

NTPC SAIL POWER COMPANY (P) LIMITED

**1X250 MW NSPCL ROURKELA
THERMAL POWER PROJECT**

**TECHNICAL SPECIFICATION
FOR
MOBILE PICK UP & CARRY CRANE**

SPECIFICATION NO.: PE-TS-427-563-A601



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, INDIA**



TITLE

**1X250 MW ROURKELA TPS
MOBILE PICK UP & CARRY CRANE
CONTENTS**

SPECIFICATION NO. PE-TS-427-563-A601

Section

REV 00

Sub Sec

APRIL 2017

Page 1 OF 51

CONTENTS

SECTION

TITLE

I

Specific Technical Requirement

I A

General Technical Requirement

II

Standard Technical Requirement

IIIA

List of documents to be submitted with the bid

IIIB

Compliance cum Confirmation Certificate

IIIC

Pre-bid Clarification Schedule



**TECHNICAL SPECIFICATION
1X250 MW NSPCL ROURKELA TPS
MOBILE PICK & CARRY CRANE**

SPECIFICATION NO. PE-TS-427-563-A601

SECTION I

REV. 00

Sub Sec

DATE: APRIL 2017

Page 2 OF 51

SECTION: I

SPECIFIC TECHNICAL REQUIREMENTS

SUB-SECTION IA – Specific Technical Requirement (Mechanical)

SUB-SECTION IB – NIL



**TECHNICAL SPECIFICATION
1X250 MW NSPCL ROURKELA TPP
MOBILE PICK & CARRY CRANE**

SPECIFICATION NO. PE-TS-427-563-A601

SECTION I

REV. 00

SUB.SEC. IA

DATE: APRIL 2017

SHEET 3 OF 51

SUB-SECTION-IA

Specific Technical Requirement (Mechanical)

	TITLE 1X250 MW NSPCL ROURKELA TPS MOBILE PICK UP & CARRY CRANE INTENT OF SPECIFICATION	SPECIFICATION NO. PE-TS-427-563-A601	
		SECTION I	
		REV 00	
		SUB. SEC. IA	DATE APRIL 2017
		PAGES 4 OF 51	

1.0

INTENT OF SPECIFICATION

1.1

The specification is intended to cover design, engineering, manufacturing, inspection and testing at vendor’s /sub vendor’s / manufacturer’s works, painting, forwarding, proper packing and shipment and delivery at site on FOR site basis, of One no. 12T capacity **MOBILE PICK UP & CARRY CRANE** as per details in different sections / volumes of this specification for **1X250 MW NSPCL ROURKELA TPS** at Rourkela.

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 MOBILE PICK UP & CARRY CRANE.**

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 tenderers 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

	TITLE 1X250 MW NSPCL ROURKELA TPS MOBILE PICK UP & CARRY CRANE INTENT OF SPECIFICATION	SPECIFICATION NO. PE-TS-427-563-A601	
		SECTION I	
		REV 00	
		SUB. SEC. IA	DATE APRIL 2017
		PAGES 4 OF 51	
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 deviation schedule along with cost of withdrawal; otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification. If no cost of withdrawal is given against the deviation, it will be presumed that deviation can be withdrawn without any cost to BHEL/its customer 1.9 In the event of any conflict between the requirements of two clauses of this specification documents or requirements of different codes and standards specified, more stringent requirement as per the interpretation of the owner shall apply. 1.10 In case all above requirements are not complied with, the offer may be considered as incomplete and would become liable for rejection. 1.11 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 Customer including their consultant as interpreted by BHEL in the relevant context. Note: Bidder to note that BHEL reserves the right for drawing/document submission through web based Document Management System. Bidder would be provided access to the DMS for drawing/document 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). • 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://dmsserver.bhelnepem.com/Wrench%20Web%20Access/Login.aspx.			



TITLE	SPECIFICATION NO. PE-TS-427-563-A-601	
	SECTION -I	
	REV 0	
	SUB.SECTION –IA	DATE APRIL 2017
MOBILE PICK UP AND CARRY CRANE		Page 6 of 51
1X250 MW NSPCL ROURKELA TPS		

1.0.0. SCOPE OF WORK

1.1.0. SUPPLIES

- 1.1.1. Equipment and services to be furnished by the bidder for **12T Capacity Mobile Pick up and Carry Crane** with accessories as per the details given in data sheet A. Any equipment / accessories not specified in the specification but required to make the crane unit complete and efficient shall also be under the bidder's scope of work.

1.1.2. SERVICES

Bidders' scope of work shall also include, arranging the statutory clearance from the concerned Government body/Authority as and when required.

Temporary registration and on road insurance will be responsibility of the Bidder

Permanent registration and 01 year insurance of the vehicle will be responsibility of bidder in the name of ultimate customer.

1.1.3. Maintenance Tools and Tackles

A complete unused new set of special purpose tools, tackles and accessories along with detailed instructions and maintenance manual shall be supplied. Each tool and wrench shall be stamped so as to be identified easy for its use. The tools shall be supplied in steel toolbox and with a copy of instruction manual. The items supplied shall be of the best quality and specially protected against rusting in tropical climate.

Note: - The crane shall be supplied with one set of tool and tackles with O&M manual in the toolbox separately.

1.2.0. Inspection and Testing

- 1.2.1. Inspection and testing at Manufacturer's works

A. Shop inspection and tests will be carried out at manufacturer's works.

Bidder shall submit detailed quality plan, indicating various test to be carried out at works at various stages along with final performance test procedure along with guaranteed parameters.

1.3.0. SURFACE PREPARATION, PAINTING & COLOUR SCHEME

- 1.3.1. Standard painting procedure shall be furnished by vendor during detail engineering & the same shall be subject to customer approval. Any observation on the same shall be complied by vendor without any commercial implication

- 1.3.1.1 Necessary touch up paint of sufficient quantity for coating at site shall be provided by the vendor

- 1.3.1.2 All exposed surfaces should be made free from oil and grease before it is Sand Blasted.



TITLE	SPECIFICATION NO. PE-TS-427-563-A-601	
	SECTION -I	
	REV 0	
	SUB.SECTION –IA	DATE APRIL 2017
MOBILE PICK UP AND CARRY CRANE		Page 6 of 51
1X250 MW NSPCL ROURKELA TPS		

1.4.0. **Drawing / design document for submission.**

A. **For Approval**

As per Annexure-II

2.0.0. **Number of drawing and documents for submission**

The number of prints / copies required for various drawing and documents are listed in Annexure-I of this specification.

3.0.0. **Deviations**

If the proposal submitted has got any deviation from the technical stipulations in the tender document, bidder shall tabulate the same in the cost of withdrawal format attached in GCC furnishing full particular of such deviations. Deviations are to be furnished with mention to specific clause Number. Notes / comments etc. are not acceptable. If there are no deviations from the tender document, bidder shall indicate so. Reasons / explanations for such deviations shall be furnished

4.0.0. **Performance/Demonstration test**

Mobile crane along with its drives, controls and other accessories shall be demonstrated for the rated capacity against the rated speed of motions and for the service conditions specified

The bidder shall have the full responsibility for the safe and efficient operation of the crane with associated accessories as a single unit. If the shop/site performance tests indicate the failure of any of the components to achieve the guaranteed performance, the deficiency shall be made good at bidder's cost.

5.0.0. **Make of Sub - Vendor items.**

Bidder shall submit the 'List of Makes of Bought-out items' for BHEL/Customer review / approval. Addition/deletion of any particular sub vendor item by BHEL/Customer shall not have commercial/delivery implication

6.0.0. **Drawing & Documents to be attached with Tender**

6.1.0. No Deviation Certificate. Deviation, if any, will have to be clearly brought out in the Cost of withdrawal format attached in the GCC.

6.2.0. List of Maintenance Tools and Tackles, Commissioning Spares, if any,



TECHNICAL SPECIFICATION FOR
MOBILE PICK AND CARRY CRANE
1X250 MW NSPCL ROURKELA TPS

SPECIFICATION NO. PE-TS-427-563-A601

SEC : I

REV 00

SUB. SEC. IA

DATE APRIL 2017

Sl no.	Description	Specification requirement
1	Cap.	12T
2	Quantity	1 no.
3	Turning radius	As per manufacturer std.
4	Main Frame	Rigid construction box-type frame having high strength
5	Boom	Telescopic type boom
6	Boom Telescope	Min three part telescopic boom with hydraulically operated extension jack.
7	Boom Angle	Maximum 50 deg., minimum 0 deg.
8	Hoist System	Driven by Hydraulic Motor/ Hydraulic winch type
9	Max crane speed	25-30 Kmph without load, with load 2-3 Kmph
10	Hoisting/lowering speed	As per manufacturing standard design
11	Steering	Hydraulic power assisted steering/ Articulated power steering/ as per manufacturer's design
12	Drive	As per manufacturer's standard design.
13	Brake	Service Brake should be pneumatically assisted hydraulic brake. Front and rear brakes to be applicable through a foot pedal. Parking brakes shall also be provided
14	Transmission	As per manufacturer std
15	Engine	Water cooled diesel engine providing sufficient power to properly run the mobile crane along with the rated load.
16	Hydraulic system	Vane/gear type hydraulic pump with control valve.
17	Fluid capacities	Fuel tank – As per mfr's std Hydraulic tank – As per mfr's std
18	Wheels	Front – total 4 no's, Rear – Total 2 no's
19	Electrical System	12V, DC starting and lighting equipment including two dipping head lights, side lights, rear and stop light, flashing direction indicator
20	Safety Features	Audio overload warning Hose failure protection Safety brake on hoist Audio over hoisting warning
21	Gauges	Water temperature Engine Oil Pressure etc.
22	Accessories	Standard accessories as per list of manufacturers including the following- a) Front and rear work lights b) Reflectors c) Safety belt for the operator d) Front bumper e) Rear view mirror
23	Cabin	Rear/Front mounted as per proven design of manufacturer
24	Tool kit	Standard tool kit in a tool box
25	Painting	Manufacturer standard
26	Battery discharge indicator	Yes
27	Side indicator	Yes
28	Engine pollution norms	Shall conform to BS-III

GENERAL TECHNICAL REQUIREMENTS (AS APPLICABLE)

1.00.00 INTRODUCTION

This part covers technical requirements which will form an integral part of the Contract. The following provisions shall supplement all the detailed technical specifications and requirements brought out in Section-VI, the Technical Specification and the Technical Data Sheets.

2.00.00 BRAND NAME

Whenever a material or article is specified or described by the name of a particular brand, manufacturer or vendor, the specific item mentioned shall be understood to be indicative of the function and quality desired, and not restrictive; other manufacturer's products may be considered provided sufficient information is furnished to enable the Employer to determine that the products proposed are equivalent to those named.

3.00.00 BASE OFFER & ALTERNATE PROPOSALS

The Bidder's proposal shall be based upon the use of equipment and material complying fully with the requirements specified herein. It is recognised that the Contractor may have standardized on the use of certain components, materials, processes or procedures different than those specified herein. Alternate proposals offering similar equipment based on the manufacturer's standard practice will also be considered, provided the base offer is in line with technical specifications and such proposals meet the specified design standards and performance requirement and are acceptable to the Employer. Sufficient amount of information for justifying such proposals shall be furnished to Employer alongwith the bid to enable the Employer to determine the acceptability of these proposals.

4.00.00 COMPLETENESS OF FACILITIES

4.01.00 Bidders may note that this is a turnkey contract. Each of the plant shall be engineered and designed in accordance with the specification requirement. All engineering and associated services are required to ensure a completely engineered plant shall be provided.

4.02.00 All equipments furnished by the Contractor shall be complete in every respect, with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or those needed for erection, completion and safe operation of the equipment and for the safety of the operating personnel, as required by applicable codes, though they may not have been specifically detailed in the respective specifications, unless included in the list of exclusions.

All same standard components/ parts of same equipment provided, shall be interchangeable with one another.

586



4.03.00 For the C&I systems, the Contractor shall be required to provide regular information about future upgrades and migration paths to the Employer.

5.00.00 **CODES & STANDARDS**

5.01.00 In addition to the codes and standards specifically mentioned in the relevant technical specifications for the equipment / plant / system, all equipment parts, systems and works covered under this specification shall comply with all currently applicable statutory regulations and safety codes of the Republic of India as well as of the locality where they will be installed, including the following :

- a) Indian Electricity Act
- b) Indian Electricity Rules
- c) Indian Explosives Act
- d) Indian Factories Act and State Factories Act
- e) Indian Boiler Regulations (IBR)
- f) Regulations of the Central Pollution Control Board, India
- g) Regulations of the Ministry of Environment & Forest (MoEF), Government of India
- h) Pollution Control Regulations of Department of Environment, Government of India
- i) State Pollution Control Board.
- (j.) Rules for Electrical installation by Tariff Advisory Committee (TAC).
- (k.) Building and other construction workers (Regulation of Employment and Conditions of services) Act, 1996
- (l.) Building and other construction workers (Regulation of Employment and Conditions of services) Central Rules, 1998
- (m.) Explosive Rules, 1983
- (n.) Petroleum Act, 1984
- (o.) Petroleum Rules, 1976,
- (p.) Gas Cylinder Rules, 1981



- (q.) Static and Mobile Pressure Vessels (Unified) Rules, 1981
- (r.) Workmen's Compensation Act, 1923
- (s.) Workmen's Compensation Rules, 1924
- (t.) NSPCL Safety Rules for Construction and Erection
- (u.) NSPCL Safety Policy
- (v.) Any other statutory codes / standards / regulations, as may be applicable.

5.02.00

Unless covered otherwise in the specifications, the latest editions (as applicable as on date of bid opening), of the codes and standards given below shall also apply :

- a) Bureau of Indian standards (BIS)
- b) Japanese Industrial Standards (JIS)
- c) American National Standards Institute (ANSI)
- d) American Society of Testing and Materials (ASTM)
- e) American Society of Mechanical Engineers (ASME)
- f) American Petroleum Institute (API)
- g) Standards of the Hydraulic Institute , U.S.A.
- h) International Organisation for Standardisation (ISO)
- i) Tubular Exchanger Manufacturer's Association (TEMA)
- j) American Welding Society (AWS)
- k) National Electrical Manufacturers Association (NEMA)
- l) National Fire Protection Association (NFPA)
- m) International Electro-Technical Commission (IEC)
- n) Expansion Joint Manufacturers Association (EJMA)



588



o) Heat Exchange Institute (HEI)

p) IEEE standard

q) JEC standard

5.03.00 Other International/ National standards such as DIN, VDI, BS, GOST etc. shall also be accepted for only material codes and manufacturing standards, subject to the Employer's approval, for which the Bidder shall furnish, adequate information to justify that these standards are equivalent or superior to the standards mentioned above. In all such cases the Bidder shall furnish specifically the variations and deviations from the standards mentioned elsewhere in the specification together with the complete word to word translation of the standard that is normally not published in English.

5.04.00 As regards highly standardised equipments such as Steam Turbine and Generator, National /International standards such as JIS, DIN, VDI, ISO, SEL, SEW, VDE, IEC & VGB shall also be considered as far as applicable for Design, Manufacturing and Testing of the respective equipment. However, for those of the above equipment not covered by these National / International standards, established and proven standards of manufacturers shall also be considered.

5.05.00 In the event of any conflict between the codes and standards referred to in the above clauses and the requirement of this specification, the requirement of Technical Specification shall govern.

5.06.00 Two (2) English language copies of all national and international codes and/or standards used in the design of the plant and equipment shall be provided by the Contractor to the Employer within two calendar months from the date of the Notification of Award.

5.07.00 In case of any change in codes, standards & regulations between the date of bid opening and the date when vendors proceed with fabrication, the Employer shall have the option to incorporate the changed requirements or to retain the original standard. It shall be the responsibility of the Contractor to bring to the notice of the Employer such changes and advise Employer of the resulting effect.

5.08.00 A detailed list of standards apart from those mentioned in the respective detailed specifications in other parts of Volume : II-F to which all equipment/systems/civil works should conform as indicated elsewhere in the specification.

6.00.00 **EQUIPMENT FUNCTIONAL GUARANTEE**

6.01.00 The functional guarantees of the equipment under the scope of the Contract is given in **Volume-I, Chapter-6** of Technical Specifications.

6.02.00 Liquidated damages for shortfall in meeting functional guarantee(s) during the performance and guarantee tests shall be assessed and recovered from the Contractor as specified elsewhere in this specification.

7.00.00 **DESIGN OF FACILITIES/ MAINTENANCE & AVAILABILITY CONSIDERATIONS**

7.01.00 **DESIGN OF FACILITIES**

All the design procedures, systems and components proposed shall have already been adequately developed and shall have demonstrated good reliability under similar conditions elsewhere.

The Contractor shall be responsible for the selection and design of appropriate equipments to provide the best co-ordinated performance of the entire system. The basic requirements are detailed out in various clauses of the Technical Specifications. The design of various components, assemblies and subassemblies shall be done so that it facilitates easy field assembly and dismantling. All the rotating components shall be so selected that the natural frequency of the complete unit is not critical or close to the operating range of the unit.

7.02.00 **MAINTENANCE AND AVILABILITY CONSIDERATIONS**

Equipment/works offered shall be designed for high availability, low maintenance and ease of maintenance. The Bidder shall specifically state the design features incorporated to achieve high degree of reliability/ availability and ease of maintenance. The Bidder shall also furnish details of availability records in the reference plants stated in his experience list.

Bidder shall state in his offer the various maintenance intervals, spare parts and man-hour requirement during such operation. The intervals for each type of maintenance namely inspection of the furnace, inspection of the entire hot gas path and the minor and major overhauls shall be specified in terms of fired hours, clearly defining the spare parts and man-hour requirement for each stage.

Lifting devices i.e. hoists and chain pulley jacks, etc. shall be provided by the contractor for handling of any equipment or any of its part having weight in excess of 500 Kgs during erection and maintenance activities.

Lifting devices like lifting tackles, slings, etc. to be connected to hook of the hoist / crane shall be provided by the contractor for lifting the equipment and accessories covered under the specification.

✓ 590



8.00.00 **DOCUMENTS, DATA AND DRAWINGS TO BE FURNISHED BY CONTRACTOR**

8.01.00 Bidders may note that this is a turnkey contract. Each of the plant and equipment shall be fully integrated, engineered and designed to perform in accordance with the technical specification. All engineering and technical services required to ensure a completely engineered plant shall be provided in respect of mechanical, electrical and power systems, control & instrumentation, civil & structural works.

The Contractor shall furnish engineering data /drawings in accordance with the schedule of information as specified in Technical Data Sheets and Technical Specification.

A comprehensive engg and quality coordination procedure shall be finalized with the successful bidder covering salient features as described in this section of specifications.

8.02.00 The number of copies/prints/CD-ROMs/manuals to be furnished for various types of document is given in **Annexure-VI** of the Technical Specification.

8.03.00 The documentation that shall be provided by the Contractor is indicated in the various sections of specification. This documentation shall include but not be limited to the following:

8.03.01 A) **BASIC ENGINEERING DOCUMENTATION**

Prior to commencement of the detailed engineering work, the Contractor shall furnish a Plant Definition Manual within 12 weeks from the date of the Notification of Award. This manual shall contain the following as a minimum:

- i) System description of all the mechanical, electrical, control & instrumentation & civil systems.
- ii) Technology scan for each system / sub-system & equipment.
- iii) Selection of appropriate technology / schemes for various systems/ subsystems including techno-economic studies between various options.
- iv) Optimisation studies including thermal cycle optimisation.
- v) Sizing criteria of all the systems, sub-systems/ equipments/ structures/ equipment foundations alongwith all calculations justifying and identifying the sizing and the design margins.

- vi) Schemes and Process & Instrumentation diagrams for the various systems/ sub-system with functional write-ups.
- vii) Water Balance diagram.
- viii) Operation Philosophy and the control philosophy of the Main Plant and other plants.
- ix) General Layout plan of the power station incorporating all facilities in Bidder's as well as those in the Employer's scope. This drawing shall also be furnished in the form of CD-ROMs to the Employer for engineering of areas not included in bidder's scope.
- x) Basic layouts and cross sections of the main plant building (various floor elevations), boiler, fuel oil area, transformer yard, switchyard and other areas included in the scope of the bidder.
- xi) Documentation in respect of Quality Assurance System as listed out elsewhere in this specification.

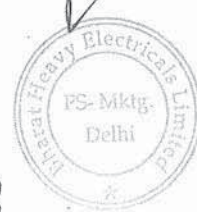
The successful bidder shall furnish within three (3) weeks from the date of Notification of Award, a list of contents of the Plant Definition Manual (PDMs) including techno-economic studies, which shall then be mutually discussed & finalised with the Employer.

B) DETAILED ENGINEERING DOCUMENTS

- i) General layout plan of the station.
- ii) Layouts, general arrangements, elevations and cross-sections drawings for all the equipment and facilities of the plant.
- iii) Flow diagram, process and instrumentation diagrams along with write up and system description.
- iv) Start up curves for boiler and both turbines and boiler combined together as a unit for various start ups, viz. cold, warm and hot start up.
- v) Piping isometric, composite layout and fabrication drawings.
- vi) Piping engineering diagrams, pipe and fittings schedules, valve schedules, hanger and support schedules, insulation schedules.



592



- vii) Technical data sheets for all bought out and manufactured items. Contractor shall use the Employer's specifications as a base for placement of orders on their sub vendors.
- viii) Detailed design calculations for components, system, piping etc., wherever applicable including sizing calculations for all auxiliaries like mills, fans, BFPs, CEPs, Heaters/ Deaerators, Condensers, vacuum pumps etc.
- ix) Boiler pressure part schedule and sizing calculations. Boiler performance data and boiler design dossier.
- x) Transient, hydraulic and thermal stress analysis of piping and system wherever applicable & input and output data alongwith stress analysis isometrics showing nodes..
- xi) Thermal cycle information (heat balance diagrams, boiler performance calculations, condenser and heat exchanger thermal calculations etc.).
- xii) Characteristic Curves/ Performance Correction Curves. Hydraulic & Mechanical design calculations for condensers & heaters.
- xiii) Comprehensive list of all terminal points which interface with Employer's facilities, giving details of location, terminal pressure, temperature, fluid handled & end connection details, forces, moments etc.
- xiv) Power supply single line diagram, block logics, control schematics, electrical schematics, etc.
- xv) Protection system diagrams and relay settings.
- xvi) Cables schedules and interconnection diagrams.
- xvii) Cable routing plan.
- xviii) Instrument schedule, measuring point list, I/O list, Interconnection & wiring diagram, functional write-ups, installation drawings for field mounted instruments, logic diagrams, control schematics, wiring and tubing diagrams of panels and enclosures etc. Drawings for open loop and close loop controls (both hardware and software). Motor list and valve schedule including type of actuator etc.
- xix) Alarm and annunciation/ Sequence of Event (SOE) list and alarms & trip set points.

- xx) Sequence and protection interlock schemes.
- xxi) Type test reports, insulation co-ordination study report and power system stability study report.
- xxii) Control system configuration diagrams and card circuit diagrams and maintenance details.
- xxiii) Detailed DDCMIS system manuals.
- xxiv) Detailed flow chart for digital control system.
- xv) Mimic diagram layout, Assignment for other application engg.
- xxvi) Civil and Structural works drawings and documents for all structures, facilities, architectural works, foundations underground and overground works and super-structural works as included in the scope of the bidder civil calculation sheets including structural analysis and design alongwith output results.
- xxvii) Underground facilities, levelling ,sanitary, land scaping drawings. xxviii) Geotechnical investigation and site survey reports (if and as applicable).
- xxix) Model study reports wherever applicable.
- xxx) Functional & guarantee test procedures and test reports.
- xxxi) Documentation in respect of Quality Assurance System, and Documentation in respect of Commissioning, as listed out elsewhere in this specification.

The Contractor's while sumitting the above documents/ drawings for approval/ reference as the case may be, shall mark on each copy of submission the reference letter alongwith the date vide which the submissions are made.

8.03.02

INSTRUCTION MANUALS

The Contractor shall submit to the Employer, draft Instruction Manuals for all the equipments covered under the Contract by the end of one year from the date of his acceptance of the Letter of Award. The Instruction manuals shall contain full details required for erection, commissioning, operation and maintenance of each equipment. The manual shall be specifically compiled for this project. After finalisation and approval of the Employer the Instruction Manuals shall be submitted as indicated in **Annexure-IV**. The Contract shall not be considered to be completed



for purposes of taking over until the final Instructions manuals have been supplied to the Employer. The Instruction Manuals shall comprise of the following.

A) ERECTION MANUALS

The erection manuals shall be submitted atleast three (3) months prior to the commencement of erection activities of particular equipment/system. The erection manual should contain the following as a minimum.

- a) Erection strategy.
- b) Sequence of erection.
- c) Erection instructions.
- d) Critical checks and permissible deviation/tolerances.
- e) List of tool, tackles, heavy equipments like cranes, dozers, etc.
- f) Bill of Materials
- g) Procedure for erection and General Safety procedures to followed during erection/installation.
- h) Procedure for initial checking after erection.
- i) Procedure for testing and acceptance norms.
- j) Procedure / Check list for pre-commissioning activities.
- k) Procedure / Check list for commissioning of the system.
- l) Safety precautions to be followed in electrical supply distribution during erection.

B) OPERATION & MAINTENANCE MANUALS

- a) The manual shall be a two rim PVC bound stiff sided binder able to withstand constant usage or where a thicker type is required it shall have locking steel pins, the size of the manual shall not be larger than international size A3. The cover shall be printed with the Project Name, Services covered and Volume / Book number Each section of the manual shall be divided by a stiff divider of the same size as the holder. The dividers shall clearly state the section number and title. All written instructions within the manual not provided by the

manufacturers shall be typewritten with a margin on the left hand side.

b) The arrangement and contents of O & M manuals shall be as follows :

- 1) Chapter 1 - Plant Description : To contain the following sections specific to the equipment/system supplied
 - (a) Description of operating principle of equipment / system with schematic drawing / layouts.
 - (b) Functional description of associated accessories / controls. Control interlock protection write up.
 - (c) Integrated operation of the equipment alongwith the intended system. (The is to be given by the supplier of the Main equipment by taking into account the operating instruction given by the associated suppliers).
 - (d) Exploded view of the main equipment, associated accessories and auxiliaries with description. Schematic drawing of the equipment alongwith its accessories and auxiliaries.
 - (e) Design data against which the plant performance will be compared.
 - (f) Master list of equipments, Technical specification of the equipment/ system and approved data sheets.
 - (g) Identification system adopted for the various components, (it will be of a simple process linked tagging system).
 - (h) Master list of drawings (as built drawing - Drawings to be enclosed in a separate volume).
- 2) Chapter 2.0 - Plant Operation: To contain the following sections specific to the equipment supplied
 - (a) Protection logics provided for the equipment alongwith brief philosophy behind the logic, Drawings etc.
 - (b) Limiting values of all protection settings.
 - (c) Various settings of annunciation/interlocks provided.

596



- (d) Startup and shut down procedure for equipment alongwith the associated systems in step mode.
- (e) Do's and Don'ts related to operation of the equipment.
- (f) Safety precautions to be take during normal operation. Emergency instruction on total power failure condition/lubrication failure/any other conditions.
- (g) Parameters to be monitored with normal value and limiting values.
- (h) Equipment isolating procedures.
- (i) Trouble shooting with causes and remedial measures.
- (j) Routine testing procedure to ascertain healthiness of the safety devices alongwith schedule of testing.
- (k) Routine Operational Checks, Recommended Logs and Records
- (l) Change over schedule if more than one auxiliary for the same purpose is given.
- (m) Preservation procedure on long shut down.
- (n) System/plant commissioning procedure.

3) Chapter 3.0 - Plant Maintenance- To contain the following sections specific to the equipment supplied.

- (a) Exploded view of each of the equipments. Drawings alongwith bill of materials including name, code no. & population.
- (b) Exploded view of the spare parts and critical components with dimensional drawings (In case of Electronic cards, the circuit diagram to be given) and spare parts catalogue for each equipment.
- (c) List of Special T/ P required for Overhauling /Trouble shooting including special testing equipment required for calibration etc.
- (d) Stepwise dismantling and assembly procedure clearly specifying the tools to be used, checks to be made, records to be maintained etc. Clearance to be maintained etc.



- (e) Preventive Maintenance schedules linked with running hours/calendar period along with checks to be carried out.
 - (f) Overhauling schedules linked with running hours/calendar period along with checks to be done.
 - (g) Long term maintenance schedules
 - (h) Consumables list along with the estimated quantity required during normal running and during maintenance like Preventive Maintenance and Overhauling.
 - (i) List of lubricants with their Indian equivalent, Lubrication Schedule including charts showing lubrication checking, testing and replacement procedure to be carried daily, weekly, monthly & at longer intervals to ensure trouble free operation and quantity required for complete replacement..
 - (j) Tolerance for fitment of various components.
-
- (k) Details of sub vendors with their part no. in case of bought out items. (l)
List of spare parts with their Part No, total population, life expediency & their interchangeability with already supplied spares to NSPCL .
 - (m) List of mandatory and recommended spare list along with manufacturing drawings, material specification & quality plan for fast moving consumable spares.
 - (n) Lead time required for ordering of spares from the equipment supplier, instructions for storage and preservation of spares.
 - (o) General information on the equipment such as modification carried out in the equipment from its inception, equipment population in the country / foreign country and list of utilities where similar equipments have been supplied.

8.03.03

After finalization and approval of the Employer, the O & M Manuals shall be submitted as indicated in Annexure-VI. The Contract shall not be considered to be completed for purposes of taking over until the final Instructions manuals (both erection and O & M manuals have been supplied to the Employer.

If after the commissioning and initial operation of the plant, the instruction manuals (Erection and /or O&M manuals) require modifications/additions/ changes, the same shall be incorporated and the updated final instruction manuals shall be submitted by the



598

Contractor to the Employer for records and number of copies shall be as mentioned in Annexure-VI.

8.03.03 PLANT HANDBOOK AND PROJECT COMPLETION REPORT

8.03.03.01 PLANT HANDBOOK

The Contractor shall submit to the Employer a preliminary plant hand book preferably in A-4 size sheets which shall contain the design and performance data of various plants, equipments and systems covering the complete project including

- i) Design and performance data.
- ii) Process & Instrumentation diagrams.
- iii) Single line diagrams.
- iv) Sequence & Protection Interlock Schemes.
- v) Alarm and trip values.
- vi) Performance Curves.
- vii) General layout plan and layout of main plant building and auxiliary buildings
- viii) Important Do's & Don't's

The plant handbook shall be submitted within twelve (12) months from the date of award of contract. After the incorporation of Employer's comments, the final plant handbook complete in all respects shall be submitted three (3) months before start-up and commissioning activities.

8.03.03.02 PROJECT COMPLETION REPORT

The Contractor shall submit a Project Completion Report at the time of handing over the plant.

8.03.04 DRAWINGS

- a) i) All the plant layouts shall be made in computerised 3D modelling system. The Employer reserves the right to review the 3D model at different stages during the progress of engineering. The layout drawings submitted for Employer's review shall be fully dimensioned and extracted from 3D model after interference check.



- ii) All documents submitted by the Contractor for Employer's review shall be in electronic form (soft copies) along with the desired number of hard copies as per **Annexure-VI**, however numbers of drawings/document shall be decided during Kick off Meeting.

The soft copies of identified drawings/documents shall be in pdf format, whereas the attachments/reply to the submitted document(s) can be in .doc, .xls, .pdf, .dwg or .std formats.

- iii) Final copies of the approved drawings along with requisite number of hard copies shall be submitted as per **Annexure-VI**.

- iv) The completed plant documentation including integrated 3-D model with equipment drawings, data sheets, P&ID, BOQ, schematics, logic diagrams, test reports and quality plan, etc. attached to the respective equipments / systems in the 3D model shall be furnished to Employer, along with the design review software (network ready) which shall include interference check, walk-through animation, simulation, visual effect, photo realism etc. loaded on a server with 2 work stations (latest configuration for server & workstation) with one A4 size colored laser printer and one A0 size colored plotter. The software shall include facility for obtaining hard copies of all the drawings/documents on standard plotter / printer.

The requisite hardware and software shall be supplied and commissioned by the Contractor at Employer's Engineering Office Complex at Noida as per mutually agreed schedule.

All softwares provided shall necessarily include the cost for perpetual license(s) for use on all the machines and an Annual Maintenance Contract (AMC) which shall include software upgrades as & when released by the software agency for a period of three (3) years after warranty/guarantee period.

- b) All documents/text information shall be in latest version of MS Office or MS Excel as applicable.
- c) All drawings submitted by the Contractor including those submitted at the time of bid shall be in sufficient detail indicating the type, size, arrangement, weight of each component for packing and shipment, the external connection, fixing arrangement required, the dimensions required for installation and interconnections with other equipments and materials, clearance and spaces required between various portions of equipment and any other information specifically requested in the drawing schedules.



- d) Each drawing submitted by the Contractor (including those of subvendors) shall bear a title block at the right hand bottom corner with clear mention of the name of the Employer, the system designation, the specifications title, the specification number, the name of the Project, drawing number and revisions. If standard catalogue pages are submitted the applicable items shall be indicated therein. All titles, notings, markings and writings on the drawing shall be in English. All the dimensions should be in metric units.
- e) The drawings submitted by the Contractor (or their subvendors) shall bear Employer's drawing number in addition to contractor's (their sub-vendor's) own drawing number. Employer's drawing numbering system shall be made available to the successful bidder so as to enable him to assign Employer's drawing numbers to the drawings to be submitted by him during the course of execution of the Contract.

The Contractor shall also furnish a "Master Drawing List" which shall be a comprehensive list of all drawings/ documents/ calculations envisaged to be furnished by him during the detailed engineering to the Employer. Such list should clearly indicate the purpose of submission of these drawings i.e. "FOR APPROVAL" or "FOR INFORMATION ONLY".

Similarly, all the drawings/ documents submitted by the Contractor during detailed engineering stage shall be marked "FOR APPROVAL" or "FOR INFORMATION" prior to submission. Further, space shall be identified on each drawing for Approval stamp and electronic signature.

- f) The furnishing of detailed engineering data and drawings by the Contractor shall be in accordance with the time schedule for the project. The review of these documents/ data/ drawings by the Employer will cover only general conformance of the data/ drawings/ documents to the specifications and contract, interfaces with the equipments provided by others and external connections & dimensions which might affect plant layout. The review by the Employer should not be construed to be a thorough review of all dimensions, quantities and details of the equipments, materials, any devices or items indicated or the accuracy of the information submitted. The review and/ or approval by the Employer/ Project Manager shall not relieve the Contractor of any of his responsibilities and liabilities under this contract.
- g) After the approval of the drawings, further work by the Contractor shall be in strict accordance with these approved drawings and no deviation shall be permitted without the written approval of the Employer.
- h) All manufacturing, fabrication and execution of work in connection with the equipment / system, prior to the approval of the drawings, shall be at the Contractor's risk. The Contractor is expected not to make any changes in the design of the equipment /system, once they are approved by the Employer.

However, if some changes are necessitated in the design of the equipment/system at a later date, the Contractor may do so, but such changes shall promptly be brought to the notice of the Employer indicating the reasons for the change and get the revised drawing approved again in strict conformance to the provisions of the Technical Specification.

- i) Drawings shall include all installations and detailed piping layout drawings. Layout drawings for all piping of 65 mm and larger diameter shall be submitted for review/ approval of Employer prior to erection. Small diameter pipes shall however be routed as per site conditions in consultation with site authority/ representative of Employer based on requirements of such piping indicated in approved/ finalised Flow Scheme/ Process & Instrumentation Diagrams and/or the requirements cropping up for draining & venting of larger diameter piping or otherwise after their erection as per actual physical condition for the entire scope of work of this turnkey package.

Assessing & anticipating the requirement and supply of all piping and equipment shall be done by the contractor well in advance so as not to hinder the progress of piping & equipment erection, subsequent system charging and its effective draining & venting arrangement as per site suitability.

- j) As Built Drawings

After final acceptance of individual equipment / system by the Employer, the Contractor will update all original drawings and documents for the equipment / system to "as built" conditions and submit no. of copies as per Annexure VI.

- k) Drawings must be checked by the Contractor in terms of its completeness, data adequacy and relevance with respect to Engineering schedule prior to submission to the Employer. In case drawings are found to be submitted without proper checking by the Contractor, the same shall not be reviewed and returned to the Contractor for re-submission. The contractor shall make a visit to site to see the existing facilities and understand the layout completely and collect all necessary data/ drawings at site which are needed as an input to the engineering. The contractor shall do the complete engineering including interfacing and integration of all his equipment, systems & facilities within his scope of work as well as interface engineering & integration of systems, facilities, equipment & works under Employer's scope and submit all necessary drawings/ documents for the same.

- l) The Contractor shall submit adequate prints of drawing / data / document for Employer's review and approval. The Employer shall review the drawings and return soft copy to the Contractor authorizing either to proceed with manufacture or fabrication, or marked to show changes desired. When



602

changes are required, drawings shall be re-submitted promptly, with revisions clearly marked, for final review. Any delays arising out of the failure of the Contractor to submit/rectify and resubmit in time shall not be accepted as a reason for delay in the contract schedule.

- m) All engineering data submitted by the Contractor after final process including review and approval by the Project Manager/ Employer shall form part of the contract documents and the entire works covered under these specification shall be performed in strict conformity with technical specifications unless otherwise expressly requested by the Project Manager in writing.

8.04.00

ENGINEERING INFORMATION SUBMISSION SCHEDULE

Prior to the award of Contract, a Detailed Engineering Information Submission Schedule shall be tied up with the Employer. For this, the bidder shall furnish a detailed list of engineering information alongwith the proposed submission schedule. This list would be a comprehensive one including all engineering data / drawings / information for all bought out items and manufactured items. The information shall be categorised into the following parts.

- i) Information that shall be submitted for the approval to the Employer before proceeding further, and
- ii) Information that would be submitted for Employer's information only.

The Master Drawing List(MDL) shall be updated periodically and submitted to the employer, highlighting the changes made in MDL.

The schedule should allow adequate time for proper review and incorporation of changes/ modifications, if any, to meet the contract without affecting the equipment delivery schedule and overall project schedule. The early submission of drawings and data is as important as the manufacture and delivery of equipment and hardware and this shall be duly considered while determining the overall performance and progress.

8.06.00

Engineering Co-ordination Procedure

8.06.01

The following principal coordinators will be identified by respective organizations at time of award of contract :

NSPCL Engineering Coordinator:

Name

Designation



R

Address :

a) Postal :

b) Telegraphic / e-Mail :

c) FAX : TELEPHONE :

Contractor's/ Vendor's Engineering Coordinator (VENDOR EC):

Name :

Designation :

Address :

a) Postal :

b) Telegraphic / e-Mail :

c) FAX : TELEPHONE :

8.06.02 All engineering correspondence shall be in the name of above coordinators on behalf of the respective organizations.

8.06.03 Contractor's/Vendor's Drawing Submission and Approval Procedure :

- a) All data/information furnished by Vendor in the form of drawings/ documents/catalogues or in any other form for NSPCL's information/ interface and or review and approval are referred by the general term "drawings".
- b) The 'Master drawings list' indicating titles, Drawing Number, Date of submission and approval etc. shall be finalised mutually between Contractor and Employer before the award of contract. This list shall be updated if required at suitable interval during detailed engineering.
- c) All drawings (including those of subvendor's) shall bear at the right hand bottom corner the 'title plate' with all relevant information duly filled in. The Contractor shall furnish this format to his subvendor along with his purchase order for subvendor's compliance.
- d) Employer and contractor shall follow their own numbering systems for the drawings. However, Employer shall intimate the contractor, NSPCL drawing number on receipt of the first submission of each drawing. Vendor, thereafter, shall indicate NSPCL's drawing number in subsequent



604

in the space provided for this purpose in title plate, in addition to his own drawing number.

- e) The contractor shall make a visit to site to see the existing facilities and understand the layout completely and collect all necessary data / drawings at site which are needed as an input to the engineering. The contractor shall do the complete engineering including interfacing and integration of all his equipment, systems & facilities within his scope of work as well as interface engineering & integration of systems, facilities, equipment & works under Employer's scope and submit all necessary drawings/ documents for the same.
- f) Drawings must be checked by the Contractor in terms of its completeness, data adequacy and relevance with respect to engineering schedule prior to submission to the Employer. In case drawings are found to be submitted without proper endorsement for checking by the Contractor, the same shall not be reviewed and returned to the Contractor for re-submission.
- g) The Contractor shall submit adequate prints of drawing / data / document for Employer's review and approval. The drawings submitted by the Contractor/vendor shall be reviewed by NSPCL and their comments shall be forwarded within four (4) weeks of receipt of drawings. Upon review of each drawing, depending on the correctness and completeness of the drawing, the same will be categorized and approval accorded in one of the following categories :

CATEGORY-I: Approved

CATEGORY-II Approved, subject to incorporation of comments/ modification as noted. Resubmit revised drawing incorporating the comments.

CATEGORY -III Not approved. Resubmit revised drawings for approval after incorporating comments/ modification as noted.

CATEGORY -IV For information and records.

- h) Contractor shall resubmit the drawings approved under Category II, III & IV within three (3) weeks of receipt of comments on the drawings, incorporating all comments. Every revision of the drawing shall bear a revision index wherein such revisions shall be highlighted in the form of description or marked up in the drawing identifying the same with relevant revision Number enclosed in a triangle (eg. 1, 2, 3 etc). Contractor shall not make any changes in the portions of the drawing other than those commented. If changes are required to be made in the portions already approved, the

Contractor shall resubmit the drawing identifying the changes for Employer's review and approval. Drawings resubmitted shall show clearly the portions where the same are revised marking the relevant revision numbers and Employer shall review only such revised portion of documents.

- i) In case, the Contractor/ Vendor does not agree with any specific comment, he shall furnish the explanation for the same to NSPCL for consideration. In all such cases the Contractor shall necessarily enclose explanations along with the revised drawing (taking care of balance comments) to avoid any delay and/or duplication in review work.
 - j) It is responsibility of the Contractor/ Vendor to get all the drawings approved in the Category I & IV (as the case may be) and complete engineering activities within the agreed schedule. Any delay arising out of submission and modification of drawings shall not alter the contract completion schedule.
 - k) If Contractor/ Vendor fails to resubmit the drawings as per the schedule, construction work at site will not be held up and work will be carried out on the basis of comments furnished on previous issues of the drawing.
-
- l) These comments will be taken care by the contractor while submitting the revised drawing.

The contractor shall use a single transmittal for drawings. Submission. This shall include transmittal numbers and date, number of copies being sent, names of the agencies to whom copies being sent, drawing number and titles, remarks or special notes if any etc.

8.05.00 **ENGINEERING PROGRESS AND EXCEPTION REPORT**

- 8.05.01 The Contractor shall submit every month an Engineering progress and Exception Report giving the status of each engineering information including
 - a) A list of drawings/engineering information which remains unapproved for more than four (4) weeks after the date of first submission
 - b) Drawings which were not submitted as per agreed schedule.
- 8.05.02 The draft format for this report shall be furnished to the Employer within four (4) weeks of the award of the contract, which shall then be discussed and finalised with the Employer.



606

9.00.00 **TECHNICAL CO-ORDINATION MEETING**

9.01.00 The Contractor shall be called upon to organise and attend monthly Design/ Technical Co-ordination Meetings (TCMs) with the Employer/Employer's representatives and other Contractors of the Employer during the period of contract. The Contractor shall attend such meetings at his own cost at NEW DELHI or at mutually agreed venue as and when required and fully co-operate with such persons and agencies involved during the discussions.

9.02.00 The Contractor should note that Time is the essence of the contract. In order to expedite the early completion of engineering activities, the Contractor shall submit all drawings as per the agreed Engineering Information Submission Schedule. The drawings submitted by the Contractor will be reviewed by the Employer as far as practicable within three (3) weeks from the date of receipt of the drawing. The comments of the Employer shall then be discussed across the table during the above Technical Co-ordination Meeting (s) wherein best efforts shall be made by both sides to ensure the approval of the drawing.

9.02.01 The Contractor shall ensure availability of the concerned experts / consultants/ personnel who are empowered to take necessary decisions during these meetings. The Contractor shall be equipped with necessary tools and facilities so that the drawings/documents can be resubmitted after incorporating necessary changes and approved during the meeting itself.

9.02.02 Should any drawing remain unapproved for more than six (6) weeks after it's first submission, this shall be brought out in the monthly Engineering Progress and Exception Report with reasons thereof.

9.03.0 Any delays arising out of failure by the Contractor to incorporate Employer's comments and resubmit the same during the TCM shall be considered as a default and in no case shall entitle the Contractor to alter the Contract completion date.

10.00.00 **DESIGN IMPROVEMENTS**

The Employer or the Contractor may propose changes in the specification of the equipment or quality thereof and if the parties agree upon any such changes the specification shall be modified accordingly.

If any such agreed upon change is such that it affects the price and schedule of completion, the parties shall agree in writing as to the extent of any changing the price and/or schedule of completion before the Contractor proceeds with the change. Following such agreement, the provision thereof, shall be deemed to have been amended accordingly.



11.00.00 **EQUIPMENT BASES**

A cast iron or welded steel base plate shall be provided for all rotating equipment which is to be installed on a concrete base, unless otherwise specifically agreed to by the Employer. Each base plate shall support the unit and its drive assembly, shall be of a neat design with pads for anchoring the units, shall have a raised lip all around, and shall have threaded drain connections.

12.00.00 **PROTECTIVE GUARDS**

Suitable guards shall be provided for protection of personnel on all exposed rotating and/or moving machine parts. All such guards shall be designed for easy installation and removal for maintenance purpose.

13.00.00 **LUBRICANTS, SERVO FLUIDS AND CHEMICALS**

13.01.00 The Bidder's scope includes all the first fill and one year's topping, requirements of consumables such as oils, lubricants, servo fluids, gases essential chemicals etc. Consumption of all these consumables during the initial operation and final filling after the initial operation shall also be included in the scope of the Bidder. Bidder shall also supply a quantity not less than 10% of the full charge of each variety of lubricants, servo fluids, gases, chemicals etc. used which is expected to be utilised during the first year of operation. This additional quantity shall be supplied in separate Containers.

13.02.00 As far as possible lubricants marketed by the Indian Oil Corporation shall be used. The variety of lubricants shall be kept to a minimum possible.

Detailed specifications for the lubricating oil, grease, gases, servo fluids, control fluids, chemicals etc. required for the complete plant covered herein shall be furnished. On completion of erection, a complete list of bearings/ equipment giving their location and identification marks shall be furnished to the Employer alongwith lubrication requirements.

14.00.00 **LUBRICATION**

14.01.00 Equipment shall be lubricated by systems designed for continuous operation. Lubricant level indicators shall be furnished and marked to indicate proper levels under both standstill and operating conditions.

15.00.00 **MATERIAL OF CONSTRUCTION**

15.01.00 All materials used for the construction of the equipment shall be new and shall be in accordance with the requirements of this specification. Materials utilised for various components shall be those which have established themselves for use in such applications.



608

16.00.00 **RATING PLATES, NAME PLATES & LABELS**

- 16.01.00 Each main and auxiliary item of plant shall have permanently attached to it in a conspicuous position, a rating plate of non-corrosive material upon which shall be engraved manufacturer's name, equipment, type or serial number together with details of the ratings, service conditions under which the item of plant in question has been designed to operate, and such diagram plates as may be required by the Employer.
- 16.02.00 Each item of plant shall be provided with nameplate or label designating the service of the particular equipment. The inscriptions shall be approved by the Employer or as detailed in appropriate section of the technical specifications.
- 16.03.00 Such nameplates or labels shall be of white nonhygroscopic material with engraved black lettering or alternately, in the case of indoor circuit breakers, starters, etc. of transparent plastic material with suitably coloured lettering engraved on the back.
- 16.04.00 Items of plant such as valves, which are subject to handling, shall be provided with an engraved chromium plated nameplate or label with engraving filled with enamel. The name plates for valves shall be marked in accordance with MSS standard SP-25 and ANSI B 16.34 as a minimum.
- 16.05.00 Hanger/ support numbers shall be marked on all pipe supports, anchors, hangers, snubbers and restraint assemblies. Each constant and variable spring support shall also have stamped upon it the designed hot and cold load which it is intended to support.
- 16.06.00 Valves, steam traps and strainers shall be identified by Employer's tag number of a metal tag permanently attached to non pressure parts such as the yoke by a stainless steel wire.
- 16.07.00 Safety and relief valves shall be provided with the following:
- a) Manufacturer's identification.
 - b) Nominal inlet and outlet sizes in mm.
 - c) Set pressure in Kg/cm^2 (abs).
 - d) Blowdown and accumulation as percentage of set pressure.
 - e) Certified capacity in Kg of saturated steam per hour or in case of liquid certified capacity in litres of water per minute.



16.08.00 All such plates, instruction plates, etc. shall be bilingual with Hindi inscription first, followed by English. Alternatively, two separate plates one with Hindi and the other with English inscriptions may be provided.

16.09.00 All segregated phases of conductors or bus ducts, indoor or outdoor, shall be provided with coloured phase plates to clearly identify the phase of the system.

17.00.00 **TOOLS AND TACKLES**

The Contractor shall supply with the equipment one complete set of all special tools and tackles and other instruments required and other instruments for the erection, assembly, disassembly and proper maintenance of the plant and equipment and systems (including software). These special tools will also include special material handling equipment, jigs and fixtures for maintenance and calibration / readjustment, checking and measurement aids etc. A list of such tools and tackles shall be submitted by the Bidder alongwith the offer.

The price of each tool / tackle shall be deemed to have been included in the total bid price. These tools and tackles shall be separately packed and sent to site. ~~The Contractor shall also ensure that these tools and tackles are not used by him during erection, commissioning and initial operation.~~ For this period the Contractor should bring his own tools and tackles. In case these tools and tackles are used by the Contractor during erection, commissioning or initial operation the same shall be refurbished repaired/replaced as required to the satisfaction of the Employer before handing over to the Employer. All the tools and tackles shall be of reputed make acceptable to the Employer.

18.00.00 **WELDING**

18.01.00 If the manufacturer has special requirements relating to the welding procedures for welds at the terminals of the equipments to be per formed by others the requirements shall be submitted to the Employer in advance of commencement of erection work.

19.00.00 **COLOUR CODE FOR ALL EQUIPMENTS/ PIPINGS/ PIPE SERVICES**

19.01.00 All equipment/ piping/ pipe services are to be painted by the Contractor in accordance with Employer's standard colour coding scheme as mentioned in **Volume : II-G (Painting)** of the technical Specification.

20.00.00 **PROTECTION AND PRESERVATIVE SHOP COATING**

20.01.00 **PROTECTION**

All coated surfaces shall be protected against abrasion, impact, discoloration and any other damages. All exposed threaded portions shall be suitably protected with



either metallic or a nonmetallic protection device. All ends of all valves and piping and conduit equipment connections shall be properly sealed with suitable devices to protect them from damage. All primers/paints/coatings shall take into account the hot humid, corrosive & alkaline, subsoil or over ground environment as the case may be. The requirements for painting specification shall be complied with as detailed out in Part-A & B of the Technical Specification.

20.02.00 **PRESERVATIVE SHOP COATING**

All exposed metallic surfaces subject to corrosion shall be protected by shop application of suitable coatings. All surfaces which will not be easily accessible after the shop assembly, shall be treated beforehand and protected for the life of the equipment. All surfaces shall be thoroughly cleaned of all mill scales, oxides and other coatings and prepared in the shop. The surfaces that are to be finish-painted after installation or require corrosion protection until installation, shall be shop painted as per the requirements covered in the relevant part of the Technical Specification.

Transformers and other electrical equipments, if included shall be shop finished with one or more coats of primer and two coats of high grade resistance enamel. The finished colors shall be as per manufacturer's standards, to be selected and specified by the Employer at a later date.

20.03.00 Shop primer for all steel surfaces which will be exposed to operating temperature below 95 degrees Celsius shall be selected by the Contractor after obtaining specific approval of the Employer regarding the quality of primer proposed to be applied. Special high temperature primer shall be used on surfaces exposed to temperature higher than 95 degrees Celsius and such primer shall also be subject to the approval of the Employer.

20.04.00 All other steel surfaces which are not to be painted shall be coated with suitable dust preventive compound subject to the approval of the Employer.

20.05.00 All piping shall be cleaned after shop assembly by shot blasting or other means approved by the Employer. Lubé oil piping or carbon steel shall be pickled.

20.06.00 Painting for Civil structures and equipment/system covered under this package shall be done as specified under technical requirements on civil works in relevant part of this specifications.

21.00.00 **QUALITY ASSURANCE PROGRAMME**

21.01.00 To ensure that the equipment and services under the scope of contract whether manufactured or performed within the Contractor's works or at his sub-contractor's premises or at the Employer's site or at any other place of work are in accordance with the specifications, the Contractor shall adopt suitable quality assurance

programme to control such activities at all points, as necessary. Such programmes shall be outlined by the Contractor and shall be finally accepted by the Employer/authorised representative after discussions before the award of the contract. The QA programme shall be generally in line with ISO-9001/IS-14001. A quality assurance programme of the contractor shall generally cover the following:

- a) His organisation structure for the management and implementation of the proposed quality assurance programme
- b) Quality System Manual
- c) Design Control System
- d) Documentation Control System
- e) Qualification data for Bidder's key Personnel.
- f) The procedure for purchase of materials, parts, components and selection of sub-contractor's services including vendor analysis, source inspection, incoming raw-material inspection, verification of materials purchased etc.
- g) System for shop manufacturing and site erection control including process controls and fabrication and assembly controls.
- h) Control of non-conforming items and system for corrective actions.
- i) Inspection and test procedure both for manufacture and field activities.
- j) Control of calibration and testing of measuring testing equipments.
- k) System for Quality Audits.
- l) System for indication and appraisal of inspection status.
- m) System for authorising release of manufactured product to the Employer.
- n) System for handling storage and delivery.
- o) System for maintenance of records, and
- p) Furnishing of quality plans for manufacturing and field activities detailing out the specific quality control procedure adopted for controlling the quality characteristics relevant to each item of equipment/component as per formats enclosed as **Annexure-I** and **Annexure-II** respectively.



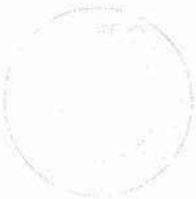
22.00.00 **GENERAL REQUIREMENTS - QUALITY ASSURANCE**

- 22.01.00 All materials, components and equipment covered under this specification shall be procured, manufactured, erected, commissioned and tested at all the stages, as per a comprehensive Quality Assurance Programme. An indicative programme of inspection/tests to be carried out by the contractor for some of the major items is given in the respective technical specification. This is, however, not intended to form a comprehensive programme as it is the contractor's responsibility to draw up and implement such programme duly approved by the Employer. The detailed Quality Plans for manufacturing and field activities shall be drawn up by the Bidder and will be submitted to Employer for approval. Schedule of finalisation of such quality plans will be finalised before award in enclosed format shall be furnished.
- 22.02.00 Manufacturing Quality Plan will detail out for all the components and equipment, various tests/inspection, to be carried out as per the requirements of this specification and standards mentioned therein and quality practices and procedures followed by Contractor's/ Sub-contractor's/ sub-supplier's Quality Control Organisation, the relevant reference documents and standards, acceptance norms, inspection documents raised etc., during all stages of materials procurement, manufacture, assembly and final testing/performance testing. The Quality Plan after approval shall be submitted in compiled form on CD-ROM (As per format at Annexure-I)
- 22.03.00 Field Quality Plans will detail out for all the equipment, the quality practices and procedures etc. to be followed by the Contractor's "Site Quality Control Organisation", during various stages of site activities starting from receipt of materials/equipment at site (As per format at Annexure - II).
- 22.04.00 The Bidder shall also furnish copies of the reference documents/plant standards/acceptance norms/tests and inspection procedure etc., as referred in Quality Plans along with Quality Plans. These Quality Plans and reference documents/standards etc. will be subject to Employer's approval without which manufacturer shall not proceed. These approved documents shall form a part of the contract. In these approved Quality Plans, Employer shall identify customer hold points (CHP), i.e. test/checks which shall be carried out in presence of the Employer's Project Manager or his authorised representative and beyond which the work will not proceed without consent of Employer in writing. All deviations to this specification, approved quality plans and applicable standards must be documented and referred to Employer along with technical justification for approval and dispositioning.
- 22.05.00 The contractor shall submit to the Employer Field Welding Schedule for field welding activities in the format enclosed at **Annexure-V**. The field welding schedule shall be submitted to the Employer along with all supporting documents, like welding



procedures, heat treatment procedures, NDT procedures etc. at least ninety days before schedule start of erection work at site.

- 22.06.00 The contractor shall have suitable Field Quality Organization with adequate manpower at Employer's site, to effectively implement the Field Quality Plan (FQP) and Field Quality Management System for site activities. The contractor shall submit the details of proposed FQA setup (organizational structure and manpower) for employer's approval. The FQA setup shall be in place at least one month before the start of site activities.
- 22.07.00 No material shall be despatched from the manufacturer's works before the same is accepted, subsequent to predespatch final inspection including verification of records of all previous tests/inspections by Employer's Project Manager/Authorised representative and duly authorised for despatch by issuance of Material Despatch Clearance Certificate (MDCC).
- 22.08.00 All material used for equipment manufacture including casting and forging etc. shall be of tested quality as per relevant codes/standards. Details of results of the tests conducted to determine the mechanical properties; chemical analysis and details of heat treatment procedure recommended and actually followed shall be recorded on certificates and time temperature chart. Tests shall be carried out as per applicable material standards and/or agreed details
- 22.09.00 All welding and brazing shall be carried out as per procedure drawn and qualified in accordance with requirements of ASME Section IX/BS-4870 or other International equivalent standard acceptable to the Employer.
- All welding/brazing procedures shall be submitted to the Employer or its authorised representative for approval prior to carrying out the welding/brazing.
- 22.10.00 All brazers, welders and welding operators employed on any part of the contract either in Contractor's/his sub-contractor's works or at site or elsewhere shall be qualified as per ASME Section-IX or BS-4871 or other equivalent International Standards acceptable to the Employer.
- 22.11.00 All brazers, welders and welding operators employed on any part of the contract either in Contractor's/sub-contractor's works or at site or elsewhere shall be qualified as per ASME Section-IX or BS-4871 or other equivalent International Standards acceptable to the Employer..
- 22.12.00 For all IBR pressure parts and high pressure piping welding, the latest applicable requirements of the IBR (Indian Boiler Regulations) shall also be essentially complied with. However, other piping shall be as per relevant code. Similarly, any other statutory requirements for the equipment/systems shall also be complied with. On all back-gauged welds MPI/LPI shall be carried before seal welding



Distribution Schedule Annex-I

S.No	Description of Drgs/Docs	No of Prints	No of CD ROMs/DVDs/Portable Hard Disk
1	Drawings, Data sheets, Design calculations, Purchase specifications and other documents		
	First submission and submission with major changes		
	③ Layout (A0&A1 sizes)	6	-
	③ Other Drawings/Documents (A0&A1 sizes)	6	-
	③ P&ID (All sizes)	6	-
	a) Final drawings/documents (Directly to site)	6	2
	b) "As Built" Drawing/Documents (Directly to site)	6	2
	c) Analysis reports of Equipments / piping /structures components/system employing software packages as detailed in the specifications.	4	2
2	Erection Manual (Directly to site)	4 sets	2
3	Operation & Maintenance manual		
	i) First Submission	1 set	--
	ii) Final Submission (Directly to site)	4 sets	2
4	Plant Hand Book		
	i) First Submission	1	1
5	Commissioning and Performance Test Procedure manual		
	i) First Submission	1 set	--
	ii) Final Submission (Directly to site)	4 sets	2



S.No	Description of Drgs/Docs	No of Prints	No of ROMs/DVDs/Portable Hard Disk	CD
6	Performance and Functional Guarantee Test Report			
	i) First Submission	4 sets	—	
	ii) Approved Copies (Direct to Site)	6 sets	2	
7	Project Completion Report (Directly to site)	6 sets	2	
8	QA programme including Organisation for implementation and QA system manual(with revisions)	1	—	
9	Vendor details in respect of proposed vendors including contractor's evaluation report.	2	—	
10	Manufacturing QPs, Field QPs, Field welding schedules and their reference document like test procedures, WPS, POR etc			
	i) For review/comment	1	—	
	ii) Approved final copies of Field QPs, Field welding schedules and their reference document like test procedures, WPS, POR etc (Direct to Site)	4	2	
11	Welding Manual, Heat Treatment Manuals, Storage & preservation manuals			
	i) For review/comment	1 set	—	
	ii) Approved copies (Direct to Site)	4 sets	2	
12	QA Documentation Package for items / equipment manufactured and despatched to site	2 sets	2	
13	QA Documentation Package for field activities on equipment/systems at site	2 sets	2	

654





TECHNICAL SPECIFICATION FOR
1X250 MW NSPCL ROURKELA
MOBILE CRANE

SPECIFICATION NO. PE-TS-427-563-A-601

SECTION I

REV 00

Sub. Sec I A

DATE APRIL 2017

ANNEXURE-II

DRAWINGS/ DOCUMENTS TO BE SUBMITTED AFTER AWARD OF CONTRACT

The successful bidder shall submit the following drawings / documents during detail engineering for customer's approval /information:

Sl. No.	BHEL DRG.NO	DRAWING TITLE	Approval category	SUBMISSION SCHEDULE - WEEK NUMBER FROM DATE OF LOI
1	PE-V0-427-563-A601	Inspection Check List / Manufacturing Quality Plan of Mobile Pick and Carry Crane	A	2
2	PE-V0-427-563-A602	GA & Data sheet of Mobile Pick and Carry Crane with painting and Catalogue	A	2
3	PE-V0-427-563-A603	O & MANUAL	A	4

Notes:

- The above drawing list is tentative and shall be finalized with the successful bidder after placement of order. While some of the drawings indicated above may not be applicable, some additional drawings may also be required based on scope of work.
- Drawings shall be prepared in Auto-Cad latest edition. Required no. of hard and soft copies (editable) of the drawings shall be furnished as per requirement specified elsewhere in the specification.
- Only manual calculation with authentic supporting literature (e.g. extracts of hand Book/ standard/codes) shall be acceptable. All design calculations and drawings shall be in SI system only.
- Bidder to note that all values/dimensions/elevations etc. without supporting back up data adopted/assumed by the successful bidder (during contract stage) in the design calculation/drawings shall be taken by the customer/owner to be correct unless they are stipulated in the specification. Any problem arising later in this regard shall be made good by the successful bidder at his cost and no extension of time shall be granted for the same.
- All the drawings and documents including general arrangement drawing, data sheet, calculation etc. to be furnished to the customer during detailed engineering stage shall include / indicate the following details for clarity w.r.t. Inspection, construction, erection and maintenance etc.:-
 - All drawings and documents shall indicate the list of all reference drawings including general arrangement.
 - All drawings shall include / show plan, elevation, side view, cross - section, skin section, blow - up view; all major self-manufactured and bought out items shall be labeled and included in BOQ / BOM in tabular form.
 - Painting schedule shall also be made as a part of general arrangement drawing of each equipment / items indicating at least 3 trade names.
 - All the drawings required to be furnished to customer during detailed engineering stage shall include technical parameters, details of paints and lubrication, hardness and BOQ / BOM in tabular form indicating all major components including bought out items and their quantity, material of construction indicating its applicable code / standard, weight, make etc.
 - Drawings/ documents to be submitted for purchasers review/ approval shall be under Revision A, B, C... etc. while drawings /documents to be submitted thereafter for customer's approval after purchaser's approval shall be under R-0, 1, 2, 3etc.
- Drawings and documents not covered above but required to check safety of machines/ system, shall be submitted during detailed engineering stage without any commercial implication.
- All drawings shall include "B.O.M" and indicate quantity, material of construction, make along with IS/BS No., Technical parameters, dimensions, hardness, machining symbol and tolerance, requirement of radiography and hydraulic tests, painting details, elevation, side view, plan, skin section and blow-up view for clarity.
- All drawings shall be prepared as per BHEL's title block and shall bear BHEL's drawing No.



TECHNICAL SPECIFICATION FOR
1X250 MW NSPCL ROURKELA
MOBILE CRANE

SPECIFICATION NO. PE-TS-427-563-A-601

SECTION I

REV 00

Sub. Sec I A

DATE APRIL 2017

9. 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.
10. Bidder to follow the following the drawing submission schedule:
- 1st submission of drawings from date of LOI as per the submission schedule.
 - Every revised submission incorporating comments – within 7 days.
 - Bidder to submit revised drawings complete in all respects incorporating all comments. Any incomplete drawing submitted shall be treated as non-submission with delays attributable to bidder's account. For any clarification/ discussion required to complete the drawings, the bidder shall himself depute his personal to BHEL for across the table discussions/ finalizations/ submissions of drawings.



**TECHNICAL SPECIFICATION
1X250 MW NSPCL ROURKELA TPS
MOBILE PICK & CARRY CRANE**

SPECIFICATION NO. PE-TS-427-563-A601

SECTION II

REV. 00

Sub Sec

DATE: APRIL 2017

SHEET 42 OF 51

SECTION: II

STANDARD TECHNICAL REQUIREMENTS



**TECHNICAL SPECIFICATION FOR
MOBILE CRANE
1X250 MW NSPCL ROURKELA TPS**

SPECIFICATION NO. PE-TS-427-563-A601

SECTION -II

REV 00

SUB SEC.

DATE APRIL 2017

1.0. SCOPE

This specification covers the design, material, manufacture, assembly, inspection and testing at manufacturer works for Mobile Pick-up and Carry crane

2.0. CODES AND STANDARDS

The equipment to be supplied under this specification shall conform to **IS 4573 (latest revision) – Specification for Power Driven Mobile Cranes** (Type 3) unless otherwise specified hereinafter.

3.0 DESIGN REQUIREMENTS

- 3.1 Mass of hook, hook block, slings shackles, etc, except that of the hoist rope shall be considered part of the tipping load.
- 3.2 Rated loads at specified radii shall not exceed the limits given under IS 4573 - 2006
- 3.3 Maximum speeds for a crane handling its working load on a firm level surface shall be as per Appendix D of IS 4573 – 2006.
- 3.4 The breaking strength of all splicing, sockets, thimbles and rope anchorages shall be not less than 90 percent of the minimum breaking strength of the rope or ropes to which they are attached.
- 3.5 Rope drums shall be made of cast iron, cast steel or mild steel conforming to relevant Indian Standards.
- 3.6 When a safe load indicator is specified, certain duties may be modified to compensate for indicator characteristics. Sheaves shall be machine grooved to a depth of not less than 1.5 times diameter of rope. The grooves shall be finished smooth and shall be free from surface defects likely to injure the rope. The contour at the bottom of the groove shall be circular over an angle of 130° approximately.
- 3.7 Shafts and axles shall have ample strength and rigidity and adequate bearing surfaces for their purposes. They shall, where necessary, be finished smoothly
- 3.8 Bearings shall be generally of ball, roller or ring lubricated type. Bush bearings may be used for shafts running at 450 rev/min or below.
- 3.9 Road wheels shall be fitted with resilient tyres of a type to suit application. When pneumatic tyres are fitted the valves shall be brought to the outside of the wheels.

4.0 SPECIFICATIONS

Main Frame	Rigid construction box-type frame having high strength
Boom	Box type telescopic boom
Boom Angle	Maximum 50 deg., minimum 0 deg.
Hoist System	Driven by Hydraulic Motor employing 4 falls.
Brake	Service Brake should be pneumatically assisted hydraulic brake. Front and rear brakes to be applicable through a foot pedal. Parking brakes are compulsory.
Boom Telescope	Three part boom with hydraulically operated extension jack.
Transmission	Sliding mesh with minimum 6 forward and 2 reverse speeds and high low range selector
Clutch	Single dry friction clutch plate



TECHNICAL SPECIFICATION FOR
MOBILE CRANE
1X250 MW NSPCL ROURKELA TPS

SPECIFICATION NO. PE-TS-427-563-A601

SECTION -II

REV 00

SUB SEC.

DATE APRIL 2017

Engine	Water cooled diesel engine providing sufficient power to properly run the mobile crane along with the rated load.				
Steering	Articulated steering with double acting hydraulically operated jacks				
Hydraulic system	Main pump of intra-vane type driven from engine crank shaft pulley through propeller shaft, 4 spool control valve.				
Fluid capacities	<table border="0"> <tr> <td>Fuel tank –</td><td rowspan="3">} As per Manufacturer's standard</td></tr> <tr> <td>Hydraulic tank –</td></tr> <tr> <td>Transmission –</td></tr> </table>	Fuel tank –	} As per Manufacturer's standard	Hydraulic tank –	Transmission –
Fuel tank –	} As per Manufacturer's standard				
Hydraulic tank –					
Transmission –					
Wheels	Front – total 4 nos Rear – Total 2 nos				
Electrical System	12 V Battery with around 35 amp alternator				
Safety Features	Audio overload warning Hose failure protection Safety brake on hoist (Fail-safe) Audio over hoisting warning				
Gauges	Water temperature Engine Oil Pressure etc.				
Tool kit	Standard tool kit in a tool box				



**TECHNICAL SPECIFICATION
1X250 MW NSPCL ROURKELA TPS
MOBILE PICK & CARRY CRANE**

SPECIFICATION NO. PE-TS-427-563-A601

SECTION III

REV. 00

Sub Sec IIIA DATE: APRIL 2017

Page 45 of 51

SUB SECTION: III A

LIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH BID

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

- 1.0 Deviation schedule with reference to specific clauses of the specification along with reason for such deviation or No deviation in the format
- 2.0 Unpriced format, duly mentioned 'Quoted' against each Sl.no.below each column.
- 3.0 Duly signed and stamped Compliance cum Confirmation form.
- 4.0 Duly signed pre-bid clarifications If Any

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 the bidder does not submit the documents mentioned in Sl. No. 1.0, 2.0, and 3.0 along with their offer then their offer is liable to be rejected.



**TECHNICAL SPECIFICATION
1X250 MW NSPCL ROURKELA TPS
MOBILE PICK & CARRY CRANE**

SPECIFICATION NO. PE-TS-427-563-A601

SECTION III

REV. 00

Sub Sec IIIB

DATE: APRIL 2017

Page 47 of 51

SUB SECTION: III B

COMPLIANCE CUM CONFIRMATION CERTIFICATE



TITLE:

**1X250 MW NSPCL ROURKELA TPS
TECHNICAL SPECIFICATION FOR
MOBILE PICK UP & CARRY CRANE
COMPLIANCE CUM CONFIRMATION
CERTIFICATE**

SPEC. NO.: PE-TS-427-563-A601

SECTION: III

REV. NO. 00

SUB SECTION: III B

COMPLIANCE CUM CONFIRMATION CERTIFICATE

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

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions, other than those mentioned under "exclusion and those resolved as per 'Schedule of Deviations', with regard to same.
- b) There are no other deviations w.r.t. specifications other than those furnished in the 'Schedule of Deviations'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the 'Schedule of Deviations'
- c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL / CUSTOMER approval & customer hold points for inspection / testing shall be marked in the QP at the contract stage. Inspection / testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc. This is within the contracted price without any extra implications to BHEL after award of the contract.
- d) All drawings/ data-sheets / calculations etc. submitted along with the offer shall not be taken cognizance off.
- e) The offered materials shall be either equivalent or superior to those specified in the specification & shall meet the specified / intended duty requirements. In case the material specified in the specifications is not compatible for intended duty requirements then same shall be resolved by the bidder with BHEL during the pre-bid discussions, otherwise BHEL / Customer's decision shall be binding on the bidder whenever the deficiency is pointed out.

For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.

- f) The commissioning spares shall be supplied on 'As Required Basis' & prices for same included in the base price itself.
- g) All sub vendors shall be subject to BHEL / CUSTOMER approval in the event of order.
- h) Guarantee for plant/equipment shall be as per relevant clause of GCC / SCC / Other Commercial Terms & Conditions
- i) In the event of order, all the material required for completing the job at site shall be supplied by the bidder within the ordered price even if the same are additional to approved billing break up, approved drawing or approved Bill of quantities within the scope of work as tender specification. This clause will apply in case during site



TITLE:

**1X250 MW NSPCL ROURKELA TPS
TECHNICAL SPECIFICATION FOR
MOBILE PICK UP & CARRY CRANE
COMPLIANCE CUM CONFIRMATION
CERTIFICATE**

SPEC. NO.: PE-TS-427-563-A601

SECTION: III

REV. NO. 00

SUB SECTION: III B

commissioning, additional requirements emerges due to customer and / or consultant's comments. No extra claims shall be put on this account

- j) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL's / Customer's / Consultant's office for across the table resolution of issues and to get documents approved in the stipulated time.
- k) As built drawings shall be submitted as and when required during the project execution.
- l) The bidder has not tempered with this compliance cum confirmation certificate and if at any stage any tempering in the signed copy of this document is noticed then same shall be treated as breach of contract and suitable actions shall be taken against the bidder.
- m) Successful bidder shall furnish detailed erection manual for each of the equipment supplied under this contract at least 3 months before the scheduled erection of the concerned equipment / component or along with supply of concerned equipment / component whichever is earlier.
- n) Document approval by customer under Approval category or information category shall not absolve the vendor of their contractual obligations of completing the work as per specification requirement. Any deviation from specified requirement shall be reported by the vendor in writing and require written approval. Unless any change in specified requirement has been brought out by the vendor during detail engineering in writing while submitting the document to customer for approval, approved document (with implicit deviation) will not be cited as a reason for not following the specification requirement.
- o) In case vendor submits revised drawing after approval of the corresponding drawing, any delay in approval of revised drawing shall be to vendor's account and shall not be used as a reason for extension in contract completion.



**TECHNICAL SPECIFICATION
1X250 MW NSPCL ROURKELA TPS
MOBILE PICK & CARRY CRANE**

SPECIFICATION NO. PE-TS-427-563-A601

SECTION III

REV. 00

Sub Sec IIIB

DATE: APRIL 2017

Page 50 of 51

SUB SECTION: III C

PRE BID CLARIFICATION SCHEDULE



TITLE

TECHNICAL SPECIFICATION FOR MOBILE CRANE

SPECIFICATION NO. PE-TS-427-563-A601

SECTION III

REV 00

SUB SECTION III C

DATE APRIL 2017

Page 51 of 51

PRE-BID CLARIFICATION SCHEDULE

S. No.	Section/Clause /Page No.	Statement of the referred clause	Clarification Required

The bidder hereby certifies that above mentioned are the only clarifications required on the technical specification for the subject package.

SIGNATURE: _____

NAME: _____

DESIGNATION: _____

COMPANY: _____

DATE: _____

COMPANY SEAL