Gear

The reduction gear shall be either spur or worm/ worm wheel type. The spur gear and worm shall be of high grade carbon steel and heat treated. The worm wheel shall be of bronze. A detachable steel cover shall be provided for total enclosure of the gear train and ample lubrication to be provided.

3.1.5 Brakes

Brakes shall be of screw friction disc type self-actuating or any other superior type. Brake capacity shall be ample and humid atmosphere shall not affect materials used. The brake shall prevent self lowering of load and arrest and sustain load in all working positions. The load brake shall also allow smooth lowering of the load without serious overheating which may impair working of block

3.1.6 Bearing

Bearing used shall be as per guidelines laid down in IS: 3832.

3.1.7 Chain Wheels

The load chain wheel shall be made of heavy duty malleable casting and shall be designed to ensure, effective operation of the chain. Load chain wheels shall be mounted on two ball bearings. Hand chain wheel shall be made from malleable casting/pressed sheet steel. The idler wheel shall be so shaped as to avoid the twisting of the chain during operation. The P.C.D of idler wheels shall be such that the bending action of the link is avoided. The hand chain wheel shall be provided with flanges and designed to ensure effective operation with hand chain.

3.1.8 Other components

All other components of chain pulley block such as anchorage, guide, pawl, stripper etc. shall be designed and provided as per IS: 3832.

3.1.9 Trolley

Monorail trolley frame shall be of heavy section rolled steel, held together by bolts. Wheels shall be of high grade cast iron/steel mounted on ball bearings. Axles and shafts shall be of carbon steel, accurately machined and suitably supported. The trolley shall be suitable for variations in I section beams. The trolley shall be geared travel type.

The hand chain required for trolley travel shall be as per clause 3.1.2 of this specification.

Hand chain wheel shall be as per clause 3.1.7 of this specification.

3.1.10 The effort required for hoisting and travel shall be as stipulated in IS 3832.

	TITLE **DATA SHEET – A** **CHAIN PULLEY BLOCK** 2X660 MW SURATGARH SUPER CRITICAL TPS, STAGE - V UNIT 7& 8	SPECIFICATION NO. PE-TS-392-563-A001 VOLUME II-B SECTION - D REV 00 DATE 05.05.15 SHEET 1 OF 3

1.00.00	Type	:	Hand operated chain pulley blocks
2.00.00	Capacity & Lift	:	As per Annexure I in Volume II B, Section C
3.00.00	Design	:	IS: 3832 OR BS 3243
4.00.00	Duty Class as per IS:3832	:	Class -II
5.00.00	Hoisting Mechanism		
a)	Type	:	Hand operated gear transmission
b)	Type of gear	:	Spur / Helical
c)	Load Chain	:	
	i) Type	:	Link type
ii)	Material	:	Alloy steel grade 80 as per IS: 6216 / IS3109
iii)	Conforms to (Std./Code)	:	IS: 6216/3109
d)	Hand Chain	:	
	i) Type	:	Link type
	ii) Material	:	Mild steel (grade 30) as per IS 2429 Part I
e)	Load Hook & Hook Block	:	
	i) Type of load hook	:	Plain shank- Trapezoidal section
ii)	Load hooks conforms to (Std./Code)/ Material	:	IS: 15560/ Forged alloy steel/ carbon steel
iii)	Type of hook suspension	:	Swiveling
iv)	Type of make of bearing of hook suspension	:	Thrust ball bearing
f)	Gears	:	
i)	Type	:	Spur
ii)	Material	:	Alloy steel / carbon steel
iii)	Type of bearing used	:	Antifriction ball bearing / Roller
g)	Pinions		
i)	Type of bearing used	:	Antifriction ball bearing / Roller

h)	Sprockets		
i)	Type of bearings used	:	Antifriction ball bearing / Roller
i)	Method of lubrications Used		
i)	Bearings	:	Grease
ii)	Gearing & Pinions	:	Grease
iii)	Sprockets	:	Grease
j)	Brakes	:	
i)	Type	:	Screw and friction disc type self-actuating load pressure brake
6.00.0	Trolley & Bridge Drive		
a)	Trolley		
i)	Type	:	Geared (Manually operated)
ii)	Material of frame	:	Rolled structural steel (IS:2062 Grade A or B)
b)	Drive Chain		
i)	Type	:	Link type
ii)	Material	:	Steel Gr.30
c]	Trolley Wheel		
i)	Number of pairs of wheel in each trolley/bridge	:	Two/four
ii)	Flange	:	Single flanged
iii)	Wheel material	:	Heat Treated Carbon steel/low alloy steel/graded cast iron
iv)	Type of bearings need	:	Antifriction
d)	Gears		
	i) Type	:	Spur / helical
	ii) Material	:	Alloy/ Carbon steel

iii) Type of bearings used : Antifriction

e) Method of lubrication for

i) Bearings : Grease

ii) Sprockets : Grease

f) Load chain wheel

i) Material : Heavy Duty Malleable Casting/Steel casting/pressed sheet steel.

g) Hand chain wheel

i) Material : Steel casting/pressed sheet steel

3 4 5 6

DRAWING No.

CUSTOMER'S DRAWING No.

A B F

COMPUTER FILE NAME : TAL5

DRG NO	
OWNER	RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD
STATUS CONTRACT DRG./REF. NO. (INTERNAL)	2X660 MW SURATGARH SUPER CRITICAL TPS, STAGE – V UNIT 7& 8
PRINT SCALE 0 2 4 6 8 10 20 30 40 50	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NEW DELHI
SUB-CONTRACTOR	
TITLE	
DEPT. SCALE SIGN DATE	BHEL DRG NO : SHEET 1 OF 1 REV

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD

DEPT CODE		NAME	SIGN	DATE
	DRN			
	DESN			
	CHD			
	APPD			

SIZE-A2

Master drawing list and submission schedule

Sl. No.	BHEL DRG.NO	DRAWING TITLE	REMARKS	SUBMISSION SCHEDULE - WEEK NUMBER FROM DATE OF P.O
	PE-TS-392-563-A001	**REV 00**		
1	PE-V0-387-563-A200	Manufacturing Quality Plan	INFORMATION	2
2	PE-V0-387-563-A201	GA Drawing for Chain Pulley Block with detail BOM with painting details	INFORMATION	2
3	PE-V0-387-563-A202	O & M Manual	INFORMATION	4
4	PE-V0-387-563-A203	Mandatory spare parts list	APPROVAL	3
5	PE-V0-387-563-A204	Erection procedure	INFORMATION	4
NOTE:	1	VENDOR SHALL RESUBMIT THE REVISED DRAWINGS WITHIN 7 DAYS OF RECIEPT OF COMMENTS.		
	2	INCOMPLETE DRAWINGS/DOCUMENTS SHALL NOT BE TREATED AS SUBMITTED.		
	3	MANUFACTURING SHALL BE STARTED ON RECIEPT OF CAT II APPROVED DRAWINGS.		

NO.OF DRAWINGS/DOCUMENTS FOR SUBMISSION

A.	Drawing for Approval	No. of prints/copies
i.	For approval	8
ii.	For final distribution (after the vendor obtains final approval from the customer).	12
B.	Certificate, reports etc. (Material test, inspection report and all other type of tests etc.)	6
C.	O&M Manual	
i.	Draft for approval	2
ii.	For final distribution	6

Note:

1.0 The number of hard copies may change.

2.0 Bidder to note that all the drawings and documents shall also be submitted on CD's (compact disc) in following software.

a) All the drawings shall be prepared in AutoCAD.
b) All the documents shall be prepared MS word / EXCEL.
c) PDF files for all drawings/documents shall also be submitted.

VOLUME III
DEVIATION SHEET (COST OF WITHDRAWAL)

PROJECT:- 2x660MW Suratgarh STPS

PACKAGE:- Chain Pulley Blocks, SPECIFICATION NO.: PE-TS-392-563-A001

TENDER ENQUIRY REFERENCE:-

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
TECHNICAL DEVIATIONS									
COMMERCIAL DEVIATIONS									

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	**DESIGNATIONS**	**SIGN & DATE**	

NOTES:

1. For self manufactured items of bidder, cost of withdrawl of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. For directly dispatchable items, cost of withdrawl of deviation will be applicable on the basic price including taxes, duties & freight.
3. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
4. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
5. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawl of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
6. Bidder shall furnish price copy of above format along with price bid.
7. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
8. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
9. For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawl of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawl of deviation shall be taken as NIL.
10. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
11. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
12. Cost of withdrawl is to be given seperately for each deviation. In no event bidder should club cost of withdrawl of more than one deviation else cost of withdrawl of such deviations which have been clubbed together shall be considered as NIL.
13. In case nature of cost of withdrawl (positive/negative) is not specified it shall be assumed as positive.
14. In case of descrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

DOCUMENTS TO BE FURNISHED WITH OFFER FOR TECHNICAL EVALUATION

1) SCHEDULE OF TECHNICAL DEVIATION (IF ANY)
   OR

   'NO DEVIATION CERTIFICATE' – Clearly mentioning that bidder has considered 'No - Deviation' from the technical specification provided by BHEL.

2) SIGNED AND STAMPED COPY OF COMPLIANCE CUM CONFIRMATION CERTIFICATE.
3) Unpriced format, duly mentioned 'Quoted' against each Sl.no. below each column.

NOTE:

i) NO OTHER DOCUMENTS OTHER THAN THOSE LISTED ABOVE ARE REQUIRED TO BE S UBMITTED FOR TECHNICAL EVALUATION. IN CASE ANY OTHER DOCUMENT IS FURNISHED, THE SAME WILL NOT BE TAKEN INTO CONSIDERATION FOR TECHNICAL EVALAUATION.

ii) BIDDER TO CLEARLY MENTION "QUOTED" AGAINST EACH ITEM. IN CASE ANY ITEM IS NOT APPLICABLE THEN "NA" SHOULD BE CLEARLY MENTIONED AGAINST THE SAME.

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', if applicable, 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 shall be within the contracted price with no extra implications to BHEL after award of the contract.

d) All drawings/ data-sheets/ calculations etc. submitted along with the offer shall be considered for reference only, same shall be subject to BHEL/ CUSTOMER approval in the event of order.

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. 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.