

VOLUME - IA


Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

FOR

SAIL, ISP Burnpur CPP-1 Package

BHARAT HEAVY ELECTRICALS LIMITED

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

 BHEL Maharaja Company	Technical Conditions Of Contract (TCC) PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD			Ref No: HY/PE&SD/SC- PROJECTS/2024 -25/TCC/SAIL, ISP IISCO Burnpur/E&C/0 1	
				Rev. No. 00	
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Revisions: Refer to record of revisions		Prepared By:	Checked By:	Approved By:	Date
					08.11.2024

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Volume IA
Part I
Contract Specific Details

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter I- Introduction

1.0 Introduction:

- 1.1 BHEL is looking for a competent Erection & Commissioning Sub-Contractor (E&CSC) qualified as per the requirements specified under Chapter No.-V of this TCC, to assist BHEL by providing Erection & Commissioning Services **for Captive Power Plant during Pre-bid stage of the tender and E&C during Post order stage (if BHEL bags the order as LSTK) for CPP-1 Package of 4.08 MTPA Expansion (Crude Steel) IISCO Burnpur UNIT owned by Steel Authority of India (SAIL, ISP), Burnpur, District- Paschim Bardhaman, West Bengal (India),** for which BHEL intends to bid as the EPC Bidder.
- 1.2 The intent of this TCC is to specify the minimum requirements of Erection & Commissioning Sub Contractor (E&CSC) to be eligible to associate with BHEL for the subject job both for Pre-Bid and Post-Order (if BHEL gets the order from SAIL, ISP in above referred **CPP-1 Package** Tender). This document provides details to be used as input by the bidders for submitting their competitive offer.

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Chapter II- Legend

2.0 Legend:

SAIL, ISP	Steel Authority of India (OWNER)
IISCO	Indian Iron and Steel Company
ISP	IISCO Steel Plant
BHEL	Bharat Heavy Electricals Limited (EPC Bidder)
PE&SD	Project Engineering & Systems Division, Hyderabad (unit of BHEL)
CPP	Captive Power Plant
CPP1	Plant and Equipment (Technological and BOP) Supplier
CPP2	Bidder for Civil and Structural Work of Entire CPP (Purchaser’s Scope)
PMC	Project Management Consultant
E&CSC	Erection and Commissioning Sub Contractor
BQC	Bidder Qualification Criteria
WO	Work Order
LOI	Letter of Intent
LSTK	Lumpsum Turnkey
EPC	Engineering, Procurement & Construction
BEDP	Basic Engineering & Design Procedure
BOP	Balance of Plant
BD	Basic Data
BE	Basic Engineering
DE	Detailed Engineering
SUP	Supply
ST	Storage
ERE	Erection
TEST	Testing
COM	Commissioning
PGT	Performance Guarantee Test

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Chapter III- Project Information

1. **Introduction:** Steel Authority of India (SAIL, ISP), the owner/ customer intends to install a Captive Power Plant of 3x40 MW STG with 03 nos of mixed gas-fired boilers each of capacity of 300 TPH at IISCO Burnpur, West Bengal. SAIL, ISP has appointed MECON Ltd as Project Management Consultant (PMC) for the project. The work will be on an EPC basis.

2. Project Details			
1	Customer	:	SAIL, ISP, Burnpur, West Bengal
2	Project Information	:	IISCO Burnpur CPP-1 Package Project
3	Location	:	Burnpur, West Bengal
4	Address Detail	:	SAIL, ISP, IISCO, Burnpur, Paschim Bardhaman District, West Bengal, India
5	Nearest Railway Station	:	Asansol Railway Station, 10KM
6	Road Approach	:	221 KM from Kolkata via Durgapur and NH 19
7	Nearest Air Port	:	Kazi Nazrul Islam Airport, Durgapur, West Bengal, 48KM
11	Ambient Air Temperature (Average)	:	a) Maximum : 39 ⁰ C b) Minimum : 10 ⁰ C
12	Average Relative Humidity	:	90 %
13	Climatic Condition	:	Hot and Dry Climate

Bidder is advised to visit the project site and appraise himself about the local conditions and infrastructure available in the area for fulfilling their commitments under the contract. BHEL will not admit any claims whatsoever on account of Bidder’s non-familiarization of local conditions.

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Chapter IV- Scope of Work of E&CSC

4.0 **Scope:**

4.1 Scope of the Erection & Commissioning Sub-Contractor (E&CSC) is to provide support for the erection and commissioning of all types of equipment and BOP supplies by various BHEL Units and other free issue items by Customer, if any, the activities of Site Enabling/ Establishment, Statutory Approvals, Material Handling and Store/Site Preparation, Site Security, Cranes and handling equipments, Safety, quality Services during Pre-bid stage of the tender and during Post order stage (if BHEL bags the order as EPC) for subject package.

4.2 E&CSC shall execute and be solely responsible for, broadly, the following activities of the subject tender/ project:

- 4.2.1 All the plant & equipment and piping, etc., units/sub units supplied by the BHEL shall be erected by the Bidder. Testing and commissioning of plant & equipment and piping, etc. individually as well as in an integrated manner shall be under the scope of the Bidder. It is the responsibility of the Bidder to ensure proper installation and satisfactory performance of the plant & equipment and piping, etc. supplied to them.
- 4.2.2 Bidder's scope of work shall include unloading and storage, preservation, handling at site complete erection/ installation of mechanical, electrical, instrumentation and other associated works, pre-commissioning, commissioning, handing over and performance guarantee testing.
- 4.2.3 Civil and structural works including the foundation of equipment shall be executed by a separate agency (appointed by Customer i.e. SAIL, ISP) under the supervision of Bidder.
- 4.2.4 The civil work of the chimney shall be carried out by a separate agency to be appointed by Customer i.e. SAIL, ISP under the supervision of Bidder.
- 4.2.5 The Bidder shall erect the technological structure for the plant & equipment.
- 4.2.6 The scope shall also include obtaining all necessary approval / statutory clearances from the concerned authority/agencies including IBR. However, Necessary official fees for the same shall be paid by the Customer for site activities.
- 4.2.7 The Bidder shall include in their scope the requirement of oils, grease, lubricants and consumables for the plant & equipment to be supplied by them. All consumables till commissioning shall be in the scope of the Bidder. The Bidder shall submit the list of initial fills of oils, grease and lubricants. Quantities and specifications of the same shall be furnished by the Bidder after the placement of the work order.
- 4.2.8 Any work/ equipment and material which may not have been specifically mentioned in this Technical Specification but are required to make the plant complete in every respect in

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accordance with the Tender condition and necessary for safe operation and guaranteed performance of the plant shall be deemed to have been covered under the scope of this Technical Specification and shall be provided by the Bidder within the quoted price.

- 4.2.9 The Bidder shall supply all required manpower, E&C tools and related equipment, all hoisting equipment, all necessary scaffoldings, all necessary transporting equipment, and consumables. Construction and erection materials, petrol, diesel oil, Kerosene, solvents, sealing compound, tapes, brazing and soldering materials, welding and brazing gases, packing sheets/compounds, temporary supports, wooden blocks, spacers, templates, jute and cotton wastes, sand/emery paper etc. as required for the satisfactory completion of work.
- 4.2.10 Pre-Commissioning & Commissioning shall be single point responsibility of the Bidder, completely covering the activities and services in respect of all the equipment & works specified and covered under the Technical Specification as mentioned in the BHEL TCC Specification and SAIL, ISP customer specification (**BIDDING DOCUMENT NO.:MEC/11/S3/M/0033/CPP-1/TS, REV.01 October 2024**).
- 4.2.11 Any loss of plant and equipment due to imprudence, negligence and/or unsuitable treatment and handling shall be replaced by the Bidder at his own cost.
- 4.2.12 The Bidder shall satisfy the BHEL/Customer by possessing the necessary technical experience and having at his disposal, suitable facilities and staff to ensure that the contract shall be executed with the best quality material and workmanship within the stipulated time.
- 4.2.13 During site testing and commissioning, the Bidder shall be required to formulate and operate a safety clearance system. The details of these systems are to be approved by the Customer / Consultant.
- 4.2.14 The Bidder shall perform the performance guarantee test of all the equipment within a period of 6 months from the date of successful commissioning.
- 4.2.15 Pre-bid support is required for submitting the offer to M/s SAIL, ISP during the Pre-Bid Stage.
- 4.2.16 Erection & Commissioning with respective detailed BOQ of Civil, Electrical, Mechanical, C&I disciplines at Post Bid.
- 4.2.17 Preparation of Material Requisitions of all Equipment and Package items as defined in the tender elsewhere.
- 4.2.18 Technical Support in Technical & Construction Audits
- 4.2.19 The Bidder shall be part of Punch Point Closure.

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4.3 E&CSC shall execute E&C Scope if BHEL is successful in getting the Order.

Memorandum of Understanding (MoU) will be signed on non-judicial stamp paper of Rs. 200/- by BHEL with L-1 Bidder after reverse auction and /or price negotiation after submission of Bid Bond for 1% value of the finalized price as per the **attached draft (Annexure-A)**. The MoU shall be converted into a contract after BHEL wins the order from M/s SAIL, ISP. BHEL will inform the MoU partner to enter into the contract once the order is received from the customer. The following documents (As per the details mentioned in the draft MoU in **(Annexure- A)**) shall form part of the contract:

- a. Notice Inviting Tender
- b. This Technical Specification
- c. General Conditions of Contract
- d. Special Conditions of Contract
- e. Forms & Procedure
- f. Price Bid

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Chapter V- Facilities in the scope of BHEL/Bidder

S. No.	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
5.1	ESTABLISHMENT			
5.1.1	FOR CONSTRUCTION PURPOSE:			
a	Open space for office (as per availability)	Yes		Location shall be finalized after joint survey with customer.
b	Open space for storage (as per availability)	Yes		Location shall be finalized after joint survey with customer.
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipment, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc.		Yes	
f	Firefighting equipment like buckets, extinguishers etc.		Yes	
g	Fencing of storage area, office, canteen etc. of the bidder		Yes	
5.1.2	FOR LIVING PURPOSES OF THE BIDDER			
a	Open space for labor colony (as per availability)		Yes	
b	Labor Colony with internal roads, sanitation, complying with statutory requirements		Yes	
5.2.0	ELECTRICITY			

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S. No.	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
5.2.1	Electricity For construction purposes		Yes	Electricity shall be provided by SAIL, ISP/ BHEL at one point on non-chargeable basis. However, for fabrication it is chargeable (SI No. 5.10.2) Further distribution from SAIL, ISP/ BHEL feeder point shall be done by Bidder. No separate payment for downstream power distribution shall be made. Bidder shall install a calibrated energy meter at feeder point for billing purpose.
5.2.2	Electricity for the office, stores, canteen etc. of the bidder		Yes	
5.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc.		Yes	
5.3.0	WATER SUPPLY			
5.3.1	For construction purposes		Yes	Water shall be provided by SAIL, ISP at one point on non-chargeable basis. Further distribution shall be done by Bidder.—Further distribution from SAIL, ISP supply point shall be done by Bidder. No separate payment for downstream water distribution shall be made.
5.3.2	<u>Water supply for bidder's office, stores, canteen etc.</u>		Yes	
5.3.3	<u>Water supply for Living Purpose</u>		Yes	
5.4.0	LIGHTING			

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S. No.	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc. during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
5.5.0	COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER			
a	Téléphone, fax, internet, intranet, e-mail etc.		Yes	
5.6.0	COMPRESSED AIR wherever required for the work		Yes	
a	Supply of Compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage systems etc		Yes	
b	Installation of above system and operation & maintenance of the same		Yes	
c	Supply of the all the consumables for the above system during the contract period		Yes	
5.7.0	Demobilization of all the above facilities		Yes	
5.8.0	TRANSPORTATION			
a	For site personnel of the bidder		Yes	
b	For bidder's equipment and consumables (T&P, Consumables etc.)		Yes	

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Sl. No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
5.9.0	Erection Facilities			
5.9.1	Engineering works for construction:			
a	Providing the erection drawings for all the works covered under this scope	Yes		Drawing schedule shall be finalized at the time of kick off meeting
b	Drawings for erection methods	Yes	Yes	In consultation with BHEL
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	In consultation with BHEL
d	Shipping lists etc. for reference and planning the activities	Yes		
e	Preparation of site erection schedules and other input requirements		Yes	In consultation with BHEL
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly erection schedules based on S. No. e. hard copy to Construction manager, by email to HO.		Yes	In consultation with BHEL
h	Daily erection / work plan based on S. No. g. hard copy to Construction manager, by email to HO.		Yes	In consultation with BHEL
i	Periodic visit of senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two Weeks.		Yes	
j	Arranging the materials required for Work		Yes	
k	Coordination for inspection & checking and getting clearance from customer		Yes	
l	Preparation of formats for completion of activities		Yes	

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Bharat Heavy Electrical Limited, Project Engineering & System Division, RC Puram, Hyd-32.

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Sl. No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
m	Preparation of preassembly bay		Yes	
5.10	Work Permits, gate pass etc. from customer for manpower, machinery and material		Yes	
3.11	Ambulance Services for Bidder’s site staff		Yes	

5.10 Open Space:

- i) Minimum Open space as made available by customer will be provided at free of charges to the Bidder, for construction of temporary office shed, fabrication yard and storage area at the job site, Bidder’s stores shed(s). This is subjected to availability of space from customer. Non-availability of space due to any reason whatsoever shall not entitle the Bidder for any claim against BHEL because of cost and time implications.
- ii) BHEL shall not provide to the Bidder any residential accommodation to any of his staff and the Bidder has to make his own arrangements.
- iii) Bidder has to make his own arrangements for labour colony.
- iv) Location and area requirement for office / storage sheds / fabrication yard shall be discussed and mutually agreed to.

5.11 Construction Power: For construction power supply, 415V power supply shall be provided by the Customer within a distance of 300 meters. Bidder shall have to make their own arrangement for feeding to various load centers. This shall include supply, laying and termination of required power and control cables, associated distribution boards, if required, breakers etc.

5.11.1 Unless specifically excluded in Technical specification, the Customer will supply power in bulk at one point within 300 meters of battery limit, for construction & erection free of charge. The Bidder shall make its own arrangements to lay and maintain necessary distribution lines and wiring at its own cost.

5.11.2 Electrical power for fabrication work, if any, envisaged at site shall be supplied, metered and charged at the rate including applicable taxes & duties (if any), prevailing from time to time.

5.11.3 Provision of distribution of electrical power from the given points to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State/ BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / Bidder.

5.11.4 The Bidder shall ensure that the electrical equipment employed by the Bidder will be such that the aggregate power factor does not fall below 0.8 at the Customer’s terminal point. Penalty if any levied by customer on this account will be recovered from Bidder’s bills.

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5.11.5 Bidder has to make their own arrangements for electricity requirement for labour colony at their cost. Any duty, deposit involved in getting the Electricity for Bidders use i.e. Office shed, labour colony etc. shall be borne by the bidder.

5.11.6 BHEL is not responsible for any loss or damage to the Bidder’s equipment as a result of variations in voltage /frequency or interruptions in power supply.

5.11.7 The Bidder will employ Electricians having valid Electrical License for carrying out the installations as well as for maintenance.

5.12 Construction Water:

Construction water shall be supplied free of cost by the Customer at a single point within a distance of 300 m from the battery limit. The Bidder shall make its own arrangements to lay and maintain necessary distribution lines, valves, etc., from this point at its own cost.

The Bidder shall be responsible for storing water in sufficient quantities to meet its requirements and ensure that there is no wastage of water. Quantum of supply will depend on availability and no claim for shortfall shall be allowed by BHEL.

However, in case BHEL/ SAIL, ISP is not able to provide construction water due to any reason whatsoever, Bidder shall be responsible for making all arrangements for Construction water at his cost. Any statutory requirements/ documentation etc. to this effect shall be met by the Bidder.

Non-availability of water due to any reason shall not entitle the Bidder for any claim against BHEL because of cost and time implications.

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5.13 Online Site Construction Management System (SCMS):

5.13.1 Two Nos of computers and printers (MFP) of latest configuration (preferably i5 processor, 8GB Ram, 1 TB Hard disk, with internet provision on all the computers), along with one data entry operator per computer to be arranged by Bidder for reporting of daily progress, billing, updating details in online SCMS package of BHEL, etc., within the quoted rate.

5.14 Consumables: All consumables shall be of approved type as per tender specifications

5.14.1 The Bidder shall provide within finally accepted price / rates, all consumables like welding electrodes (including alloy steel and stainless steel), all gases (inert, welding, and cutting), soldering material, dye penetrants, radiography films. Other erection consumables such as wrap cloth, tapes, jointing compound, grease, lubricants, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the Bidder. Steel, H&S, packers, shims, wooden planks, scaffolding and pre-assembly materials, hardware items etc. required for temporary works such as supports, scaffoldings and bed are to be arranged by him. Sealing compounds, gaskets, gland packing, wooden sleepers, for temporary work, required for completion of work except those, which are specifically supplied by BHEL, are also to be arranged by him.

5.14.2 All consumables to be used for the job shall have to be approved by BHEL prior to use.

5.14.3 All the shims, gaskets and packing, which go finally as part of equipment, shall be supplied by BHEL free of cost.

5.13.4 In the event of failure of Bidder to bring necessary and sufficient consumables, BHEL shall arrange for the same at the risk and cost of the Bidder. The entire cost towards this along with standard BHEL overhead shall be deducted from the Bidder's immediate due bills.

5.15 Gases:

5.15.1 All the required gases like Oxygen / Acetylene / Argon / Nitrogen required for work shall be supplied by the Bidder at his cost. It shall be the responsibility of the Bidder to plan the activities and store sufficient quantity of these gases. Non-availability of gases shall not be considered as reason for not attaining the required progress.

5.15.2 BHEL reserves the right to reject the use of any gas in case required purity is not maintained.

5.15.3 The Bidder shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

5.15.4 The Bidder shall ensure safekeeping of the inflammable cylinder at a separate place away from normal habit with proper security etc.

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3.16 Electrodes Supply and Storage

5.16.1 It shall be the responsibility of the Bidder to obtain prior approval of BHEL, before procurement, regarding suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The Bidder shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc. Test certificates for electrodes and other consumables should be submitted to BHEL Engineer as per requirement.

5.16.2 Shortage of any of the electrodes or the equivalent suggested by BHEL shall not be quoted as reason for deficiency in progress or for additional rate. Bidder shall submit weekly/ fortnightly/ monthly statement/ report regarding consumption and available stock of all types of electrodes for avoiding stoppage of work on consumable scarcity.

5.16.3 Storage of electrodes shall be done in an air conditioned / controlled humidity room as per requirement, at his own cost by the Bidder.

3.16.4 All low hydrogen electrodes shall be baked / dried in the electrode-drying oven (range 375 deg. C - 425 deg. C) To the temperature and period specified by the BHEL Engineer before they are used in erection work and each welder should be provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by Bidder at his cost.

5.16.5 In case of improper arrangement of procurement of above electrodes BHEL reserves the right to procure the same from any source and recover the cost from the Bidder's first subsequent bills at market value plus departmental charges of BHEL communicated from time to time. Postponement of such recovery is not permitted.

5.16.6 BHEL reserves the right to reject the use of any electrodes at any stage, if found defective because of bad quality, improper storage, date of expiry, unapproved type of electrodes etc. It shall be the responsibility of the Bidder to replace at his cost without loss of time.

5.17 Possession of Generators

It shall be the responsibility of the tenderer / Bidder to provide, and maintain the complete installation on the load side of the supply with due regard to safety requirements at site. It shall be responsibility of the Bidder to have at least one diesel operated welding generator sets to get urgent and important work to go on without interruptions. The consumables required to operate the generators are to be provided by tenderers. This may also be noted while quoting. No separate payment shall be made for this contingency.

5.18 Lighting Facility:

Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the Bidder at the site of construction, pre-assembly yard and Bidder's material storage area etc. at his cost.

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5.19 Bidder's Obligation on Completion

On completion of work, all the temporary buildings, structures, pipelines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the Bidder at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the Bidder. The decision of BHEL Engineer in this regard shall be final.

5.20 Potable/Drinking Water: Potable/Drinking water shall be supplied free of cost by the Customer at a single point within a distance of 300 m from the battery limit. The Bidder shall make its own arrangements to lay and maintain necessary distribution lines, valves, etc., from this point at its own cost. No separate payment shall be made, for any contingency water arrangement made by Bidder, due to delay / failure for providing water supply. Bidder has to make his own arrangements for his water requirement for his labour colony at his cost.

5.21 Other Facilities

- i) Adequate water less urinals (male & female both) shall be arranged by the Bidder within quoted rates, at site of construction at different level and different areas of works with proper disposal arrangement.
- ii) Bidders have to comply requirements of HSE & Statutory requirement in line with SAIL, ISP/ BHEL HSE plan.
- iii) Bidders have to arrange labour rest sheds, drinking water facility, toilets, canteen facility as per local labour act/BOCW act. Maintaining hygiene and disposal of debris, scraps, canteen items and area cleaning is included in Bidder's scope.
- iv) Bidder has to arrange trained scaffolding experts with accreditation from statutory agencies with proper experience and they will issue fitness certificates for safe use. Such kind of qualified scaffolding experts will vary as per job requirement. At the same time, training has to be given by these experts at regular intervals for their own workers for increasing no. of experts.
- v) Agencies HSE officers should have sufficient experience as per rule 209 of BOCW act central rule 1998. Agencies HSE officers will be part of BHEL HSE Team and they will be responsible for giving training on HSE issues in addition to normal field works and other normal site requirements.
- vi) Preparation of method statement, HIRA, Job Safety analysis, permit to work, Lifting plans, and all supporting documents as required for starting & continuation of work/job is in Bidder's scope.
- vii) First aid facilities shall be maintained by Bidder at no. of working places as required as per instruction of BHEL Engineer. The basic medical facility will be maintained by BHEL at site.
- viii) Bidder has to arrange land within his quoted rate for making labour colony. Bidder's labour colony has to be maintained with proper hygiene, drinking water, bathroom water, lighting arrangement, sewerage system. These facilities are to be regularly maintained including drains, surrounding, and upkeepment of labour colony. BHEL/Customer & local statutory authorities will visit labour colony from time to time and all healthy conditions are to be maintained by Bidder.
- ix) Scaffolding pipes, clamps, safety nets, floor grills for working platforms are to be made of good quality with proper certifications as per IS Codes.

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5.22 Dewatering: Bidder shall ensure at all times that the work area & approach/ access roads are free from accumulation of water, so that the materials are safe and the erection/ progress schedule are not affected. All equipments/materials required for dewatering such as pumps, pipes and accessories shall be arranged by the Bidder. No separate claim in this regard shall be admitted by BHEL.

5.23 Site Organization

- i) The Bidder shall provide adequate staffing in the following areas in addition to the staffing requirements of execution as instructed/informed by BHEL:
 - a) Overall planning, monitoring & control.
 - b) Quality control and quality assurance.
 - c) Materials management.
 - d) Safety, fire & security.
 - e) Industrial relations and fulfilment of labour laws and other statutory obligations.
- ii) The Bidder shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent Construction Manager having sufficient authority to take decisions at site.
- iii) The Bidder should also submit to BHEL for approval a list of construction equipment, erection tools, tackle etc prior to commencement of site activities. These tools & tackles shall not be removed from site without written permission of BHEL.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter VI- Bidders (E&CSC) Qualification Criteria

6.0 Bidders (E&CSC) Qualification Criteria:

6.1 Technical Criteria

6.1.1 The Bidder (sole or consortium) should have carried out the Erection & Commissioning of the following equipment in a single project during the last Twenty (Twenty) years ending the last date of the month previous to the one in which NIT is published

- (a) One (01) no. Blast Furnace Gas or Coke Oven Gas or Basic Oxygen Furnace Gas or combination of these gaseous fuels fired Boiler of a steaming capacity not less than 100TPH.

Or

One (01) no. coal fired Boiler of steam generation capacity not less than 100TPH

- (b) One (01) no. Steam Turbine Generator having power generation capacity not less than 20MW and

6.1.2 In support of the above-mentioned Technical Eligibility criteria, copies of the following documents shall be submitted by the Bidder:

- (a) Work Order(s)/ any other letter of award of work/ Contract Agreement(s)/ Purchase Order(s)/any other documents in respect of Technical Eligibility Criteria as above.
- (b) Commissioning Certificate/ Completion certificate/ Final acceptance certificate/ any other documents indicating completion corresponding to above.

6.2 Financial Criteria

6.2.1 The average annual financial Turnover of E&CSC during any of the preceding five financial years, i.e., 2023-2024, 2022-2023, 2021-2022, 2020-2021 & 2019-2020 shall be equal to or more than INR **45.0 Crs.**

6.2.2 Net worth of the Bidder based on the latest Audited Accounts, for “FY 2023-24”, should be positive.

Net worth = Paid up share capital* + Reserves. (*Share Capital OR Partnership Capital OR Proprietor Capital as the case may be)

6.2.3 Bidder must have earned cash profit in any one of the five Financial Years as applicable in the last five years defined in ‘clause no.6.2.1’ above based on the latest Audited Accounts. NET cash profit= (PAT + Non-cash expenditure viz depreciation).

6.2.4 Audited financial statement have to be submitted for all five years as indicated against the clause above. If financial statements are not required to be audited statutorily, then instead of audited

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

financial statements, financial statements are required to be certified by a chartered accountant. Published Annual Report available in the public domain shall also be acceptable.

- 6.2.5 In case audited Financial statements have not been submitted for any of the five years as indicated above, then the applicable audited statements submitted by bidders against the requisite five years, will be averaged for five years i.e. total divided by five.
- 6.3 For evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical criteria, bidder may utilize the experience of its Parent/ Subsidiary Company along with its own experience, subject to following:
- The parent company shall have a controlling stake of $\geq 50\%$ in the subsidiary company.
- i) The Parent Company/ Subsidiary Company of which experience is being utilized for bidding shall submit Security Deposit (SD) equivalent to 1% of the total contract value.
 - ii) The parent/ subsidiary company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract.
- 6.4 The bidder can be a company under Companies Act, 1956 or Partnership firm or Proprietor firm. Bidder to submit the document for same.
- 6.5 E&CSC shall not be under not been banned or blacklisted or de-listed or put on Holiday by any Government / Quasi-Government / Public Sector Undertaking / Private Firm / Financial Institutions on due date of submission of bid.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter VII-Bid-Evaluation Criteria

7.0 Bid-Evaluation Criteria:

- 7.1 The bid evaluation shall be on a Lumpsum L1 basis as per the Lumpsum Price in the attached Price Bid Format. Quotations submitted in partial will be summarily rejected. BHEL will not entertain any other expenses/ assumptions written separately elsewhere other than those specified in the price bid format. The price shall be quoted in Indian Rupees.
- 7.2 Memorandum of Understanding (MoU) will be signed on non-judicial stamp paper of Rs. 200/- by BHEL for Post-bid work with L-1 Bidder after the reverse auction and /or price negotiation after submission of Bid Bond for 1% value of the finalized price as per the attached draft. The MoU shall be converted into a contract after BHEL wins the order from M/s SAIL, ISP. BHEL will inform the MoU partner to enter into the contract once the order is received from the customer.
- 7.3 E&CSC shall not have any claim whatsoever on the Post-Order component if BHEL is not successful in winning the Contract.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter VIII- Terms of Contract

8.0 Terms of Contract:

- 8.1** BHEL reserves the right of cancellation of this NIT at its discretion, based on the status of the Tender or time available for submitting BHEL’s offer to M/s SAIL, ISP or as per business decision.
- 8.2** The MoU shall be valid for at least **180 days from the last date of opening of Unpriced Technical and Commercial bid by Customer (M/s SAIL, ISP)** or date of signing of contract agreement post issue of work order in case BHEL gets the order from M/s SAIL, ISP, whichever is earlier. Further extension of the validity of MoU shall be on mutual agreement.
- 8.3** **The completion schedule of the entire plant & equipment shall be completed within Thirty-Nine (39) months from the date of the work contract.**
- 8.4** **Contract Period shall be Thirty-Nine (39) Months from the commencement date of work in all Units. The commencement date shall be a mutually agreed date between BHEL & E&CSC after the issue of the work order.**
- 8.5** BHEL shall at its discretion depute its personnel at the site of the E&CSC - to control, monitor and approve the work/ deliverables of the E&CSC before their issuance for review/ approval by the Owner/ Consultant.
- 8.6** E&CSC shall not sublet the work without prior written permission of BHEL.
- 8.7** The bid price shall be all inclusive and shall cover all services necessary for the successful completion of the project. Any services, if specifically, not included in the specification but found necessary for the safe and satisfactory functioning of the units shall be erected and commissioned by the Bidder at no extra cost to BHEL.
- 8.8** Bidder shall take all necessary measures to protect the work and workmen against accident and occupational diseases. Bidder shall observe and comply with all Governmental safety regulations as well as BHEL/Customer’s and accepted industry safety practices as required for this work
- 8.9** If any contradiction arises between the BHEL TCC Specification and the SAIL, ISP Customer specification (Bidding Document No.: MEC/11/S3/M/0033/CPP-1/TS, Rev.01 October 2024), the **Customer Specification shall supersede** the BHEL TCC Specification.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter IX- Guarantees and Penalties

9.0 Guarantees and Penalties:

- 9.1 Since speedy completion of the project is essential for a tight project schedule, it shall be the responsibility of E&CSC to ensure timely delivery of all milestones.
- 9.2 E&CSC shall familiarize fully with the standard/ procedures/ practice of BHEL/Customer, to avoid any dispute at a later date and after order placement.
- 9.3 BHEL shall not pay any amount, other than the fee specifically agreed, towards any cost incurred by E&CSC by way of salaries to their employees (income and taxes), insurance of any nature, benefits/bonuses to the employees, etc. BHEL's liability is limited to the amount contracted for the services to be rendered under the scope of work defined.
- 9.4 E&CSC shall bear all expenses/ fee penalties in case of suits, court proceedings, damage claims etc., due to any reason whatsoever.
- 9.5 E&CSC shall ensure that it possesses the latest revisions of various national and international standards, codes of practices, statutory & environmental regulations etc. as applicable, for execution of the work. BHEL shall not provide any such documents to E&CSC. Engineers of E&CSC assigned for this project shall have familiarity with relevant documents as mentioned above for their use and applications.
- 9.6 E&CSC shall maintain at their own cost the personal accidents policy, life insurance and/or any such insurance required in respect of their personnel deputed to the project for the given contract.
- 9.7 E&CSC shall keep all information/data/drawings etc. related to the E&C work as confidential information and shall not divulge or use the information indirectly or directly in any way detrimental to the interest of BHEL. All drawings, documents, and manuals, including all originals prepared or obtained during the work, shall remain the property of BHEL and shall be handed over to BHEL on demand.
- 9.8 All T&Ps for E&C work are to be deployed by the Bidder as and when required as per instruction of BHEL/Customer/PMC. If work is delayed due to the non-availability of the above T&Ps, BHEL reserves the right to deploy the same and recover the charges thereof from the contractor as per prevailing market rate/hiring rate/BHEL internal hiring rates + Applicable overhead rates.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter X- Statutory Regulation

10.0 BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998 and

INTER-STATE MIGRANT WORKMEN ACT, 1979 (IN CASE BIDDER ENGAGE MANPOWER FROM OTHER STATE)

In case any portion of work involves execution through building or construction workers and/or inter-state migrant workers, then compliance to the above titled Acts as applicable shall be ensured by the Bidder and Bidder shall obtain license and deposit the cess under the Act. In the circumstances, it may be ensured as under: -

It shall be the sole responsibility of the Bidder in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a license to the Competent Authority under the BOCW Act and/or ISMW Act as applicable and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the Bidder to furnish a copy of such certificate of license / permission to BHEL within a period of one month from the date of award of contract.

It shall be the sole responsibility of the Bidder as employer to ensure compliance of all the statutory obligations under these acts and rules including that of payment / deposit of cess as per the applicability under above referred Acts within a period of one month from the receipt of payment.

It shall be the responsibility of the sub-Bidder to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building/Inter-state Migrant workmen) engaged by the sub-Bidder during the preceding month.

It shall be the absolute responsibility of the sub-Bidder to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen’s Compensation Act, 1923.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter XI- Field Quality Control Plan

Work shall be executed as per approved field quality control plan (FQCP). The indicative quality control plan of SAIL, ISP is attached as **Chapter-7** of **Annexure-II**. Bidder shall prepare, and submit the field quality control plan in line with SAIL, ISP QCP.

Submitted FQCP shall be reviewed and approved by BHEL/SAIL, ISP/ MECON.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter XII- List of Documents

Work shall be performed as per below listed documents, customer/ BHEL specifications, and approved drawings issued by BHEL:

SI No	Description	Reference	Remarks
1	Underground Mapping	Annexure-I	
2	Technical Specification of SAIL, ISP	Annexure-II	
3	Draft Copy of MOU	Annexure-A	
4			
5			
6			
7			
8			
9			
10			
11			
12			

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Chapter XIII- Price Bid Format

Price Schedule

ITEM NO.	DESCRIPTION	UOM	TOTAL PRICE(Rs)	Weightage
1.0	Complete Erection and commissioning of the Plant “Main Plant Package of CPP-1” as per the TCC/Technical/Tender specification.	Lumpsum		
	TOTAL			

NOTES: -

1. E&CSC to quote strictly as per BHEL’s NIT requirements.
2. E&CSC to note that this is a LUMP SUM Turn-Key Order. Any additional claim after placement of order will not be entertained under any circumstances.
3. E&CSC to quote the base rates only. Goods and Services Tax shall be indicated separately for the Erection & Commissioning Portion.
4. E&CSC shall also submit unpriced copy of the Price-Bid Format with “Quoted” against each line item of the format along with the technical offer.
5. E&CSC to quote strictly in the price bid format with line wise itemized price
6. Bidders need to quote the basic rates only against each item. They may indicate applicable taxes (GST) separately.
7. Payment of GST will be made as per GCC & SCC document.
8. A detailed Billing Break up (BBU) shall be prepared by the bidder after award of the work and shall be approved by BHEL. The same approved BBU shall be used for item wise payment to the bidder for monthly RA Bill payments.
9. All the requirements stipulated in the Tender Specification, Replies to Pre bid queries, subsequent amendments, Clarifications etc issued by M/s BHEL/ MECON (from date of issue of Tender to date of Handing over of the Plant) shall be met by E&CSC. However, Tender Specification, amendments, Clarifications etc issued by M/s MECON/BHEL, Three (3) days prior to bid submission date shall be considered for Bid evaluation.

Signature of Erection & Commissioning Sub-Bidder (E&CSC)

Authorized representative

Date.....

TCC No: HY/PE&SD/SC-PROJECTS/2024-25/TCC/SAIL, ISP Burnpur/ E&C/01, Rev.00
Bharat Heavy Electrical Limited, Project Engineering & System Division, RC Puram, Hyd-32.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

VOLUME -IB

PART—II

Technical Specification

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

A. STEAM TURBINES - 3 nos. (each of 40 MW)

Erection Weight per Steam Turbine as below:

Note: For 3 Turbines, Erection Agency should consider 3 times of below erections weights

1.	ERECTION WEIGHTS ARE AS FOLLOWS	:	Wts / QTY	
A)	TOTAL TURBINE ASSEMBLY	:	70,000	KGS
B)	GEAR BOX	:	13,000	KGS
C)	OIL TANK (MOT, OHOT)	:	10,000	KGS
D)	LUBE OIL SYSTEM (2 No. MOP, EOP, JOP, Oil Centrifuge, Lube oil filter etc.)	:	12,000	KGS
E)	Governing Console	:	1,200	KGS
F)	Lube oil Piping	:	10,000	KGS
G)	Integral piping & valves	:	10,000	KGS
H)	LOCAL INSTRUMENTATION	:	5,000	KGS
3.	MAINTENANCE WEIGHTS AS FOLLOWS	:	Wts / QTY	
A)	MAXIMUM MAINTENANCE WEIGHT	:	23,000	KGS

B. GENERATORS - 3 nos (each of 40 MW)

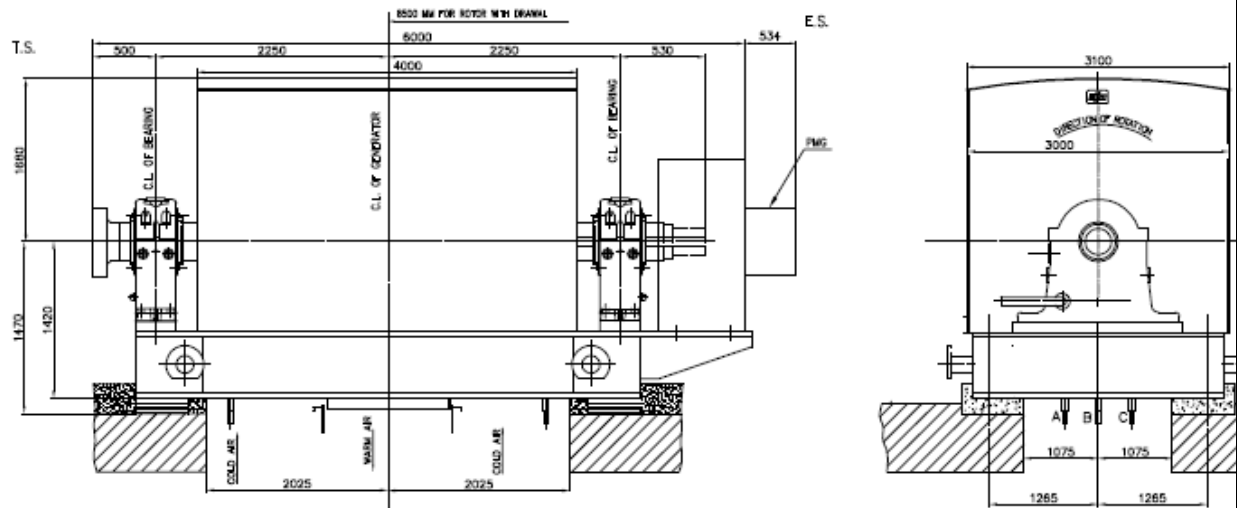
Erection Weight per Generator as below:

Note: For 3 Generators, Erection Agency should consider 3 times of below erections weights

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

S.NO.	ITEM	WIDTH MM.	DEPTH MM	HEIGHT MM	WEIGH KG
A. GENERATOR					
1.	AS PER LAYOUT DRG. NO. TLA-2670-Rev02				
B BRUSHLESS EXCITATION SYSTEM					
1.	BRUSHLESS EXCITER	AS	PER	LAYOUT	DRG.
2.	PILOT EXCITER	AS	PER	LAYOUT	DRG.
C CONTROL,METERING,RELAY, PROTECTION & SYNCHRONISING PANELS					
1.	CONTROL PANEL	2000	1000	2300	1000
2.	RELAY AND PROTECTION PANEL	2000	1000	2300	1200
D GENERATOR AUXILIARY CUBICLE(GAC)					
1.	GAC	6000	3000	4000	8500

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”



WEIGHT IN TONNE

GEN. STATOR	51.3
GEN. ROTOR	23.3
BEARINGS	2.8
EXCITER	3.5
FOUNDATION ITEMS	2.0

TOTAL WT.	82.9
MAX. TRANSPORT WT.	80.9

TECHNICAL DATA

GEN. RATED SPEED	1500 RPM
GEN. CRITICAL SPEED	> 1800 RPM
MOMENT OF INERTIA (GD ² /4)	3950 KG M ²
<u>QTY. OF COOLING AIR</u>	
FOR GENERATOR	27 CU. M/SEC.

QTY. OF LUBE OIL

GEN. BEARINGS	44 LT/MIN/BRG.
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NOTE:

THE DRAWING IS FOR TENDER PURPOSE ONLY
ALL THE DIMENSIONS AND WEIGHTS ARE TO BE
ALL DIMENSIONS ARE IN mm.

TYPE	B-CATG-50-4P
CUSTOMER:	
	TITLE: LAYOUT OF GENERATOR
PREPARED:	CHECKED:
	DRAWING NO.

C. Blowers 3 nos (each of 40 MW)

Erection Weight per Blower as below:

Note: For 3 Blowers, Erection Agency should consider 3 times of below erections weights

Sl. No	Item/Equipment	Quantity	Dry Weight (in kgs)	Remarks
1	Blower	1	90,000	

D. Heat Exchangers

Erection Weight for HE is per 40 MW STG as below:

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Note: For 3 STGs, Erection Agency should consider 3 times of below erections weights

Sl.No	Equipment	Overall Dimensions (in mm)	Quantity	Dry Weight (in kgs)
1.	Surface Condenser			(Wt / Assly.)
a.	Main Assly	L 11000 x W 3700 x H 3800	1 no.	100,000
b.	Hot Well	L 6000 x W 2200 x H 2200	1 no.	
c.	Dome	L 6000 x W 1000 x H 2500	1 no.	
2.	Steam Jet Air ejector			
	Assly	L 6000 x W 2800 x H 3000	1 no.	7,500
3.	Gland Steam Condenser			
a.	Complete Assly.	L 2650 x W 1300 x H 1200	1 no.	1400
4.	LP Heater			
a.	Complete Assly.	L 9000 x W 1500 x H 1600	1 no.	8500
5.	HP Heater-1			
a.	Complete Assly.	L 12000 x W 1500 x H 1600	1 no.	14000
6.	HP Heater-2			
a.	Complete Assly.	L 10000 x W 1500 x H 1600	1 no.	12500
7.	HP Flash Tank			
a.	Complete Assly.	Dia 2050 x H 4600	1 no.	6600
8.	ST Oil Cooler (Vertical 2x100%)			
a.	Complete Assly.	Dia 750 x H 5000	2 no.	5400
9.	STG Air Cooler			
c.	Per Element	L 3000 x W 670 x H 630	6 nos.	850

Erection Weight for HE is per 32 MW STG as below:

Note: For 3 STGs, Erection Agency should consider 3 times of below erections weights

Sl.No	Equipment	Overall Dimensions (in mm)	Quantity	Dry Weight (in kgs)
1.	Surface Condenser			(Wt / Assly.)

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

a.	Main Assly	L 11000 x W 3700 x H 3800	1 no.	96,000
b.	Hot Well	L 6000 x W 2200 x H 2200	1 no.	
c.	Dome	L 6000 x W 1000 x H 2500	1 no.	
2.	Steam Jet Air ejector			
	Assly	L 6000 x W 2800 x H 3000	1 no.	7,500
3.	Gland Steam Condenser			
a.	Complete Assly.	L 2600 x W 1300 x H 1200	1 no.	1400
4.	LP Heater			
a.	Complete Assly.	L 9000 x W 1500 x H 1600	1 no.	7500
5.	HP Heater-1			
a.	Complete Assly.	L 11500 x W 1500 x H 1600	1 no.	11000
6.	HP Heater-2			
a.	Complete Assly.	L 10000 x W 1500 x H 1600	1 no.	11500
7.	HP Flash Tank			
a.	Complete Assly.	Dia 1550 x H 3500	1 no.	3500
8.	ST Oil Cooler (Horizontal 2x100%)			
a.	Complete Assly.	L 5000 x W 800 x H 2500	2 no.	5700

E. GAS FIRED BOILERS: 3 nos. (each of 300 TPH)

Erection Weight per Boiler as below:

Note: For 3 Boilers, Erection Agency should consider 3 times of below erections weights

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

TOTAL WEIGHT PER BOILER

PRESSURE PARTS (PG.No- 04, 05, 06, 07,10, 11, 12, 15, 16, 17, 19, 20, 21, & 24)	tonnes	: 1240.3
NON - PRESSURE PARTS (PG. No.- 08, 09, 18, 28, 30, 31, 32, 33, 35, 36, 37, 38, 39, 40, 46, 48, 51, 65, 67 & 99.)	tonnes	: 246.7
FIRING SYSTEM (PG. No.- 41, 42, 43, 45, & 47.)	tonnes	: 2417.2
OTHERS	tonnes	: 0.0
TOTAL		: 3904.7

Details of weight in Tonnes as below per Boiler:

DESCRIPTION	WEIGHT
Boiler Drum (s)	95.6
Water Wall Headers & Drums	29.5
Water Wall Panels	270.8
Circulation System Components	102.5
<u>Buckstays</u> and Framing	103.5
Seal Boxes	7.5
Superheater Headers	42.6
Superheater Coils and Walls	266.8
Superheater Components	40.7
Reheater Headers	19.4
Reheater Coils and Walls	118.7
Reheater Components	18.9
Roof Skin Casing	8.8
Economiser	183.1

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

DESCRIPTION	WEIGHT
Soot Blowers	7.3
Soot Blower and Soot Blowing System	8.1
HP & LP Bypass System	--
Boiler Integral Piping and Fittings	36.0
<u>Man</u> Holes and Furnace Openings	7.9
Fixing Components for Main Boiler Lining and Insulation	81.1
Boiler Skin Casing	3.1
Fixing Components for Boiler Auxiliaries Insulation	37.5
Lining and Insulation Materials	268.1
Bunker Structure	0.0
Boiler Supporting Structure	781.2
Galleries and Stair Ways	343.7
Boiler Outer Casing	70.0
Interconnecting Walk Ways	100.0

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

DESCRIPTION	WEIGHT
External Structures (<u>Supporting</u> Structures for ID System)	250.0
Recovery System	--
Oil and Gas Burners, Ignitors and Scanners	2.7
Oil and Gas System	228.7
Ignitor and Scanner Air System	15.2
Bottom Ash Handling System	--
Burner System (WB)	37.2
Stoker Components	--
Pulverized Fuel Piping	0.0
Ducts, Dampers & Expansion Joints	299.0
Steam Coil Air heater / Tubular Air heater	--
Cascade Evaporator	--
Conventional Large Heaters (<u>Regenerative</u> Trisector AH)	--
Lifting Tackles	18.7

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

SYSTEMWISE ERECTION WELD JOINTS (Per Boiler)

Note: For 3 Boilers, Erection Agency should consider 3 times of below erections weights

S.NO.	Description	Material. spec (ASME)	SizeODx Thick. (mm)	No.of weld per boiler
A. <u>ECONOMISER SYSTEM</u>				
1.	Coils and hangers	210 A1	44.5x4.5	750
2.	Feed pipes	106 B	219.1x22.2	6
3.	Eco. Links	106 B	219.1x22.2	8
B. <u>CIRCULATING SYSTEM</u>				
1.	Down comer	106 C	323.9x25	18
2.	Bottom ring Header	106 C	406x40	8
3.	Water wall panels	210 C	63.5x4.8	2200
4.	Extended side wall	210 C	63.5x4.8	90
5.	Rear arch hanger screen at horiz. Pass	210 A1	76.2x7.1	250
6.	Soot blower openings	210 C	63.5x4.8	90
7.	Riser pipe	106 C	127x10	250
8.	Water platens	210 C	63.5x4.8	210
9.	Boiler Bank	SA192	63.5x5.6	1600
10.	Boiler bank headers	210 C	323.9x25	40
C. <u>SH SYSTEM</u>				
1.	Sat. steam connection pipe	106 C	127 x 10	36
2.	SH roof	213 T11	51 x 5	210

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

3.	SH Rear roof & wall (Second pass)	210 C	44.5x 5	360
4.	SH Front wall (Second pass)	210 C	44.5x 5	270
5.	SH side walls (Second pass)	210 C	44.5x 5	270
6.	Links to LTSH	210 C	44.5x 5	180
7.	LTSH & terminals	210 C	44.5x 5	360
8.	LTSH to platen	106 B	323.9x35	4
9.	Platen SH	213 T22	38.1x5.6	64
		213 T22	51 x5.6	64
		213 T22	51 x5.6	96
		347H	47.63x5.6	64
		213 T22		
10.	Platen to FSH link	335 P12	323.9x32	4
11.	Finish SH	213 T91	38.1 x 5.6	130
		213 T22	51 x 7.1	130
		213 T22	51x10.0	130

D. FINE FITTINGS

—————→ **2500**

F. Piping

Erection Weight is for total Project

Description of Items	Quantity	Total Weight in Ton	Remarks
IBR-Piping	1 lot	980 Ton	
Non-IBR Piping	1 lot	2015 Ton	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

G. Valves

Erection Weight per BTG (Boiler + Turbine + Generator) as below:

Note: For this project, Erection Agency should consider 3 times of below erections weights.

Description of Items	Quantity	Total Weight in Kgs	Remarks
Valves	520 nos.	150,000 Kg	

H. APH, FANS

Erection Weight per Boiler as below:

Note: For 3 Boilers, Erection Agency should consider 3 times of below erections weights

Description of Items	Quantity	Total Weight in Kgs/litres	Remarks
Fans	1 lot	119,000 Kg	
Air Pre Heater (TAPH)	1 lot	286,000 Kg	including 79 MT Corten steel tubes

I. HT 6.6 kV Motors

Erection Weight is for total Project as below:

Description of Items	Quantity	Weight in Kgs per Motor	Remarks
ID FAN	6 nos	7600	
SA FAN	6 nos	3500	
PA FAN	6 nos	5800	
BFP	5 nos	7800	

J. HT Switchgear

Erection Weight is for total Project as below

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

SOE Item No.	Qty. of Switch boards	Qty. of Panels in each switch board	Item Details / Name of Switchboard	Package Size	Total Number of Packages	Package Serial Nos. (From... To)		Width of Switch board (m)	Height of Switch board (m)	Depth of Switch board (m)	
1	1	28	Panels- 6.6kV CPP Unit Switchgear-1	Double	14	1	14	22.960	2.800	2.927	
2	1	28	Panels- 6.6kV CPP Unit Switchgear-2	Double	14	15	28	22.960	2.800	2.927	
3	1	39	Panels- 6.6kV CPP Staton Switchgear-1	Double	19	29	47	31.980	2.800	2.927	
3				Single	1	48	48	0.820	2.800	2.927	
4	1	34	Panels- 6.6kV CPP Staton Switchgear-2	Double	17	49	65	28.280	2.800	2.927	
5	1	9	Panels- 6.6kV DG Switchger	Double	4	66	69	7.780	2.800	2.927	
5				Single	1	70	70	0.820	2.800	2.927	

PROJECT SUMMARY		SHIPPING SIZE DETAILS	
Total SOE Items	5	Double Size Package	Single Size Package
Total Panels	138	Weight	3MT
Total No. of Packages (Double Size)	68	Volume	14.43 Cbm
Total No. of Packages (Single Size)	2	Width	1.85 m
Grand Total No. of Packages	70	Height	3.00 m
Grand Total Shipping Volume (Cbm)	997	Depth	3.20 m / 2.6m
Grand Total Shipping Weight (Metric Tonnes)	207		

K. BUSDUCT

Erection Weight is for total Project as below

Sl No.	Item	Qty.	UoM	Unit Weight(K G)	Maximum Dimension of Single BoM (LXBXH)	Nos. of Expected BoMs. For per Unit
1	SPBD:GAC to GT connection	3	Set	10000	500mmx1500mmx4000mm	18Nos.
2	Current Transformers for SPBD	3	Set	10500	500mmx500mmx500mm	30 Nos.
3	LT BUSUDCT	8	Set	3000	900mmx500mmx4000mm	30 Nos.
4	STEEL STRUCTIRE (MT)	3	Set	36000	6000mmx150mmx150mm	25 Nos.
5	APE	3	Set	10000	2000mmx2500mmx3000mm	1 Nos.

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6	SPARES	1	Set	10000	500mmx500mmx500 mm	18 Nos.
7	MISC. Items	1	Set	20000		

L. Transformers

Erection Weight is for total Project as below

Description of Items	Quantity	Weight in Kgs per Transformer	Remarks
11/34.5 kV, 50 MVA, ONAN Generator Trafo. For STG-1,2 &3.	3nos	60000	
33/6.9kV, 16/20MVA, Dyn11 ONAN/ONAF PTR-1 to 9	9nos	40000	
33/6.9kV, 25/31.5 MVA, Dyn11 ONAN/ONAF PTR-10 & 11	2nos	50000	

M. Other Mechanical Items

Erection Weight is for total Project as below

Sl.No	Equipment Description	qty	Dimension each	Weight each	Remarks
	--	no	LxBxH (m)	tons	--
1.	LDO system for boilers				
a	LDO forwarding pump skid with motor drive	1	3 x 2.5 x 1.0	5.5	
b	Condensate drain tank with 2x100% pumps	1	Dia 1.0 x 1.5	5.0	
c.	LDO tank	1	Dia 6.0 x 6.0	50.0	Empty wt.
2.	LSHS system for boilers				
a.	LSHS forwarding pump skid with motor drive	1	3 x 2.5 x 1.0	3.5	
b.	LSHS heaters	2	Dia 0.75 x 4	12.0	

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c.	Condensate drain tank with 2x100% pumps	1	Dia 1.0 x 1.5	5.0	
d.	LSHS tank	1	Dia 6.0 x 6.0	50.0	Empty wt.
3.	Feed water system				
a.	Boiler feed pumps for main boilers	5	6 x 3 x 1.0	23.0	
b.	LP dosing skids	2	5 x 3.5x 1.0	4.0	
c.	HP dosing skids	1	6 x 3.5 x 1.0	6.0	
4.	Condensate system				
a.	CEPs for 18MW STGs	6	3.5 x 2.5 x 1	4.0	
b.	CEPs for 25MW ST for blowers	6	4.5 x 3 x 1	6.0	
5.	Cooling water system				
a.	Main cooling water pumps	6	6 x 3.5 x 1.0	25.0	
b.	Auxiliary cooling water pumps	3	3.0 x 2.0 x 1.0	6.0	
c.	Closed loop DM water circulation pumps	3	4.0 x 1.0 x 1.0	6.0	
d.	Plate heat exchangers	2	6 x 4 x 1.0	25.0	Empty wt.
e.	Cooling water make-up pumps	2	3.0x2.0x1.0	3.5	
6.	Blowdown tanks for UB	2	Dia 2.5x 2.5	6.0	Located near Ubs.
7.	Miscellaneous Equipment				
b)	Control panels (10A)	12			
c)	Control panel (63A)	5 no			
d)	Sump pumps	5	2.5x1.0x0.5	0.75	
e)	Boiler fill pumps	4	4.5x2.0x1.0	3.0	
8.	Unit condensate float tank	6	Dia3.0x3.0	25.0	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

9.	Condensate transfer pumps for LDO/ LSHS heaters condensate	2	1.5x1.0x1.0	1.5	
10.	Miscellaneous pumps	8	1.5x1.0x1.0		

Sl.No	Equipment Description	qty	Dimension each	Weight Each (ton)	Remarks
1.	Cooling tower and cooling tower basin				Supply, erection by Vendor.
2.	Side stream filtration	5	3.5 Dia x 8.7 H	20	Horizontal
3.	CW Treatment				
a)	Electro-chlorination				
b)	Anti scalant tank	1	3m L x 2.5m W	3	skid
c)	Anti-Corrosion tank	1	3m L x 2.5m W	3	skid
d)	Biocide tank	1	3m L x 2.5m W	3	skid
2.	Water treatment systems				
a)	DM water tank of 4200 cu.m capacity each	2	Dia 20x16.0	250	Empty weight
b)	Raw water booster pumps to filter plant	2	1.5x1.0x2.0	0.5	
c)	Potable water pumps	2	0.5x0.3x0.3	0.2	
d)	Service water pumps	2	0.5x0.3x0.3	0.2	
e)	Pressure sand filter	2	1.5x2.0x1.0	20.0	
f)	Filtered water tank	1	Dia. 8 x 8	460	400 cu.m capacity
g)	Service water storage tank	1	10cu.m		Overhead tank
h)	Potable water tank	1	10cu.m		Overhead tank

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i)	DM water feed pumps	2	3.0x2.0x6.5	1.5	
j)	Multi grade filters	3	Dia 3.6 x 2.2	6.1	
k)	Dual Media filters	3	Dia 3.4 x 2.2	6.5	
l)	Activated Carbon filters	3	Dia 3.6 x 2.2	6.1	
m)	Strong Acid cation	3	Dia 2.2 x 3	2.6	
n)	Degassifier Tower	3	Dia 1.8x3.3	2.1	
o)	Degasified water storage tank	3	Φ3x6.0	4.1	
p)	Air Blowers	12	0.2x0.2x1.5	0.3	DMF, MGF, DG & MB
q)	Degassified water pumps	6	0.2x0.1x1	1	
r)	Strong base anion	3	Dia 2.5 x 3.4	3.5	
s)	Mixed bed units	3	Dia 2.4 x 2.2	3	
t)	Regeneration pumps	2	1.5x0.6x0.6	0.3	
u)	Filter backwash pump	2	2x1x5.4	1.5	
v)	Acid unloading pumps	2	0.2x0.2x1	0.5	
w)	Alkali unloading pumps	2	0.2x0.2x1	0.5	
y)	Acid measuring tanks	4	Φ1.5x2.0	0.1	
z)	Alkali measuring tanks	4	Φ1.5x2.0	0.1	
aa)	Acid storage tank	2	Φ3x4.6	1	
ab)	Alkali storage tank	2	Φ3x4.6	1	
ac)	Neutralization pit	1	20 x 4	--	RCC tank with single partition
ad)	DM water transfer pumps	2	3.0x2.0x1.0	3.5	
ae)	MCC of DM plant	1	lot		
3.	Effluent treatment systems				
a	Clarifier mechanism	1		5.5	Includes radial launder, shaft, mixing well etc.
b	Dosing skids	3	3m x 3m x 3m	5	Lime, alum, PE
c	Filter press	2	5.5 x 1.2 x 1.5	8	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

d	Feed pump	2	3.0x2.0x0.5	1.0	
e	Clarified water pump	2	3.0x2.0x0.5	1.0	
f	MCC of PT plant				
g	High pressure pump	2	0.5 x 0.5 x 2	0.5	
h	Cartridge filter	2	Dia. 1 x 1.5	1	
i	RO membranes	2		5	
j	Dosing skids for RO	4	3m x 3m x 3m	3	
4.	Fire water system				
a)	MV Spray pumps	2No.	3.0x2.0x1.0	3.5	
b)	SV Spray pumps	2No.	3.0x2.0x1.0	3.5	
c)	Jockey pumps	2	2x1.0x1.0	1.0	
5.	AC system for control room				
a)	Refrigerant systems	2	4 x 4x3	5.0	
b)	AHU	2	3 x 3x 3	4.0	
c)	Condenser water pumps	2	2.5 x 1.5x 1.0	3.0	
d)	Cooling towers	2	3 x3 x1.5	5.0	
e)	Electric strip heater	6	1.5 x 1.0x 0.75	1.5	
f)	Electric humidifier	1	3 x3 x1.5	1.5	
g)	Chilled water pumps	2	2.5 x 1.5x 1.0	3.0	
h)	Fresh air fans	1	1.0 x 1.0 x 0.75	0.5	
i)	Absorbent pumps	1	4.0x1.5x1.0	2.5	
j)	Package air conditioner	3	4.0x1.5x1.0	2.5	
k)	Package humidifier heaters	3	4.0x1.5x1.0	2.5	
l)	Strip heater for package air conditioners	1	1.5 x 1.0x 0.75	1.5	
m)	Fresh air fan for package Acs	2	1.5 x 1.0x 0.75	1.5	
n)	Chiller Room	1	10m x 5m	-	2 Floors
o)	Pressurisation room	3	5m x 5m	-	
p)	AHE room	1	10m x 5m	-	
6.	Ventilation system				

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

a)	Air blowers Pressurised ventilation for SG room	4	1.2x0.75x0.75	1.0	
b)	Air blowers Pressurised ventilation for Battery room	2	1.2x0.75x0.75	1.0	
c)	Roof extractors for STG hall	40	Dia 0.75	5Kg	
7.	Maintenance Equipment				
a)	EOT crane for STG hall of 50/10 tons	1	-----	-----	
b)	EOT crane for of 35/5 tons	1	-----	-----	
c)	EOT Crane DG hall 10 tons capacity	1No	-----	-----	
e)	Electrical hoist – 5 ton	4	-----	-----	5 tons
f)	Electrical hoist for DG set of 5 tons capacity	1W	-----	-----	
k)	Electrical hoist for BFPs 15 ton capacity	1			
8.	Miscellaneous Equipment				
a)	Passenger elevators	2	-----	-----	884 kg cap.
b)	Work Shop and Lab equipment	1 Lot	-----	-----	To be stored at Site and Installation at Work shop and Lab building.

N. Other Electrical Items

Erection Weight is for total Project as below:

Sl. No.	Equipment /Package Description	Unit	Qty	Dimension (each) LxBxH (M)	Weight (each) KG	Remarks
1.0	33kV GIS Switch.Board.	Set	1	28 x 2.2 x 2.7	70000	Per panel weight 2000kg

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	(Total of 35 Panels)					
2.0	LV Oil Filled 6.6/0.415kV, 2MVA Distribution transformer	Nos	8	3.6 x 2.8 x 3.55	7000	
3.0	415V Emergency DG set	Nos	1		6000	
4.0	SCAP system	Set	1	15.6X1.25X2.2	10500	
5.0	SAS system	Set	1		5000	
5.0	NGR for generator Trafo 400A,47.63 Ohms on 33kV side	Nos	3	1.9X3.2X3	5	
6.0	NGR for PTR Trafos 600A, 6.35 Ohms	Nos	11	1.8X1.5X2	4	
7.0	Data concentrator	Nos	4	0.8X0.8X0.22	50	
8.0	Lab equipment	Set	1		500	As per Bid spec
9.0	Telecom system	Set	1		500	
10.0	CCTV system	Set	1		800	
11.0	UPS	Set	1		15000	Along with battery
12.0	LT Switchgear Package					
	415V PMCC	Nos	4	12x1.5x2.5	12000	
	415V EMCC	Nos	1	9.18X1.2X2.5	8000	
	415V STGMCC	Nos	3	11.2X1.2X2.5	9000	
	415V TB MCC	Nos	3	12.3X1.2X2.5	9500	
	415VBoiler MCC	Nos	3	11.2X1.2X2.5	9000	
	415V CW MCC	Nos	3	11.2X1.2X2.5	9000	
	415V CAS MCC	Nos	1	11.2X1.2X2.5	9000	
	415V BOP MCC	Nos	3	32.8X1.2X2.5	22850	
	415V Valve DB	Nos	3	16.4x1.25x2.5	12000	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	415V Boiler ACDB	Nos	3	6.4x1.0x2.5	6000	
	415V ACDB	Nos	1	2.4x1.0x2.5	2000	
	415V ACVent MCC	Nos	1	11.2X1X2.5	9000	
	415V MLDB	Nos	2	8.06x0.6x2.5	5600	
	415V AC ELDB	Nos	2	4.86x0.6x2.5	3400	
	240V UPSDB-1	Nos	1	9.66X0.6X2.5	6700	
	240V UPSDB-2	Nos	1	9.66X0.6X2.5	6700	
	220V DCDB-1	Nos	2	9.66X0.6X2.5	2000	
	Local control station	Nos	200	1X0.4X0.4	5	
9.0	DC System					
9.1	220V Battery Bank (2400 Ah, 55 Cells) <i>1 Set of 2400Ah battery (1 Set=2 nos. of 1200Ah battery bank connected in parallel)</i>	Sets	4	4000x725x1800 for 1 no. of 1200Ah battery	5200 kg for 1 no. of 1200Ah battery	Parallel combination of 2 nos. of 1200Ah battery banks to be connected in order to arrive 2400Ah battery.
9.2	220VBattery Charger	Sets	2	4000x1000x200	5000 kg	Each set consist of FC + FCBC charger
9.3	Battery Isolation Box (650A)	Nos.	2	700x350x1000	95 kg	
9.4	220V Station Battery. (800AH, 110Cells)	Sets	2	4370x830x2500	6000kg	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

9.5	220V Station Battery Chargers.	Sets	2	3200x830x23 50	4000kg	
	NOTES: 1) Site has to arrange 110V/250A load bank (Discharge Resistor Bank) to carryout discharge test on Battery Bank of 1200Ah rating & 110V/ 20 A load bank (Discharge Resistor Bank) to carryout discharge tests on Battery Bank of 100Ah rating at the time of commissioning.					
10.0	PLANT ILLUMINATION PACKAGE					
10.1	Surface mounted LED Bulkhead fixture (10-15W approx) suitable for 240V AC supply	Nos	90	NA	1.5	
10.2	Recess mounted LED Down light (12W approx) suitable for 110V DC supply	Nos	90	NA	1.5	
10.3	Surface mounted 10-15W LED Bulkhead fixture suitable for 110V DC supply	Nos	255	NA	1.5	
10.4	Flame proof DC LED Well Glass fixture (35W approx) suitable for DC Supply	Nos	12	NA	4	
10.5	Industrial type general purpose LED Batten with 2 nos. (18-22W approx, 230V AC) LED tube lamp.	Nos	1200	NA	1.5	
10.6	600x 600mm Recess mounted decorative LED fixture (33-36W Approx, 230V AC) with high efficiency low glare optics.	Nos	1725	NA	2	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

10.7	Industrial corrosion resistant type fixture of polycarbonate body with 2 nos. (18-22W approx, 230V AC) LED tube lamp.	Nos	135	NA	1.75	
10.8	LED Well Glass fixture (35-50W Approx, 230VAC)	Nos	5100	NA	3.5	
10.9	LED medium bay fixture (80-100W Approx, 230VAC)	Nos	300	NA	4.5	
10.10	LED high bay fixture (150-180W Approx, 230VAC)	Nos	300	NA	5	
10.11	Flame proof LED Well Glass fixture (35-50W Approx, 230VAC)	Nos	66	NA	4	
10.12	LED street lighting fixture (60W approx, 230V AC)	Nos	270	NA	5	
10.13	LED Flood lighting Fixture (90 watt approx)	Nos	225	NA	6	
10.14	Flame proof LED Street lighting fixture (60W Approx, 230VAC)	Nos	15	NA	5	
10.15	LED Flame proof Flood lighting Fixture (180-200 watt approx)	Nos	15	NA	10	
10.16	11meter Steel tubular pole	Nos	6	NA	180	
10.17	4.75 meter 50NB GI pole	Nos	30	NA	25	
10.18	3 meter 50NB GI pole	Nos	2250		12	

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				NA		
10.19	1200mm long 150 deg bend (50NB) pipe	Nos	285	NA	7.5	
10.20	Saddle with saddle bar	Nos	99000	NA	0.1	
10.21	GI steel Conduit branching JB	Nos	3900	NA	0.3	
10.22	GI Flexible conduit (20 mm dia)	Mtrs	7500	NA	0.15	
10.23	GI Flexible conduit (25mm dia)	Mtrs	750	NA	0.2	
10.24	Gland /Connector for fixing Flexible conduits	Nos	4200	NA	0.02	
10.25	3000mm long 25mm PVC conduit	Nos	15600	NA	2	
10.26	PVC conduit bend	Nos	21000	NA	0.1	
10.27	PVC conduit coupler	Nos	21000	NA	0.025	
10.28	PVC Conduit branching JB (Deep drawn type for concealed wiring at ceiling)	Nos	2100	NA	0.15	
10.29	PVC Conduit branching JB	Nos	7500	NA	0.15	
10.30	Fan box (deep drawn type for concealed wiring at ceiling)	Nos	30	NA	0.15	
10.31	PVC Ceiling Rose	Nos.	3600	NA	0.2	

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10.32	3000mm long 50NB GI conduit	Nos	60	NA	15	
10.33	3000mm long 50NB PVC conduit	Nos	45	NA NA	5	
10.34	3000mm long 20mm GI conduit	Nos	900	NA	1.9	
10.35	Check nuts for 20mm conduit	Nos	4500	NA	.01	
10.36	Galvanised steel chain	Mtrs	24000	NA	0.5	
10.37	Spring loaded ball socket suitable for conduit branching round JB	Nos	1800	NA	0.2	
10.38	GI Clamp for LED Batten (For Surface mounting)	Nos	1350	NA	.3	
10.39	Rubber grommet 25mm	Nos	300	NA	.005	
10.4	Rubber grommet 20mm	Nos	1500	NA	.005	
10.41	S Hook for Highbay and Medium bay fixture	Nos	600	NA	.075	
10.42	S Hook for Recessed mounted fixture	Nos	7500	NA	.05	
10.43	Rawl plug 1.5” with screw	Nos	42000	NA	.005	
10.44	Galvanised anchoring Fastener 6mm dia x 35mm long (Bolt type)	Nos	18000	NA	0.05	

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10.45	Galvanised anchoring Fastener 6mm dia x 35/70mm long (Hook/Half ring type)	Nos	10500	NA	0.05	
10.46	Galvanised anchoring Fastener 10mm dia x 68mm long (Bolt type)	Nos	2700	NA	0.075	
10.47	Galvanised U type fan bolt (For Fan & High/Midbay Fixture)	Nos	600	NA	0.075	
10.48	Cable clamps suitable for 3Cx2.5sqmm Cu. Armoured Cable	Nos	150000	NA	.05	
10.49	Cable clamps suitable for 4Cx25/35sqmm Cu. Armoured Cable	Nos	22500	NA	.05	
10.5	4 way 250x200x120mm rectangular sheet steel weather proof JB (IP55)	Nos	150	NA	2.5	
10.51	4 way 200x150x100mm rectangular sheet steel weather proof JB (IP55) with 2A MCB	Nos	4050	NA	2	
10.52	Flame proof Cast light alloy JB (250x200x150mm)	Nos	12	NA	3.5	
10.53	Flame proof Cast light alloy JB (200x150x100mm) with 2A MCB	Nos	90	NA	3	
10.54	MCB Box with 20A MCB	Nos	300	NA	2.0	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

10.55	FLP DC MCB Box with 10A DC MCB	Nos	6	NA	3	
10.56	Switchboard (Flush/Surface mount type) with 2/3nos. 6A Piano type switch	Nos	300	NA	0.5	
10.57	Decorative type 6/16A receptacle with 16A switch (Flush/Surface mounted, modular type)	Nos	375	NA	0.4	
10.58	Industrial metal clad type 1Ph, 20A Socket with 20A interlocked rotary switch & Plug	Nos	390	NA	1.5	
10.59	Flameproof 1ph, 20A Socket with interlocked rotary switch & Plug	Nos	9	NA	3	
10.6	Industrial metal clad type 3Ph, 63A (5pin) receptacle with interlocked rotary switch & Plug	Nos	150	NA	2.5	
10.61	24V socket module with 40W GLS/20W LED Hand lamp	Nos	18	NA	3	
10.62	18 way AC Indoor Lighting Panel	Nos	6	1200x200x900	75	
10.63	12 way AC Indoor Lighting Panel	Nos	42	1000x200x900	70	
10.64	6 way AC Indoor Lighting Panel	Nos	126	800x200x900	65	
10.65	6 way DC indoor Lighting Panel	Nos	30	900x200x900	60	

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10.66	18 way AC Outdoor Lighting Panel	Nos	21	1200x200x900	80	
10.67	12 way AC Outdoor Lighting Panel	Nos	24	1000x200x900	75	
10.68	6 way AC Outdoor Lighting Panel	Nos	42	800x200x900	70	
10.69	Flame proof 12 way AC Lighting Panel	Nos	3	800x200x800	70	
10.7	Flame proof 6 way AC Lighting Panel	Nos	6	600x200x600	70	
10.71	1Cx 1.5 Sqmm Cu. Multi strand PVC Flexible wire (Green)	Mtrs	90000	NA	0.025	
10.72	1Cx 2.5 Sqmm Cu. Multi strand PVC Flexible wire (Red, Yellow, Blue and black)	Mtrs	150000	NA	0.03	
10.78	250 kVA Normal Lighting transformers	Nos	4	1.5x0.9x1.9	1800	
10.79	100 kVA Emergency Lighting transformers	Nos	4	1.5x0.8x1.6	1200	
<p><u>NOTES:</u></p> <p><u>ATTENTION:</u></p> <ol style="list-style-type: none"> 1) Fixtures and other lighting equipment will be supplied to site in loose parts as per standard packing and practices of OEM. Assembly and erection of the same shall be carried out by Erection Agency. 2) JB shall be considered for loop in and loop out of circuit cable for LED fixture. 3) Erection of all illumination items (including cutting/ threading/bending/welding etc. of conduit/pipe/ISMC/ISA/Metsec etc.) shall be carried out at site by Erection Agency as per the installation requirements. 4) All the required erection consumables (like rawl plugs, screws, check nuts, nuts & bolts, locking wire, insulation tape, sealing compound/plugs, washers etc.) which are not covered in above list but required for successful completion of the work shall be in the scope of Erection Agency. 						

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	<p>5) Pipes & accessories of poles will be supplied in loose condition. Assembling and Erection of these poles shall be carried out by Erection Agency.</p> <p>6) All the necessary civil works including foundations etc. as well as structural works required for installation of these poles shall be in Erection Agency's scope.</p> <p>7) Region / PS to ensure the completion of foundations for lighting poles before commencement of paving work in related areas.</p> <p>8) Outdoor Lighting feeders from MLDB for outdoor lighting shall be routed through available cable trench or cable tray as far as possible. Requirement of additional cable trench/buried conduits shall be envisaged based on site suitability.</p> <p>9) Before and after the installation work, each equipment shall be thoroughly cleaned and painted wherever required and same shall be considered in Erection Agency's scope.</p> <p>10) Site may note that Civil work is in customer's scope and concealed conduit system is adopted for lighting in non-false ceiling RCC buildings. Hence, site has to liaison with civil contractor and electrical contractor for installation of concealed conduits and associated components for lighting, during roofing and before wall plastering.</p> <p>11) For installation of concealed conduit, PVC conduit shall be laid at roof during roofing. Pull box shall be provided near each light and fan box shall be provided near each fan point. Also Pull box shall be provided at regular interval for pulling of wires. Special care shall be taken for location of dropping of conduit for wall run. Location of light point, fans, power sockets, switchboards, MCBDB etc shall be finalized as per illumination layout before roofing is done.</p> <p>12) Frames/enclosures of the power sockets, switchboards shall be installed and concealed conduit runs shall be made in walls, before plastering is done so as to avoid chiseling.</p> <p>13) Erection agency shall carry out the plant illumination works in line with customer/consultant's Technical specifications</p>					
11.0	HT POWER CABLE				Cable weight indicated in KG/KM	
11.1	33kV (UE) Armoured, Al Conductor XLPE insulated FRLS outer-sheathed cable. - 1CX630 sqmm	mtr	4000	NA	5200	
11.2	11kV (UE) Armoured, Al Conductor XLPE insulated FRLS outer-sheathed cable. - 1Cx630sqmm	mtr	600	NA	4050	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

11.3	6.6kV (UE) Armoured; Al Conductor XLPE insulated FRLS outer- sheathed cable. - 1Cx630	mtr	12000	NA	3450	
11.4	6.6kV (UE) Armoured; Al Conductor XLPE insulated FRLS outer- sheathed cable.- 3Cx185	mtr	12000	NA	8100	
12.0	HT POWER CABLE TERMINATION KITS					
	Cable kits	Lot	1	NA	1000	
13.0	LT POWER CABLE					Cable weight indicated in KG/KM
13.1	1CX10 CU XLPE UNARM	mtr	2000	NA	170	
13.2	1CX35 CU XLPE UNARM	mtr	2000	NA	420	
13.3	1CX120 CU XLPE UNARM	mtr	3500	NA	1250	
13.6	1CX630 Al XLPE	mtr	10000	NA	2800	
13.13	3CX2.5 Cu XLPE	mtr	150000	NA	460	
13.14	3CX6 Al XLPE	mtr	15000	NA	580	
13.16	3CX16 Al XLPE	mtr	23000	NA	530	
13.17	3CX25 Al XLPE	mtr	5000	NA	770	
13.18	3CX50 Al XLPE	mtr	10000	NA	1100	
13.2	3.5CX35 Al XLPE	mtr	14000	NA	980	
13.21	3.5CX70 Al XLPE	mtr	15000	NA	1600	
13.22	3.5CX95 Al XLPE	mtr	7500	NA	1900	

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Bharat Heavy Electrical Limited, Project Engineering & System Division, RC Puram, Hyd-32.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	3.5CX120 Al XLPE	mtr	7500	NA	2500	
13.23	3.5CX185 Al XLPE	mtr	10500	NA	3250	
13.24	3.5CX240 Al XLPE	mtr	15000	NA	4100	
13.25	4CX2.5 Cu XLPE	mtr	20000	NA	560	
13.26	4CX4 Cu XLPE	mtr	30000	NA	660	
13.27	4CX6 Al XLPE	mtr	5000	NA	625	
13.28	4CX10 Al XLPE	mtr	5000	NA	765	
13.29	4CX16 Al XLPE	mtr	30000	NA	715	
14.0	CONTROL CABLES					Cable weight indicated in kg/km
14.1	3Cx2.5 sqmm Cu PVC PVC/FRLS	mtr	30000	NA	475	
14.2	7Cx2.5 sqmm Cu PVC PVC/FRLS	mtr	18000	NA	700	
14.3	10Cx2.5 sqmm Cu PVC PVC/FRLS	mtr	40000	NA	780	
14.4	16Cx2.5 sqmm Cu PVC PVC/FRLS	mtr	12000	NA	1050	
14.5	19Cx2.5 sqmm Cu PVC PVC/FRLS	mtr	12000	NA	1150	
14.6	24Cx2.5 sqmm Cu PVC PVC/FRLS	mtr	3000	NA	1400	
15.0	CABLE GLANDS & Lugs PACKAGE	lot	1			
	Note: <ol style="list-style-type: none"> The glanding, termination and connection of cables shall be done strictly in accordance with the manufacturer's instruction, drawings and/or directed by the Purchaser. The work shall include all clamping, fitting, fixing, soldering, tapping, compound filling, cable jointing, crimping, shorting and grounding as required for the complete job. All equipment shall be of Contractor's procurement under this specification. 					

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	<ol style="list-style-type: none"> 3. Control cable cores entering control panel/switchgear/MCC etc. shall be neatly bunched and served with PVC perforated tape to keep it in position at the terminal block. 4. The contractor shall put ferrules on all control cable cores in all junction boxes and at all terminations. The ferruling shall be Cross-Ferruling. The ferrules shall carry terminal numbers as per drawings. All ferrules shall be coloured, plastic & interlocked type. 5. Spare cores shall also be similarly ferruled, crimped with lug and aped on the ends. Spare cores shall be ferruled with individual cable number. 6. Termination & Connection shall be carried out in such a manner as to avoid strain on the terminals. Cables shall be marked with cable numbers as per applicable drawing. 7. All cable entry points shall be properly sealed and made vermin and dustproof. Unused opening, if any, shall be effectively closed. Sealing work shall be carried out with approved sealing compound having fire withstand capability for at least 3 hours. 					
16.0	PRE FABRICATED GI CABLE TRAYS AND ACCESSORIES (GI Cable trays and accessories):					
16.1	Ladder type cable tray, W=600mm.	Sets	6500	2.5X0.6X0.1	45	Each cable tray length 2.5 Mtr including coupler plate and Nut & bolts.
16.2	TEEs of 900mm bending radius for ladder type cable tray, W=600mm	Sets	20	NA	45	
16.3	Horizontal Bends of 900mm bending radius for ladder type cable tray, W=600mm	Sets	20	NA	35	
16.4	Vertical UPs of 900mm bending radius for ladder type cable tray, W=600mm	Sets	20	NA	25	
16.5	Vertical downs of 900mm bending radius for ladder type cable tray, W=600mm	Sets	20	NA	25	
16.6	H.CROSS OF 900MM (BR) & CP FOR 600MM GI CT (L)	Sets	20	NA	25	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

16.7	Cover along with accessories for 600mm width ladder type cable	Sets	1000	2.5X0.6X0.005	30	Each cable tray cover length 2.5 Mtr including clamp strips and Nut&bolts
16.8	Ladder type cable tray, W=300mm.	Sets	4000	2.5X0.3X0.1	40	Each cable tray length 2.5 Mtr including coupler plate and Nut & bolts.
16.9	Cover along with accessories for 300mm width ladder type cable	Sets	800	2.5.0X0.3X0.005	20	Each cable tray cover length 2.5 Mtr including clamp strips and Nut & bolts
16.1	Horizontal Bends of 600mm bending radius for ladder type cable tray, W=300mm	Sets	10	NA	25	
16.11	Vertical UPs of 600mm bending radius for ladder type cable tray, W=300mm	Sets	10	NA	20	
16.12	Vertical downs of 600mm bending radius for ladder type cable tray, W=300mm	Sets	10	NA	20	
16.13	600mm (W) Perforated type cable tray.	Sets	1700	2.5X0.6X0.1	50	Each cable tray length 2.5 Mtr including coupler plate and Nut & bolts, Thickness is 3mm
16.14	TEEs of 900mm bending radius for perforated type cable tray, W=600mm	Sets	10	NA	55	
16.15	Horizontal Bends of 900mm bending radius for perforated	Sets	10	NA	45	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	type cable tray, W=600mm					
16.16	Vertical UPs of 900mm bending radius for perforated type cable tray, W=600mm	Sets	10	NA	45	
16.17	Vertical downs of 900mm bending radius for perforated type cable tray, W=600mm	Sets		NA	45	
16.18	Horizontal Cross of 900mm bending radius for perforated type cable tray, W=600mm	Sets		NA	55	
16.19	Cover for Perforated type Cable Tray, W=600mm	Sets	1400	2.5X 0.6X0.025	40	Each cable tray cover length 2.5 Mtr including clamp strips and Nut&bolts, cover thickness is 2 mm
16.2	300mm(W) Perforated type cable tray	Sets	2600	2.5X 0.3X0.075	30	Each cable tray length 2.5 Mtr including coupler plate and Nut& bolts
16.21	Cover for Perforated type Cable Tray, W=300mm	Sets	900	2.5X 0.6X0.025	25	Each cable tray cover length 2.5 Mtr including clamp strips and Nut&bolts thickness is 2 mm
16.22	TEEs of 600mm bending radius for perforated type cable tray, W=300mm	Sets	10	NA	35	
16.23	Horizontal Bends of 600mm bending radius for perforated	Sets	10	NA	30	

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	type cable tray, W=300mm					
16.24	Vertical UPs of 600mm bending radius for perforated type cable tray, W=300mm	Sets	10	NA	25	
16.25	Vertical downs of 600mm bending radius for perforated type cable tray, W=300mm	Sets	10	NA	25	
16.26	150mm (W) Perforated type cable tray.	Sets	4000	2.5X0.15X0.075	20	Each cable tray length 2.5 Mtr including coupler plate and Nut & bolts
16.27	50mm(W) Perforated type cable tray	Sets	3000	2.5X0.05X0.025	20	Each cable tray length 2.5 Mtr including coupler plate and Nut & bolts
16.28	Cover for Perforated type Cable Tray, W=150mm	Sets	3200	2.5X0.15X0.025	15	Each cable tray cover length 2.5 Mtr including clamp strips and Nut&bolts, cover thickness is 2 mm
16.29	Cover for Perforated type Cable Tray, W=50mm	Sets	2200	2.5X0.05X0.015	7.5	Each cable tray cover length 2.5 Mtr including clamp strips and Nut&bolts, cover thickness is 2 mm
	Notes for cable trays:					
	i) All the Pre-fabricated Ladder & Perforated type Cable Trays & accessories like Tees, Bends, Elbows, Cross etc are made out GI Sheets. Instrumentation cables, Telephone system cables, communication cables, Fire Alarm cables shall be laid in perforated GI cable trays as per the layouts issued during detail erection.					

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	ii) Erection agency shall consider supply of Red Oxide Zinc Chromate Primer for site painting of all Structural Steels (required for cable Tray Supports) in the Erection contractor's scope.
	iii) Cable Trays shall be numbered as per layout drawing before laying of cables.
	iv) All cables shall be provided with minimum of 2mm thick aluminum sheets as cable identification tags indicating cable designation in accordance with the cable schedule. The cable tags shall be provided at the ends, every 30mtrs and when the cable changes its direction/elevation. The tags shall be of aluminium with the number punched on it and securely attached to the cable by not less than two turns of 16 SWG GI wire.
	v) The cable trays shall be supported in general at a span of 1.5mtrs horizontally and at a distance of 1mtr vertically.
	vi) Cable Tray covers shall be provided for the top most cable trays and vertical trays.
	vii) For buried cable, the marker shall project at least 150mm above ground and shall be spaced at an interval of 30mtrs and at every change of direction.
	viii) All the cables shall be clamped to the cable trays/support structure with the help of clamps. All power cables shall be clamped individually and control cables shall be clamped in groups of 3 or 4 cables. Clamps for multicore cables shall be fabricated out of 25x3 mm aluminium flats. Single core power cables shall be laid in trefoil formation and suitably clamped with 25mm wide 8 SWG aluminium strips.
	ix) Ladder type cable trays shall be fixed to cable tray structural support with the help of clamps & fasteners and Perforated cable trays shall be fixed with help of nut & bolts. Cable tray clamps and fasteners shall be supplied part of cable tray accessories No welding of cable trays is envisaged.
	All Sharp edges and Burr shall be removed.
	x) Cables to be strapped to tray at interval not greater than 300mm.
	xii) Apart from supplied cable trays bends, Cable tray bends shall be fabricated at site from straight run cable trays as required to suit at site requirements.
	xi) Erection agency shall carry out the plant cabling works in line with customer/consultant's Technical specifications.
	xii) All the cable trays being supplied for the project are of length 2500 mm. Ladder type cable trays are 2 mm thick and perforated cable trays are 3mm thick.
17.0	PLANT EARTHING PLANT LIGHTNING PROTECTION MATERIALS

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

17.1	40mm dia MS rods	Mtr	8000		12 KG/Mtr	For underground earth mat
17.1	75x10mm GI Strip Below ground	Mtr	3000		6 KG/Mtr	For risers
17.3	50 x 6 mm GI Strip	Mtr	18000		2.5 KG/Mtr	
17.4	35 x 6mm GI Strips	Mtr	3000		2 KG/Mtr	
17.5	25 x 6 mm GI Strips	Mtr	9000		1.18 KG/Mtr	
17.6	25 x 3mm GI Strips	Mtr	9000		0.6 KG/Mtr	
17.7	8SWG GI wire ,solid	Mtr	90000		1 KG/Mtr	
17.8	16SWG GI wire , solid	Mtr	24000		0.5 KG/Mtr	
17.9	Copper Pipe Electrodes (3000 mm Length)	Nos	10		25	For electronics equipment Earthing with treated pits. Material (charcoal & salt etc.) required for treated earth shall be supplied by erection agency
17.1	Earth pit Electrodes(treated)	Nos	20		25	
17.11	Vertical Air Termination Rod for lightning protection (1400 mm height)	Nos	40		25	Above ground installation
1) Erection agency shall carry out the plant Earthing and lightning protection works in line with customer/consultant's Technical specifications and approved “						

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

	2) Material (charcoal & salt etc.) required for treated earth shall be supplied by erection agency					
15.0	MS STRUCTURAL STEEL					
15.1	ISMC 100 Channels				120000 kG	This is only for indicative purpose. Painting shall be ERECTION AGENCY scope and same shall be carried out as per contract standards
15.2	ISA 65x65x6 mm Runner angles				52000 kG	
15.3	ISA 50x50x6 mm Runner angles				50000 kG	
16.0	Conventional fire proof sealing materials					
16.1.	Fire Break Coatings for HT/LT Power Cables	Sq.mtr	2000			Spray type liquid on cables
16.2.	Fire proof materials required for sealing of cable entry through conduits/trenches & through panels	Sq.mtr	2000			Mortar seal
17.0	INSULATING MATS					
17.1	Insulating Mats (upto 1.1kV)	No.	400	1MX10M	15Kg	Suitable adhesives for fixing of insulating mats to be supplied by ERECTION AGENCY.
17.2	Insulating mats (above 1.1kV)	No.	150	1MX10M	15Kg	For HT Panels
	Notes: 1. ERECTION AGENCY/SITE shall carry out the installation of fire break coatings / fire barrier materials. 2. Conventional Fire Proof Sealing System - Supply by Vendor and Installation by ERECTION AGENCY/Site.					
	<u>Supply, Erection and Commissioning Consumables to be included by the Erection Agency:</u> 1) The consumables required for Electrical Equipment/Items shall be included in Erection Agency's scope (shall be of Industrial Grade and suitable for use in Power projects) 2) The following are typical erection consumables that are envisaged in this project:					

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	<ul style="list-style-type: none"> a) 6 mm thick chequered plate for covering cutouts in Switchgear room/SWAS room (Approx. 700 Sq M, Refer Switchgear Room Layout). Support structure for complete chequered plates shall be erected by Erection agency b) One meter long earthing discharge rods (1 no). c) Cable Tags 2mm thick, 75mm long, 15mm width Aluminium Strips (1 lot; At entry, exit and at every 30 M of cable run length). d) Cable Markers e) Corrosion inhibit compound to be used for jointing of cables (As required) f) Trefoil clamps for single core cables: <ul style="list-style-type: none"> – For 11kV, 1C x 500 sq.mm Aluminium XLPE cable Approx. 900 Nos; at every 3 M of cable length – For 1.1kV, 1C x 630 sq.mm Aluminium XLPE cable Approx. 700 Nos; at every 3 M of cable length g) Clamps for multicore cables--- Aluminium flats (one lot; at every 3 M of cable length). h) One set of Hardware for Erection like Nuts, bolts, washers etc. i) Anchor fasteners (M12X125- 420 Nos, M10X100-420 Nos) shall be supplied for cable tray supports. j) One set of Safety items like danger boards, Do not switch on, man on work, display charts, first aid boxes near LT switchgear panels & HT switchgear panels, etc k) 3mm dia Nylon Cord (1 lot; Required for tying cables to trays, at every 5mtrs) l) GI Conduits of 100 mm diameter, medium duty, Class-“B” Type, min 75 microns galvanizing thickness (250 Nos; As per Cable Tray/Trench layouts 3 Meters each) m) GI Conduits of 150 mm diameter, medium duty, Class-“B” Type, min 75 microns galvanizing thickness (400 Nos; As per Cable Tray/Trench layouts, 3 Meters) n) Hume Pipes (200 NB, as per IS: 458) for cables at Road Crossings (25 Nos; As per Cable Tray/Trench layouts. Standard length: 2.5M.) o) PVC Conduits of 200 mm(400Nos), 100 mm diameter (300Nos) (As per Cable Tray/Trench layouts. Standard length : 3Mts) p) 50 Nos of test link boxes as per Notes & Details for Plant Earthing & Lightning protection system.
	<p><u>ATTENTION:</u></p> <ul style="list-style-type: none"> 1) <u>Notes regarding Erection of Cables, Cable Trays and Accessories:</u> <ul style="list-style-type: none"> a) The termination and connection of cables shall be carried out strictly in accordance with the manufacturer’s instruction, drawings and / or directed by the Purchaser. The work shall include all clamping, fitting, fixing, soldering, tapping, compound filling, cable jointing, crimping, shorting and grounding as required for the complete job. Cables shall be checked for insulation resistance before and after jointing. All erection consumables shall be in Erection Agency’s scope. Termination & Connection shall be carried out in such a manner as to

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

		<p>avoid strain on the terminals. Cables shall be marked with cable numbers as per applicable drawing.</p> <p>b) Cable Glands and Lugs are being supplied along with corresponding equipment like Motors, LT Switchgear, Junction Boxes, Push Button Stations, and Transformers etc. However one lot of Glands and Lugs are being supplied to take care of shortages/mismatches at site.</p> <p>c) Control cable cores entering panel/switchgear/MCC etc. shall be neatly bunched and served with PVC perforated tape to keep in position at the terminal block.</p> <p>d) Ferrules shall be installed on all control cable cores in all junction boxes and at all terminations. The ferruling shall be Cross-Ferruling. The ferrules shall carry terminal numbers as per drawings. All ferrules shall be coloured, plastic & interlocked type. Spare cores shall also be similarly ferruled, crimped with lug and aped on the ends. Spare cores shall be ferruled with individual cable number.</p> <p>e) The cable trays and accessories such as coupler plates, Tees, horizontal cross, elbows shall have rigid welded constructions and shall be fabricated out of</p> <ol style="list-style-type: none"> i. Minimum 2.0mm thick hot rolled sheet steel for Ladder Type Cable Tray ii. Minimum 3mm thick hot rolled sheet steel for mm Perforated Type Cable Tray. <p>Covers shall have rigid constructions and shall be fabricated from 2mm thick hot rolled steel.</p> <p>f) All cables shall be provided with minimum of 2mm thick aluminum sheets as cable identification tags indicating cable designation in accordance with the cable schedule. The cable tags shall be provided at the ends, every 30mtrs and when the cable changes its direction/elevation. The tags shall be of aluminum with the number punched on it and securely attached to the cable by not less than two turns of 16 SWG GI wire.</p> <p>g) For buried cable, the marker shall project at least 150mm above ground and shall be spaced at an interval of 30mtrs and at every change of direction.</p> <p>h) The cable trays shall be supported in general at a span of 1.5 mtrs horizontally and at a distance of 1mtr vertically. Cable Tray on the top tier shall have cover whenever running below pipes. Cable Trays shall be numbered as per layout drawing before laying of cables.</p> <p>i) All the cables shall be clamped to the cable trays/support structure with the help of clamps. Cables to be strapped to tray at interval not greater than 300mm. All power cables shall be clamped individually and control cables shall be clamped in groups of 3 or 4 cables. Clamps for multicore cables shall be fabricated out of 25x3 mm aluminum flats. Single core power cables shall be laid in trefoil formation and suitably clamped with 25mm wide 8 SWG aluminum strips. All Sharp edges and Burr shall be removed. Erection Agency shall carry out the plant cabling works in line with customer/consultant's Technical specifications i.e. “Notes & Details for Plant cable Laying System”</p> <p>j) “Structural Steels for support” materials are supplied to make supports for cable trays in the buried RCC trenches, Overhead tray arrangement on pipe racks and Cable Tray arrangement in Cellars & other arrangements as applicable for the project. These are also required for making of frames for PB stations, junction</p>
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Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

boxes as per the project requirements. Drilling of holes in ISA 65 x 65 x 6/50x50x6 for bolting of cable tray clamps for ladder cable trays & fixing of fasteners for perforated cable trays shall be done by Erection Agency. Erection Agency shall ensure that all steel structure used for electrical installation shall be painted with one coat of Red Oxide Zinc Chromate Primer of approved shade for indoor installations. Supply of Red Oxide Zinc Chromate Primer for site painting of all Structural Steels (required for cable Tray Supports) shall be in the Erection contractor's scope. Erection Agency shall ensure that after welding and drilling (if any) of the steels bracket, above mentioned paint of approved shade shall be applied. Site shall carry out the structural steel works in line with customer/consultant's technical specifications “Notes & Details for Plant cable Laying System ”

O. Control & Instrumentation Items

Erection Weight is for total Project as below:

1. Packages to be Erected & Commissioned Erection Agency

BHEL shall supply following instrument packages/ panels.

Erection, installation and commissioning of these packages including vendor services (if required) shall be in ERECTION AGENCY scope.

Scope includes transportation from store to site location, placing in the location & alignment as per design documents, co-ordination with client/ OEM vendor, wiring, power on, testing, loop testing, functional testing, minor modifications as feasible, if required etc. as per OEM and BHEL design documents and handing over to customer in working condition.

Table –A:

S No.	Description	Panel/Equipment		
		Size/panel (mm)	Unit Weight (Kg)	Qty.
	DCS Package			
1	DCS Panels	800x1000x2100	350	120 Nos
2	Operator & Engineering work station, LVS and other work stations	800x800x1200	100	45 Nos
3	Printer	800x800x1200	100	5 Nos
4	System cables		1000	1 lot

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

5	Hard wired console		500	2Nos.
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Note: In case of support from Vendor, Erection Agency shall estimate & order these services on vendor directly considering the number of days required for commissioning of the system as per their assessment.

Table –B:

S.No.	Item Description	Application	Total Qty.	Unit	Remarks
A	SWAS Package				
1	WET PANEL 2000 x 1000 x 2200	Steam & Water circuit	3	Nos.	Unit Weight-1000 Kgs
2	DRY PANEL - 1200 x 800 x 2250	Steam & Water circuit	3	Nos.	Unit Weight-800 Kgs
3	CONDUCTIVITY ANALYSER	Steam & Water circuit	50	Nos.	
4	PH ANALYSER	Steam & Water circuit	30	Nos.	
5	SILICA ANALYSER	Steam & Water circuit	6	No.	3 Channel
6	DISSOLVED OXYGEN	Steam & Water circuit	6	Nos.	
7	HYDRAZINE ANALYSER	Steam & Water circuit	3	No.	
8	SODIUM ANALYSER	Steam & Water circuit	6	Nos.	
9	PHOSPHATE ANALYSER	Steam & Water circuit	3	No.	
10	CHLORIDE ANALYSER	Steam & Water circuit	3	Nos.	
11	WET Rack with sample handling system	Steam & Water circuit	3	No.	
12	Dry Panel	Steam & Water circuit	3	No.	
13	Secondary Cooler	Steam & Water circuit	3	Nos.	
14	Chiller	Steam & Water circuit	3	Nos.	
B	Process Gas Analyzers				
1	Calorific Value Analyzers	Gas Circuit	5	Nos.	

Note: In case of support from Vendor, Erection Agency shall estimate & order these services on vendor

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

directly considering the number of days required for commissioning of the system as per their assessment.

Table –C:

S. No.	Item	Weight/Inst (in Kgs)	Qty. (In Nos.)
	Field Instruments Package		
1	PT	5	580
2	Wireless PT	8	0
3	Remote seal PT	6	3
4	DPT	5	305
5	Wireless DPT	8	0
6	Remote seal DPT (remote seal for HP side only)	6	12
7	Remote seal DPT (remote seal for HP and LP side)	7	0
8	TT	5	922
9	Wireless TT	7	0
10	LT- Radar (Guided wave)	35	9
11	LT- Radar (Non-contact type)	35	3
12	Level Transmitter - Ultrasonic Type	50	0
13	PS	2	0
14	LS	2	0
15	DPS	2	0
16	PG (Bourdon Tube)	2	647
17	PG (Solid Front)	2	0
18	PG (Diaphragm seal)	2	15
19	DPG (Bourdon Tube)	2	38

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20	LG (Reflex Type)- side mounting	25	71
21	LG (Float & board) - top mounting	30	0
22	TG(Bimetallic) with Thermowell M33*2	5	0
23	TG(Bimetallic) with Thermowell Flanged	5	356
24	Thermocouple with Thermowell M33*2	5	0
25	Thermocouple with Thermowell Flanged	5	250
26	RTD with Thermowell M33*2	5	0
27	RTD with Thermowell Flanged	5	158
28	Thermowell M33*2	3	0
29	Thermowell Flanged	3	226
30	Rotameter	10	12
31	Junction Box (weather/Ex proof)	8	482
32	MCT Block	100	0
33	FRP Canopies for JB's	2	482
34	FRP Canopies for Transmitters	2	0
35	FRP Canopies for Positioners	2	20
36	FRP Canopies for Temperature Elements	2	0
37	Universal hand-held	1	2
38	Multi variable flow transmitter	10	0
39 (a)	Local Instrument racks with fittings and JB (LIR)	40	0
39 (b)	Local Instrument Encloser with fittings and JB (LIE)	50	120
40	Orifice Plate Assemblies, Annubar, Nozzles	200	56
41	Mass Flow Meter/ Vortex/ Venturi/ flow meters	100	3

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

42	Other instruments/ equipments as per final construction documents	--	As required
43	Instrumentation items for on skid GTG Package and their other auxiliary packages	--	NA
44	On skid instruments for sub packages like	--	
	· Instrument air system		Applicable
	· Water package system		Applicable
	· Gas conditioning system		NA
	· Various storage and drain tanks		1 set
45	Gauge boards on equipment skids & pressure gauge	--	1 lot
46	Vibration Transmitters	50	0

Instrument Installation materials, Pipes, Tubes and Fittings:

Table –D:

S. No.	Description		Qty.	Unit	Unit weight(Kgs)
PIPE AND PIPE FITTINGS					
1	PIPE (SMLS), SA 106 Gr. B	1/2" SCH 160	13254	Meters	0.8
2	PIPE (SMLS), SS 316L	3/4" SCH 160	0	Meters	1.2
3	PIPE (SMLS), SA 106 Gr. B	1/2" SCH 80S	1038	Meters	0.8
4	PIPE (SMLS), SA 335 Gr. P22	3/4" SCH 160	738	Meters	1.2
5	SWAGE NIPPLE	3/4" PL x 1/2" PL	1751	Nos.	0.4
6	REDUCER	3/4" X1/2" BW	0	Nos.	0.4
7	NIPPLE	1/2" PL x NPT(M)	11134	Nos.	0.2
8	NIPPLE	3/4" PL x NPT(M)	733	Nos.	0.3
9	EQUAL TEE	1/2" SW	2884	Nos.	0.3
10	EQUAL TEE	3/4" SW	126	Nos.	0.45
11	COUPLING	1/2" SW	1638	Nos.	0.2

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12	GATE VALVE	1/2" SW	1669	Nos.	0.3
13	GATE VALVE	3/4" SW	3682	Nos.	0.45
14	Ball VALVE (Quarter turn)	1/4" NPT(F)	100	Nos.	0.5
15	ELBOW	1/2" SW	4300	Nos.	0.2
16	ELBOW	3/4" SW	91	Nos.	0.3
17	CAP	1/2" NPT(F)	1331	Nos.	0.2
18	SYPHON	1/2" NPT	358	Nos.	0.55
19	CONDENSATE POT	Ø1/2" SW	657	Nos.	1.2
20	FLANGE	3/4" WNRF	7670	Nos.	1.5
21	STUDS, NUTS & GASKETS		4781	Nos.	0.3
TUBE AND TUBE FITTINGS (SS316)					
22	TUBE (SMLS)	1/2" x 2.1MM THK	7164	Meters	0.3
23	TUBE (SMLS)	8mm OD X 1 mm THK	1200	Meters	0.3
24	TUBE UNION	1/2"	1194	Meters	0.3
25	TUBE UNION	8mm OD	200	Nos.	0.2
26	UNEQUAL TEE	1" x 1" x 1/2" SW	100	Nos.	0.3
27	FEMALE CONNECTOR	1/2"NPT(F) x 1/2" OD TUBE	1194	Nos.	0.3
28	FEMALE CONNECTOR	1/4" NPT(F) x 6mm OD TUBE	100	Nos.	0.3
29	MALE CONNECTOR	1/2"NPT(M) x 1/2" OD TUBE	1194	Nos.	0.3
30	MALE CONNECTOR	1/4" NPT(M) x 6mm OD TUBE	300	Nos.	0.3
31	3 PIECE UNION	1/2" NPT(M) x 1/2" NPT(F)	651	Nos.	0.3
32	REDUCER	1/2" SW x 1/4" NPT	100	Nos.	0.4
33	2 WAY MANIFOLD		580	Nos.	1

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

34	5 WAY MANIFOLD		337	Nos.	1
FASTENING MATERIALS					
35	ANCHOR BOLT	M10 X 160	9284	Nos.	0.02
36	SCRU HEX	M10X50 P8.8	2892	Nos.	0.02
37	NUT HEX P	M10-8	2892	Nos.	0.01
38	WASHER MCD	10.5-ST	5784	Nos.	0.01
39	SHELL TYPE PIPE CLAMP	1/4"	400	Nos.	0.02
40	U-BOLT GALVZD	1/2"	13776	Nos.	0.02

Raw material shall be supplied by BHEL HYD (PE&SD) and to be fabricated, erected & commissioned by Erection Agency:

Table –D:

S. No.	Description		Qty.	Unit	Unit weight (Kgs)
1	PIPE	2" SCH HVY	4000	Meters	2
2	STR STEEL MS ANGLE	50x50x6	20000	Kg's	
3	STR STEEL 6 mm PLATE	250 x 250 x 6	10000	Kg's	
4	ISM C MS CHANNEL	100 x 50	16000	Kg's	
5	Base Plate	200x200x6	2200	Kg's	

2. Special Requirements

- a. Instrument pulse lines are piping based with welded end connections. The pipe & pipe fitting shall be as per piping specification.
- b. Painting of impulse line, instrument / JB supports etc shall be in Erection Agency scope. Painting procedure as per main piping specification.
- c. The supply of paint, primer, painting tools shall be in Erection Agency scope.
- d. The all site erected impulse lines are subject to hydrotest, radiography test in line with mother pipe requirements. Same shall be in Erection Agency scope
Pre-fabricated canopies supplied by BHEL mounting shall be in Erection Agency scope.
- e. Statutory approvals like IBR, local agencies etc as required shall be in Erection Agency scope.
- f. Calibration of instruments before erection shall be carried out by Erection Agency
- g. The all skid mounted impulse lines are subject to hydro test, radiography test in line with mother pipe requirements at site. Same shall be in Erection Agency scope
- h. Calibration of skid mounted instruments before commissioning shall be carried out Erection Agency.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

- i. Instrument Air line 1” upto 6 mm are SS.
- j. Instrument cable support system from instrument to Junction box shall be fabricated at site Erection Agency.
- k. Receipt, Handling, storage of Mandatory spares.

3. Instrumentation control & signal Cables

BHEL shall supply following cables rolled in wooden drums. Erection & installation shall be in ERECTION AGENCY scope.

Erection contractor’s scope shall be to lay and terminate the cables at both the ends as per BHEL design documents

S. No	Description	MU	Qty.	Weight in Kg/Mtr
[A]	Signal cable			
1	1P X 1.5 MM2 IS, I&OS	Meters	116700	0.40
2	2P X 1.5 MM2 IS, I&OS	Meters	45000	0.49
3	6P X 1.5 MM2 IS, I&OS	Meters		0.9
4	8P X 1.5 MM2 IS, I&OS	Meters	193000	0.98
5	10P X 1.5 MM2 IS, I&OS	Meters	6600	1.2
6	12P X 1.5 MM2 IS, I&OS	Meters	90000	1.5
[B]	Thermocouple Extension cable IS			
1	1PX16 AWG, T/C N-IS	Meters	7800	0.45
2	2PX16 AWG, T/C N-IS	Meters		0.6
[C]	Traid cable			
1	1T X 1.5 MM2 IS	Meters	35000	0.39
2	8T X 1.5 MM2 IS	Meters	8400	1.5

4. Painting Requirements at Site:

All painting related activities has to be completed Erection Agency. However the painting requirements of major items supplied by PE&SD – C&I shall be follow:

Painting for Site fabricated structure:

The below items shall be painted with coats after specified surface preparation:

- Instrument impulse line, Instruments & JB support, Panel base frame.
- The Surface cleaning, painting method, type of surface preparation, no. of coatings etc. shall be identical to main piping and major structure painting structure.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

- Touch up painting for Equipments:

The below items or any paint damaged item (during erection) shall be cleaned and touched up with same type of paint as used for shop coats after completion of fabrication and erection / handing over to customer:

- Panels, System assemblies painted at manufacture shop.

Notes: All paint materials (as required) shall be supplied by Erection Agency.

5. Items to be supplied by Erection agency:

The following items shall be supplied by Erection Agency as on requirement basis considering the total Qty. of instruments, cable, fittings etc.

- Ferrules for cable connection
- Cable Tag Plates
- Markers, Cable tying material

Sl. No.	Description of Equipment	QTY	UOM	Dimensions(LxBxH) in mm	Unit Weight (Kgs)	Unit Shipping weight (kg)
1.1	VFDs, 6.6kV for ID Fan	6	Set	6500 W x 1200 D x 2800 H	3000	3150
1.2	Breaker Panel (6.6kV) for VFD	6	Set	600 X 800 X 1600	800	840
2.1	VFDs, 6.6kV for FD fans	6	Set	6500 W x 1200 D x 2800 H	3000	3150
2.2	Breaker Panel (6.6kV) for VFD	6	Set	600 X 800 X 1600	800	840
3.1	VFDs, 6.6kV for BFPs	5	Set	6500 W x 1200 D x 2800 H	3000	3150
3.2	Breaker Panel (6.6kV) for VFD	5	Set	600 X 800 X 1600	800	840

P. Civil Works

Chimney : One no. common tri-flue chimney of minimum 90 m height, enclosed with RCC shell is envisaged for three nos. boilers.

Supply and erection of chimney complete with flue can, ladder, rack & pinion type elevator, platforms at various elevations, insulation work for flue can, aviation lighting, lightening arrestor, structural supports, expansion joints, etc. shall be under the scope of E&C Agency.

Technical Conditions of Contract (TCC) for “Pre-Bid Tie up for Erection & Commissioning Sub Contract for CPP-1 Package”

Notes:

1. Civil work of chimney will be carried out by a separate agency to be appointed by SAIL.
2. Civil and structural works including foundation of equipment will be executed by the separate agency (appointed by SAIL).