



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**



**MAHARASHTRA NATURAL GAS LIMITED**

**(A joint venture of GAIL(India) Ltd & BPCL)**

**CNG & CITY GAS DISTRIBUTION PROJECT  
FOR MNGL**

**Tender for appointment of an agency for  
carrying out Civil, Structural & Electrical works  
for construction of CGS cum MS station at Sinner  
in Nashik GA.**

**UNDER OPEN DOMESTIC COMPETITIVE BIDDING  
(THROUGH E-TENDERING MODE)**

**Bid Document No.: MNGL/CP/2022-23/219 Dt: 09.03.2023**



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## **PART - A**

### **1.0 INVITATION FOR BIDS (IFB)**



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## **PART A**

### **SECTION-I INVITATION FOR BIDS (IFB)**


**BID DOCUMENT NO.: MNGL/CP/2022-23/219**

**Date: 09.03.2023**

M/s Maharashtra Natural Gas Ltd., Pune invites online bids (Technical & Financial) **UNDER TWO BID SYSTEM** from eligible bidders for the item(s) in complete accordance with the Bid Documents.

#### **1.0 TENDER INFORMATION**

Tender document number	<b>MNGL/CP/2022-23/219 dated 09.03.2023</b>
ITEM(S)	<b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA</b>
TYPE OF BID	Open Domestic Competitive Bidding
TIME SCHEDULE	As per Scope of Work of Vol II of II of tender document
EARNEST MONEY/ BIDSECURITY	<b>Rs.2,00,000/- (Rupees Two Lakhs Only)</b> in the form of Demand Draft/BG to be in favour of "Maharashtra Natural Gas Ltd." payable at Pune.  Account Details for NEFT / RTGS for EMD: Name of the Beneficiary: M/s Maharashtra Natural Gas Limited Name of the Bank & Address: State Bank of India Branch: Industrial Finance Branch, "Tara Chambers", Pune- Mumbai Road, Wakadewadi, Pune-411 003 <b>A/c No.: 35310073625</b> <b>IFSC Code: SBIN0008966</b>
BID SECURITY VALIDITY	6(SIX) months from bid due date
TENDER FEE ((Non-refundable)	Not applicable
BID VALIDITY	4(four) months from the bid due date
Pre-bid meeting date and time	<b>16.03.2023 till 11:00 Hrs. IST</b>  Prebid meeting VC Link: <a href="https://meet.google.com/ykw-nypr-zdo">https://meet.google.com/ykw-nypr-zdo</a>
Bid submission due date and time	<b>30.03.2023 till 15:00 Hrs. IST</b>
Bid Submission at	<a href="https://etenders.gov.in">https://etenders.gov.in</a>
Techno-commercial bid opening date and time	<b>31.03.2023 at 16:00 Hrs. IST</b>
Price bid opening date and time	Date and time shall be intimated later

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Address for submission of EMD/Bid Security and venue for pre-bid meeting and opening of bids	<b>Chief Manager (C&amp;P)</b> C&P Department, Maharashtra Natural Gas Limited, Pride Purple Coronet, 2 <sup>nd</sup> Floor, Baner Road, Baner, Pune – 411045
Contact details	Telephone: +91 (20) 25611000/1190/1156 Email: <a href="mailto:gasaid@mngl.in">gasaid@mngl.in</a> / <a href="mailto:neeraj@mngl.in">neeraj@mngl.in</a>
BIDDER ELIGIBILITY CRITERIA & BID EVALUATION CRITERIA	As per Annexure – I to IFB

NOTE: Bidders are advised to complete the registration with e-tender portal (<https://etenders.gov.in>) at least two working days prior to bid submission date.

Please note that in accordance with the general conditions of tender, MNGL may amend these dates of the tender process at its sole discretion. In case any of the specified dates are declared a public holiday, the deadline shall be the next working date.

## 2.0 BIDDING PROCEDURE

Bidding will be conducted through Open Domestic Tendering. Single Stage Two Bid system is adopted for this tender. The submission and opening of bids will be through e-tendering mode at <https://etenders.gov.in/eprocure/app>. Tender document can be downloaded from the website <https://etenders.gov.in/eprocure/app> or from e-tender link given on official MNGL website [www.mngl.in](http://www.mngl.in).

Note: To participate in the e-tendering, it is mandatory for the bidders to have user ID & password. For this purpose, the bidder has to register itself on CPPP's website <https://etenders.gov.in/eprocure/app>. Please also note that the bidder has to obtain digital signature token for applying in the tender and in general, activation of registration may take 24 hours subject to the submission of all requisite documents required in the process.

Note: MNGL in no way shall be responsible if the bidder fails to apply due to non-possession of Digital Signature & non registration.

**(The bids have to be submitted online in electronic form on <https://etenders.gov.in/eprocure/app> only. No physical bids will be accepted.)**

## 3.0 DOWNLOADING OF TENDER DOCUMENT

The tender document is available for downloading from CPPP's e-tendering website <https://etenders.gov.in/eprocure/app> or from e-tender link given on official MNGL website [www.mngl.in](http://www.mngl.in) for viewing / participation of the eligible bidders. Bidders meeting the bid evaluation criteria who intend to submit their bid may download the tender for submission by the bid due date and time. Bidder shall give an undertaking on his letter-head that the contents of the bidding document have not been altered or modified. Bid evaluation criteria shall be applicable for all the bidders.

Disclaimer clause: Bidders are advised to visit CPPP's e-tendering website and MNGL website regularly for any updates on the tender. The ignorance to visit the website will not be accepted as a reason for any gap / missing information like corrigenda, amendments, clarifications etc.



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**4.0 PRE-BID MEETING:**

The bidder(s) or their designated representatives, who have downloaded the bid document, or to whom tender document has been issued and intend to bid are invited to attend the pre-bid meeting. Bidder(s) queries if any, must reach Purchaser office at least one day prior to pre-bid meeting date. The pre bid meeting can be organized through video conferencing or physically. In case of physical meeting, the venue of pre bid meeting is MNGL office at Pride Purple Coronet, 2<sup>nd</sup> Floor, Baner Road, Baner, Pune – 411045.

Non-attendance of the pre-bid meeting will not be a cause for disqualification of a bidder. Corrigendum / addendum, if any, to the tender document, shall be hosted on the website subsequent to the pre-bid meeting.

Bidders may also note that the registration process for new bidders on e-tender portal shall take a minimum of 24 hrs. Hence, bidders are advised to kindly complete their registration on e-tender portal well in advance of the pre-bid meeting.

In case of pre-bid meeting through video conferencing, Link shall be sent to all the interested bidders by the purchaser.

Instructions to bidders for Pre-bid meeting through video conferencing: All bidders intending to attend pre-bid meeting must send their interest through email (at least 2 hours prior to the scheduled time of pre-bid meeting) to the purchaser. E-mail received from bidders within specified timeline shall be invited through email to attend the meeting.

Advisories for the bidders attending the pre-bid meeting:

(1) All the Bidders who have submitted their registration details and interest to attend the pre-bid meeting will be invited to join as guests through the link shared in mail.

(2) All bidders/participants mandatorily have to pin MNGL screen on their computer screens during the pre-bid meeting.

(3) Bidders shall be allowed to discuss their queries in sequence of their responses received.

(4) Time slot shall be allotted to each bidder to ask his queries.

(5) Recording of the pre-bid meeting by the bidders is strictly prohibited. Subsequent to pre-bid meeting, corrigendum shall be issued by the purchaser regarding clarifications or queries raised during meeting.

**5.0 OTHERS:**

**5.1** Bid Document is non-transferable.

**5.2** Bids complete in all respects should reach on or before the BID DUE DATE AND TIME. Bids through Fax/ E-mail shall not be considered.

**5.3** The Bid Document calls for offers on single point "Sole Bidder" responsibility basis.

Order will be placed on the "Sole Bidder" alone (in whose name the bid document has been issued) who will be responsible for all contractual purposes.



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Further the bidders are advised to ensure that their offer is on single bidder responsibility basis and in total compliance of scope of supply as specified in Bid Document.

- 5.4 The bid should be prepared by the "Sole Bidder" and should be sent to MNGL directly. MNGL reserve the right to reject offers made by intermediaries' representatives.
- 5.5 Bidder shall ensure that Bid Security having a validity of 6(SIX) months from the bid due date, must accompany the offer in the format made available in the Bid Document.
- 5.6 This Invitation for Bids (IFB) is an integral and inseparable part of the enclosed Bid Document.
- 5.7 MNGL reserves the right to accept or reject any or all offers without assigning any reason, whatsoever.
- 5.8 ZERO DEVIATION TENDER

Bidder shall note that if any deviations are taken to the under mentioned provisions of Bid Documents by the Bidder the bid is liable to be rejected:-

- i) Do not meet BEC Criteria
- ii) Bid Security
- iii) Performance Security (Contract Performance Bank Guarantee), 3% of Contract/Order value
- iv) Delivery Period
- v) Terms of Payment
- vi) Force Majeure
- vii) Resolution of Dispute/Arbitration
- viii) Termination of Contract,
- ix) Warranty and Guarantee
- x) Offer not submitted for complete scope of work
- xi) Firm prices
- xii) Prices not quoted as per Schedule of Rates formats.
- xiii) Bidder have been banned by Government of India or any its Agency/ Undertaking/ Department of Government of India.
- xiv) Bidder is under liquidation.
- xv) Bids not conforming to technical specification/requirements.
- xvi) Any other such provisions if specifically stipulated elsewhere in the Bid Document.
- xvii) Price Reduction Schedule.

**However, MNGL reserve the right to request the bidder to withdraw the deviations against above-mentioned provisions of Bid Documents.**

THIS IS NOT AN ORDER

Yours faithfully,  
for Maharashtra Natural Gas Limited, Pune

Ganesh Said  
Chief Manager (C&P)

Encl. 1. Vol.-I of II & Vol.-II of II of the Bid Document.

Note:

**Please confirm your intention to quote or not within 5(Five) days. In case not intending to quote**



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then please give your valuable feedback to us

## **ANNEXURE-I to IFB**

### **BIDDER'S ELIGIBILITY CRITERIA**

#### **1.0 BRIEF PROJECT DETAILS**

Maharashtra Natural Gas Limited (MNGL) is a joint venture company of M/s. GAIL (India) Limited and M/s. Bharat Petroleum Corporation Limited (BPCL). MNGL has been incorporated to supply natural gas to domestic, commercial and industrial sectors including setting up of CNG filling stations to cater to the automobile sector for vehicle in Pune City including Pimpri-Chinchwad & adjoining contiguous area of Hinjewadi & Talegaon, Valsad (except already authorized), Dhule, Nashik District, Sindhudurg District in Maharashtra & Ramanagara District in Karnataka. Also work is in progress in newly secured GAs of Buldana, Nanded & Parbhani District (Maharashtra) and Nizamabad, Adilabad, Niral, Mancheria and Kumuram Bheem Asifabad, Kamareddy districts (Telangana)

#### **2.0 SCOPE OF WORK**

This tender deals with appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.

#### **3.0 BIDDER'S ELIGIBILITY CRITERIA:**

##### **A) TECHNICAL:**

The bidder must have completed "a single firm PO/VO/SO issued by Oil & Gas companies/CGDs in India for carrying out civil, electrical & Canopy structural works for construction of one number of specific new retail outlet (Petrol pump/HSD pump/CNG station/LNG station) (which is commissioned in all respect) as a main contractor for value not less than Rs. 3,21,50,000/- (including GST) in last 5 years reckoned from the final bid due date for Oil & Gas companies/CGDs in India."

Bidder must submit documents like PO/VO/SO with respect to the above including final work completion certificates issued by Oil & Gas Companies/CGDs or Consultant of Oil & Gas companies/CGDs in India and any other relevant documents in support of his claim.


In absence of requisite documents, MNGL reserves the right to reject the bid without making any reference to the bidder.

##### **B) FINANCIAL**

###### **B.1 Turnover:**

The bidder should have achieved a minimum annual turnover of **Rs. 321.50 Lakhs** in any one of the last 3 (Three) audited financial years i.e. 2019-20, 2020-21 and 2021-



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22.

**B.2 Net worth:**

Net worth must be positive as per last audited financial statement i.e. for the financial year 2021-22.

**B.3 Working Capital:**

The bidder should have a minimum working capital of **Rs. 64.30 Lakhs** as per latest audited balance sheet i.e. for the year 2021-22.

If the bidder's working capital is inadequate, the bidder should supplement this with a letter from bidder's bank, having net worth not less than Rs.100 crores, confirming the availability of line of credit to cover the inadequacy of previous year and meet the current working capital requirement.


Bidder must submit documentary evidence such as balance sheet & Profit & Loss A/c Statement for last three audited financial years i.e. 2019-20, 2020-21 & 2021-22 in support of the above.

In absence of requisite documents, MNGL reserve the right to reject the bid without making any reference to the bidder.

**4.0 Evaluation and award of contract:**

Evaluation shall be done as per complete SOR (i.e. on total evaluated price including all taxes and duties) and order shall be placed on L-1 bidder.

**In case of tie for L-1 bidder, the order shall be placed on the bidder having highest turnover during the preceding 3 Financial Years i.e. 2019-20, 2020-21 & 2021-22.**

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**Annexure- I to IFB**

**FORMAT-A**

**ANNUAL TURNOVER**

Applicant's Legal Name :

Date:

Tender No.:

Page ..... of .....

**Each bidder must fill in this form (Single Entity)**

Annual Turnover data for the last 3 audited financial years.

Year	Currency	Amount	Exchange Rate (*)	Amount (INR) (*)
Year 1:				
Year 2:				
Year 3:				

1. The information supplied should be the – Annual Turnover of the applicant.
2. A brief note should be appended describing details as per audited results.
3. Indicate Financial year if it is different from April to March.

Signature of Bidder

(\*) To filled by Owner



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**Annexure- I to IFB  
FORMAT-B**

**FINANCIAL SITUATION**

Applicant's Legal Name :

Date:

Tender No.:

Page ..... of .....

**Each bidder must fill in this form**

**FINANCIAL DATA FOR LAST AUDITED FINANCIAL YEAR**

Sl. No.	Description	Year		
		Amount	Exchange Rate (*)	Amount (INR) (*)
1.	Current Assets			
2.	Current Liabilities			
3.	Working Capital (1-2)			
4.	Net Worth Owners funds (Paid up share capital and Free Reserves & Surplus)			
5.	Profits before taxes			
6.	Return on Equity (5/4) x 100			

1. Attached are copies of the audited balance sheets, including all related notes, and income statement for the last Audited Financial year, as indicated above, complying with the following conditions.

- All such documents reflect the financial situation of the bidder, and not sister or parent companies.
- Historic financial statements must be audited by a certified accountant
- Historic financial statements must be complete, including all notes to the financial statements
- Historic financial statements must correspond to accounting periods already completed and audited (no statement for partial period shall be requested or accepted).

Signature of Bidder

(\*) Applicable for foreign bidders to be filled by Owner.



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## **2.0 ACKNOWLEDGEMENT CUM CONSENT LETTER**



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To,  
**M/s. Maharashtra Natural Gas Limited**  
Pride Purple Coronet,  
301-302, Second Floor,  
Baner Rd, Above Bata Showroom,  
Baner, Pune – 411045  
Ph.No.: 91-20-25611000  
E-mail : [gasaid@mngl.in](mailto:gasaid@mngl.in)

Kind Attn: Shri Ganesh Said, Ch. Manager (C&P)

**Sub: Tender for appointment of an agency for carrying out Civil, Structural & Electrical works  
for construction of CGS cum MS station at Sinner in Nashik GA**

Dear Sir,

We hereby acknowledge receipt of complete set of Bid Document along with enclosures for the subject works. We understand that documents received remain property of M/s Maharashtra Natural Gas Limited and further undertake that the contents of the above bid documents shall be kept confidential and shall not be transferred. We indicate below our intentions with respect to the Invitation for Bid.

a) We intend to bid as requested and furnish following details with respect to our quoting office:-

I) POSTAL ADDRESS : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
II) TELEPHONE NO. : \_\_\_\_\_  
III) TELEFAX NO. : \_\_\_\_\_  
IV) E-MAIL : \_\_\_\_\_  
V) CONTACT PERSON : \_\_\_\_\_

b) We are hereby returning the bid document as we are unable to bid for the reasons given below.

Reasons for non-submission of Bid:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

COMPANY'S NAME : \_\_\_\_\_

SIGNATURE : \_\_\_\_\_



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NAME : \_\_\_\_\_

DESIGNATION : \_\_\_\_\_

DATE : \_\_\_\_\_

Note: Bidder is requested to furnish the details mentioned at (a) & (b) above as applicable, immediately after receipt of Bid Document.

\_\_\_\_\_  
(SIGNATURE OF BIDDER)



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### **3.0 SUBMISSION OF BID**



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### **SUBMISSION OF BID**

From:

M/s

To:

**M/s Maharashtra Natural Gas Limited**

Pride Purple Coronet,  
301-302, Second Floor,  
Baner Rd, Above Bata Showroom,  
Baner, Pune – 411045

1. I/We hereby tender for execution of the **WORKS FOR Tender for appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA** as per TENDER DOCUMENT within the Time Schedule of completion of work for jobs, as separately signed and accepted by me/us, at the Schedule of Rates quoted by me/us for the whole work in accordance with Notice/Letter Inviting Tender, General Conditions of Contract, Special Conditions of Contract, Schedule of Rates of Completion of Job, and other documents and papers, all as detailed in the Tender documents.
2. It has been explained to me/us that the time stipulated for jobs and completion of WORKS in all respects and in different stages mentioned in the "Time Schedule" of completion of jobs and signed and accepted by me/us in the essence of the CONTRACT. I/We agree that in the case of failure on my/our part to strictly observe the Time of Completion mentioned for jobs or any of them and to the Final Completion of WORK in all respects according to the schedule set out in the said "Time Schedule" of completion of jobs. I/We shall pay compensation to the OWNER as per provisions and stipulations contained in General Conditions of Contract and I/We agree to recovery being made as specified therein. In exceptional circumstances, extension of time which shall always be in writing may, however, be granted by the Engineer-in-Charge at his entire discretion for some items of work, and I/We agree that such extension of time will not be counted for the extension of completion dates stipulated for job and for the Final Completion of WORK as stipulated in the said "Time Schedule" of completion of jobs.
3. I/We agree to pay the Earnest Money and Contract Performance Bank Guarantee (CPBG) and accept the terms and conditions laid down in the memorandum below in this respect.





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**MEMORANDUM**

(a) General Description of Work \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(b) Earnest Money Rs. \_\_\_\_\_  
(Rupees) \_\_\_\_\_  
\_\_\_\_\_

The Earnest Money is payable in the manner set out in para 5 below.


The Earnest Money, if the tender is accepted, will be adjusted against the Contract Performance Bank Guarantee (CPBG), when Earnest Money is paid by demand draft only.

(c) Contract Performance Bank Guarantee (CPBG) 3% of the CONTRACT amount which will be paid in the manner set out in the General Conditions of Contract.

4. Should this tender be accepted, I/We hereby agree to abide by and fulfill all terms and conditions referred to above and in default thereof, to forfeit and pay to the OWNER or its successors or its authorized nominees such sums of money as are stipulated in conditions contained in General Tender Notice and other Tender Documents.

5. I/We hereby pay the Earnest Money of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_) in Bank Demand Draft/Bank Guarantee No. \_\_\_\_\_ issued by \_\_\_\_\_ (name and office of the State Bank of India or any Nationalized Bank) in favour of Maharashtra Natural Gas Limited, Pune.

6. If I/We fail to commence the work specified in the Memorandum in Para (3) above, or I/We to deposit the amount of Contract Performance Bank Guarantee (CPBG) specified in the Memorandum in (3) above, I/We agree that the said OWNER or its successors without prejudice to any other right or remedy be at liberty to forfeit the said Earnest Money in full, otherwise the said Earnest Money shall be retained by OWNER towards the Contract Performance Bank Guarantee (CPBG) specified in (3) above. The said OWNER shall also be at liberty to cancel the Notice of Acceptance of Tender if I/We fail to deposit the Contract Performance Bank Guarantee (CPBG) as aforesaid or to execute an Agreement or to start WORK as stipulated in the Tender Documents.

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I/We enclose herewith evidence of my/our experiment of execution of works of similar nature and magnitude carried out by me/us in the prescribed proforma and also the Income- Tax Clearance Certificates.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 2023

Witness:

Name in Block Letters:

Address:

Yours faithfully,  
Signature of Tenderer(s) with the  
seal of the Firm.

Name and Designation of authorized person signing the  
Tender on behalf of the Tenderer(s).



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## **PART – B**



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## **1.0 INSTRUCTION TO BIDDERS (ITB)**




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  - 23. Deadline for Submission of Bids
  - 24. Late Bids
  - 25. Modification and Withdrawal of Bids
- E. Bid Opening and Evaluation
  - 26. Bid Opening
  - 27. Process to be Confidential
  - 28. Contacting the Employer
  - 29. Examination of bids and Determination of Responsiveness
  - 30. Correction of Errors
  - 31. Conversion to Single Currency for Comparison of Bids
  - 32. Evaluation and Comparison of Bids
  - 33. Preference for Domestic bidders
  - 34. Purchase Preference
  - 35. Compensation of Extended Stay – **Not Applicable**
- F. Award of Contract
  - 36. Award
  - 37. Employer's Right to accept any bid and to reject any or all Bids
  - 38. Notification of Award
  - 39. Signing of Agreement
  - 40. Contract Performance Security

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41. Corrupt or Fraudulent Practices
42. Procurement from a bidder which shares a land border with India

## INSTRUCTIONS TO BIDDERS

### **INSTRUCTION FOR ONLINE BID SUBMISSION**

The bidders are required to submit soft copies of their bids electronically on the Central Public Procurement (CPP) Portal i.e. <http://etenders.gov.in/eprocure/app>, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

### **REGISTRATION**

- (i) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL: <https://etenders.gov.in/eprocure/app>) by clicking on the link "Online Bidder Enrolment" option available on the home page. **Enrolment on the CPP Portal is free of charge.**
- (ii) During enrolment/ registration, the bidders should provide the correct / true information including valid email-id & mobile no. All the correspondence shall be made directly with the contractors / bidders through email-id provided.
- (iii) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- (iv) For e-tendering, possession of valid Digital Signature Certificate (Class III Certificates with signing key usage) is mandatory which can be obtained from SIFY /nCode/eMudra or any Certifying Authority recognized by CCA India on eToken/ SmartCard.
- (v) Upon enrolment on CPP Portal for e-tendering, the bidders shall register their valid Digital Signature Certificate with their profile.
- (vi) Only one valid DSC should be registered by a bidder. Bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse and should ensure safety of the same.
- (vii) Bidders can then log into the site through the secured login by entering their user ID/ password and the password of the DSC/ eToken.



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### **SEARCHING FOR TENDER DOCUMENTS**


- 1) There are various search options built in the CPP Portal to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords, etc., to search for a tender published on the CPP Portal.
- 2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.
- 3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

### **PREPARATION OF BIDS:**

- (i) For preparation of bid, Bidders shall search the tender from published tender list available on site and download the complete tender document and should take into account corrigendum if any published before submitting their bids.

After selecting the tender document same shall be moved to the 'My favourite' folder of bidders account from where bidder can view all the details of the tender document.

- (ii) Bidder shall go through the tender document carefully to understand the documents required to be submitted as part of the bid. Bidders shall note the number of covers in which the bid documents have to be submitted, the number of documents – including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.
- (iii) Any pre-bid clarifications if required, then same may be obtained online through the tender site, or through the contact details given in the tender document.
- (iv) Bidders should get ready in advance the bid documents in the required format (PDF/xls/rar/dwf/jpg formats) to be submitted as indicated in the tender document/schedule. **Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.**
- (v) Bidders can update well in advance, the documents such as experience certificates,

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annual report, PAN, EPF & other details etc., under “My Space/ Other Important Document” option, which can be submitted as per tender requirements. This will facilitate the bid submission process faster by reducing upload time of bids.

#### **SUBMISSION OF BIDS:**

- (i) Bidder should log into the site well in advance for bid submission so that he/ she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay.
- (ii) Bidder should prepare the EMD as per the instructions specified in the NIT/ tender document. The details of the DD/BG/others physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.
- (iii) While submitting the bids online, the bidder shall read the terms & conditions (of CPP portal) and accepts the same in order to proceed further to submit their bid.
- (iv) Bidders shall select the payment option as offline to pay the EMD and enter details of the DD/BG/others.
- (v) Bidder shall digitally sign and upload the required bid documents one by one as indicated in the tender document.
- (vi) Bidders shall note that the very act of using DSC for downloading the tender document and uploading their offers is deemed to be a confirmation that they have read all sections and pages of the tender document without any exception and have understood the complete tender document and are clear about the requirements of the tender document.
- (vii) Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document. For the file size of less than 1 MB, the transaction uploading time will be very fast.
- (viii) If price quotes are required in XLS format, utmost care shall be taken for uploading Schedule of quantities & Prices and any change/ modification of the price schedule shall render it unfit for bidding.

**Bidders shall download the Schedule of Quantities & Prices i.e. Schedule of Rates, in XLS format and save it without changing the name of the file. Bidder shall quote their rate in figures in the appropriate cells, thereafter save and upload the file in financial bid cover (Price bid) only.**

**If the template of Schedule of Quantities & Prices file is found to be**





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**modified/corrupted in the eventuality by the bidder, the bid will be rejected and further dealt as per provision of clause no 17.0 of ITB including forfeiture of EMD.**

**The bidders are cautioned that uploading of financial bid elsewhere i.e. other than in cover 2 will result in rejection of the tender.**

- (ix)** Bidders shall submit their bids through online e-tendering system to the Tender Inviting Authority (TIA) well before the bid submission end date & time (as per Server System Clock). **The TIA will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders at the eleventh hour.**
- (x)** After the bid submission (i.e. after Clicking “Freeze Bid Submission” in the portal), the bidders shall **take print out of system generated acknowledgement** number and keep it as a record of evidence for online submission of bid, which will also act as an entry pass to participate in the bid opening.
- (xi)** Bidders should follow the server time being displayed on bidder’s dashboard at the top of the tender site, which shall be considered valid for all actions of requesting, bid submission, bid opening etc., in the e-tender system.
- (xii)** All the documents being submitted by the bidders would be encrypted using PKI (Public Key Infrastructure) encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology.

**ASSISTANCE TO BIDDERS:**

- (i)** Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contract person indicated in the tender.
- (ii)** Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24X7 CPP Portal Helpdesk. The 24 x 7 Help Desk Number 0120-4001002, 0120-6277787 and 0120-4001005. The helpdesk email id is [support-eproc@nic.in](mailto:support-eproc@nic.in)

**A. GENERAL**

**1. Scope of Bid**

- 1.1** The Employer, as defined in the General Conditions of Contract, hereinafter “the Employer”,



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wishes to receive bids for the Work as described in bidding document.

- 1.2 The successful bidder will be expected to complete the Works within the period stated in Special Conditions of Contract.
- 1.3 Throughout these bidding documents, the terms “bid” and “tender” and their derivatives (“bidder/ tenderer”, “bid tendered”, “bidding/ tendering”, etc.) are synonymous, and day means calendar day. Singular also means plural.

**2. Eligible Bidders**

- 2.1 Bidders shall, as part of their bid, submit duly executed power of attorney authorizing the signatory of the bid to bind the bidder.
- 2.2 This invitation for bid is open to any bidder.
- 2.3 A bidder shall not be affiliated with a firm or entity
- (i) that has provided consulting services related to the Works to the Employer during the preparatory stages of the Works or of the Project of which the Works form a part, or
  - (ii) that has been hired (or is proposed to be hired) by the Employer as Engineer/ Consultant for the contract.
- 2.4 The bidder shall not be under a declaration of ineligibility by Employer for corrupt or fraudulent practices as defined in ITB.
- 2.5 While evaluating the bids, pursuant to bid evaluation criteria in Global Notice of IFB, bidders and / or his sub-contractors past performance shall be assessed for ascertaining the responsiveness of the bid. In such case the decision of employer shall be final and binding on the bidder.
- 2.6 The Bidder is not put on Black / holiday list by MNGL/MoP&NG/Oil Public Sector Enterprise(s)

**3. Bid Evaluation Criteria:-**

**3.1 Technical**


**3.1.1 Experience Criteria - As per Annexure – I of IFB.**

**3.1.2 Equipment Deployment Criteria**

The bidder shall meet the requirement regarding deployment and ownership of minimum critical construction equipment as specified in SCC Technical of the bidding document.

**3.2 Financial - As per Annexure – I of IFB**

- 3.3 Bidder shall not be affiliated with a firm or entity, (i) that has provided consulting services related to Works to Employer during preparatory stages of Works or of the Project of which the Works form a part, or (ii) that has been hired (or is proposed to be hired) by Employer as Engineer / Consultant for the contract.
- 3.4 Bidder shall meet the technical, as well as, commercial qualification criteria as stated above. Bidder shall furnish necessary documentary evidence such as LOA Copy/ Audited Financial **Statement (UDIN from CA is compulsory on financial document)** along with the bid, to justify meeting the stipulated qualification criteria. In absence of requisite documents as stated above, MNGL reserve the right to reject the bid without making any reference to the bidder.

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**4. Bids from Consortium – Not applicable**

**5. One Bid per Bidder**

5.1 A firm shall submit only one bid in the same bidding process. A bidder who submits or participates in more than one bid will cause all the proposals in which the bidder has participated to be disqualified.

5.2 More than one bid means bid(s) by bidder(s) having same Proprietor / Partners / Limited Liability Partner in any other bidder(s). Further, more than one bids shall also include two or more bidders having common power of attorney holder.

Failure to comply this clause during tendering process will disqualify all such bidders from process of evaluation of bids.

5.3 Alternative Bids shall not be considered.

5.4 The provisions mentioned at Sl. No. 5.1 and 5.2 shall not be applicable wherein bidders are quoting for different Items / Sections / Parts / Groups / SOR items of the same tender which specifies evaluation on Items / Sections / Parts / Groups / SOR items basis.

**6. Cost of Bidding**

6.1 The bidder shall bear all costs associated with the preparation and submission of the bid, and MNG will in no case, be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

**7. Site Visit**

7.1 The bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the bidder's own expense.

7.2 The bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

7.3 The Employer may conduct a Site visit concurrently with the pre-bid meeting.

**B. BIDDING DOCUMENTS**

**8. Content of Bidding Document**

8.1 The Bidding Documents/ Tender Documents should be read in conjunction with any addenda issued in accordance with ITB Clause 10.  
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- 8.2 The bidder is expected to examine all instructions, forms, terms and specifications in the bidding documents. The Invitation for Bids (IFB) together with all its attachments thereto, shall be considered to be read, understood and accepted by the bidders. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive to the bidding documents in every respect will be at bidder's risk and may result in the rejection of his bid.

**9. Clarification of Bidding Documents**

- 9.1 A prospective bidder requiring any clarification(s) of the Bidding Documents may notify MNGL in writing or by fax or e-mail at MNGL's mailing address indicated in the Invitation for Bids not later than 7 days prior to the deadline. MNGL may, if deem appropriate, respond in writing to the request for clarification. Written copies of MNGL's response (including an explanation of the query but without identifying the source of the query) will be sent to all prospective bidders who have received the bidding documents. Any Clarification or information required by the bidder but same not received by the Employer, seven days prior to the bid due date, the same is liable to be considered as no clarification/information required.

[In pre-bid meeting conference, all questions/ queries should be referred to MNGL on or before scheduled date of pre-bid conference. The question/ queries received by MNGL prior to pre-bid conference will be addressed in the pre-bid conference & no separate communication will be sent to bidders]

**10. Amendment of Bidding Documents**

- 10.1 At any time prior to the bid due date, Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the tender document, by issuing corrigendum.
- 10.2 Any addendum /corrigendum/ clarifications to bidders query thus issued shall be part of the bidding documents pursuant to ITB Clause-8.0 and shall be hosted on the MNGL's official website before bid due date. All the prospective bidders who have attended the Pre-Bid meeting till date shall be informed by email/ post about the addendum/ corrigendum/ clarifications to bidders query for their reference. Bidders desirous to submit its bid have to take into consideration of all the addendum(s)/ corrigendum (s)/ clarifications to bidders query hosted on the above websites before submitting the bid.
- 10.3 Bidders are advised to visit MNGL's websites and CPPP's e-tendering website from time to time to get updated information / documents.
- 10.4 In case of any inconsistency between an addendum and this tender document, the addendum shall prevail and in similar case between two or more addenda, the last issued addendum shall prevail.
- 10.5 The Purchaser may, at its discretion, extend the bid due date in order to allow prospective bidders, a reasonable time to furnish their most competitive bid taking into account the addenda / corrigenda issued.



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**C. PREPARATION OF BIDS:**

**11. Language of Bid**

- 11.1 The bid prepared by the bidder and all-correspondence/drawings and documents relating to the bid exchanged by bidder and MNGL shall be written in English language. Any printed literature furnished by the bidder may be written in another language so long as accompanied by an ENGLISH translation duly authenticated by the chamber of commerce of Bidders country, in which case, for the purpose of interpretation of the bid, the ENGLISH translation shall govern. Metric measurement system shall be applied.

**12. Documents Comprising the Bid**

- 12.1 The bid prepared by the bidder shall comprise the following components:

- 12.2 Envelope -1: Super scribing Techno-Commercial Un-priced Bids (PART-A)

**12.2.1 Technical cover:**

Scanned documents (duly signed by the authorized signatory) to be uploaded by the bidder on the portal as per list below:

- i) Covering Letter as per format "Submission of Tender" / "Submission of Bid" enclosed with Part- A of Vol-I of II.
- ii) Bidder's general/ details information as per format F-1.
- iii) Power of Attorney in favour of person(s) signing the bid that such person (s) is/are authorized to sign the bid on behalf of the bidder and any consequence resulting due to such signing shall be binding on the bidder.
- iv) Specific experience, annual turnover and equipment deployment details as calledfor in qualifying requirements.
- v) A Bid Form as per format F-2.
- vi) Copies of documents as required in list of enclosure.
- vii) Documents establishing the eligibility and conformity to the Bid Documents of all Goods and services, which the bidder proposes to supply under the award. Such document may be, literature, drawing or data and shall also include (a) the detailed description of the Good's essential technical and performance characteristics; (b) a clause by clause commentary on Employer's technical specification and demonstrating supplies substantial responsiveness to the specifications.
- ix) Copy of Bid security in accordance with IFB & Clause 16 of ITB to be furnished either in the form of Cashier's / Banker's cheque / Bank Draft payable to MNGL at Pune/ Bank Guarantee as per format F-4.
- x) Letter of authority in favour of any one or two of bidder's executives having authority to attend the un-priced and price bid opening on specified dates and venue as per format F-5.
- xi) Confirmation of no deviation as per Format F-6.
- xii) Present commitments strictly as per form F-9.



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- xiii) **Indian Bidders are required to submit Employees Provident Fund registration certificate, ESIC registration certificate, Professional Tax Registration certificate, Labour welfare registration under Maharashtra Labour Welfare Fund Act and Shop Act Registration certificate.**
- xiv) Bidder's declaration that they are not under liquidation, court receivership or similar proceedings.
- xv) Any other information/details required as per bid document.

**12.2.2 Financial cover:**

Price bid SOR as per prescribed format on the e-tender portal.

- 12.3 All the documents submitted shall be duly signed and stamped on each page by the bidder or an authorized signatory of the bidder.
- 12.4 Bidders are advised to submit quotations based strictly on the terms and conditions and specifications contained in the bid document and not stipulate any deviations. Should it, however, become unavoidable, deviations should be stipulated only in the prescribed Proforma. Owner reserves the right to evaluate quotations containing deviations having financial implications after adding the cost for such deviations as determined by Owner.
- 12.5 Original schedule of rates duly filled in shall not contain any condition whatsoever. Any condition given in this part shall not be considered and shall render the offer liable for rejection.
- 12.6 All signatures in bids shall be dated, as well as all pages of bids shall be initialed at lower right hand corner by the Bidder or by a person holding power of attorney authorizing him to sign on behalf of the bidder before the submission of bids.
- 12.7 The Bidder's bid is central to the evaluation and selection process. Therefore, it is important that the Bidder carefully prepares the bid and answers all questions completely. Missing information and vague answers may delay the evaluation of a bid and may impair the Bidder's chances of success.
- 12.8 Information received by Purchaser from the Bidder will be disclosed to Purchaser's employees and/or advisers or external consultants for the purpose of evaluating the bid response.

**13. Bid Prices**

- 13.1 Unless stated otherwise in the Bidding Documents, the Contract shall be for the whole works as described in Bidding Document, based on the unit rates and prices submitted by the Bidder and accepted by the EMPLOYER.
- 13.2 Prices must be filled in format for 'Schedule of Rates' enclosed as part of Bidding Document. If quoted in separate typed sheets and any variation in item description, unit or quantity is noticed; the bid is liable to be rejected.
- 13.3 Bidder shall quote for all the items of Schedule of Rates after careful analysis of cost involved for the performance of the completed item considering all parts of the Bidding Document. In case any activity though specifically not covered in description of item under 'Schedule of Rates' but is required to complete the works as per Scope of Work, Scope of supply,



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Specifications, Standards, Drawings, General Conditions of Contract, Special Condition of Contract or any other part of Bidding Document, the prices quoted shall deemed to be inclusive of cost incurred for such activity. Items against which no rate or price is entered by the bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the SOR.

13.4 All duties and taxes including applicable Custom duty, Works Contract tax and other levies payable by the Contractor under the Contract, or for any other cause, shall be included in the rates and prices and the total bid price submitted by the bidder.

13.5 Prices quoted by the bidder, shall remain firm and fixed and valid until completion of the Contract and will not be subject to variation on any account except statutory variations in Goods & Service Tax as mentioned below.

Statutory variations in Goods & Service Tax on finished product during the contractual completion period, shall be to the Employer's account for which the Contractor will furnish documentary evidence(s) in support of their claims to MNGL. However, any increase in the rate of these taxes and duties beyond the contractual completion period shall be to Contractor's account and any decrease shall be passed on to MNGL.

13.6 The Bidder shall quote the prices both in figures as well as in words. There should not be any discrepancies between the price indicated in figures and the price indicated in words. In case of any discrepancy, the price indicated in words shall prevail over the price indicated in figure.

13.7 Alternative bids shall not be considered.

13.8 Conditional discount, if offered, shall not be considered for evaluation.

13.9 The bidder shall have to raise the Cenvatable invoice in the name of Director (Commercial), MNGL, Pune

**14. Bid Currencies – VOID**

**15. Bid Validity**

15.1 Bids shall be kept valid for 4 (four) month from the final bid due date.

15.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the bidders extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing or by fax / e-mail. A bidder may refuse the request without forfeiture of his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of its bid security for the period of the extension and in accordance with Clause 16 in all respects.

**16. Bid Security**

16.1 Pursuant to Clause-5A, the bidder shall furnish, as part of his bid, bid security in the amount specified in the Invitation for Bids (IFB).

16.2 The bid security is required to protect MNGL against the risk of bidder's conduct which would warrant the security's forfeiture, pursuant to Clause-16.7

16.3 The bid security in Indian Rupees for bidders quoting in Indian currency shall be in the form of a Bank Draft/ Banker's Cheque/ Bank Guarantee.





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MNGL shall not be liable to pay any bank charges, commission or interest on the amount of Bid Security.

In case Bid Security is in the form of a Bank Guarantee or irrevocable Letter of Credit, the same shall be from any Indian scheduled bank or a branch of an International bank situated in India and registered with Reserve bank of India as scheduled foreign bank in case of Indian bidder and from any reputed International bank or Indian scheduled bank in case of foreign bidder. Bid Security shall be valid for 2 months beyond the validity of the Bid.

- 16.4 Any bid not secured in accordance with Clause-16.1 and 16.3 may be rejected by MNGL as non-responsive.
- 16.5 Unsuccessful bidder's bid security will be discharged/ returned as promptly as possible after award of contract and signing of agreement.
- 16.6 The successful bidder's bid security will be discharged upon the bidder's accepting the award & signing the Agreement, pursuant to Clause-39 and furnishing the Contract Performance Security pursuant to Clause-40.
- 16.7 The bid security may be forfeited:
- a) If a bidder withdraws his bid during the period of bid validity.
  - b) in the case of a successful bidder, if the bidder fails:
    - i) to accept the Notification of Award/Service Order (SO) or
    - ii) to furnish Contract Performance Security in accordance with Clause-40.
    - iii) to accept arithmetical corrections,
- 16.8 Bid Security should be in favour of Maharashtra Natural Gas Limited and addressed to MNGL. In case Bid Security is in the form of Bank Guarantee or Letter of Credit, the same must indicate the Bid Document and the work for which the bidder is quoting. This is essential to have proper co-relation at a later date. The Bid Security shall be in the form provided at F-4 (Bank Guarantee).
- 16.9 **The Indian / Domestic firms registered with NSIC/MSME, under its single point registration scheme are exempted from furnishing Tender Fee & Bid Security, provided they are registered for the items / work they intend to quote and subject to their enclosing with their bid a copy of latest and current registration certificate.**
17. **Pre-Bid Meeting – As per Clause VI of IFB**
- 17.1 The bidder(s) or his designated representative, who have purchased bid document, are invited to attend a pre-bid meeting which will take place as indicated in IFB
- 17.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 17.3 Text of the questions raised and the responses given, together with any responses prepared after the meeting, will be transmitted without delay (without identifying the sources of the question) to all purchasers of the bidding documents. Any modification of the bidding documents listed in ITB Sub-Clause 8.1 that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.





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17.4 Non-attendance of the pre-bid meeting will not be a cause for disqualification of a bidder.

**18. Format and Signing of Bid**

18.1 The original of the bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the bidder. The name and position held by each person signing, must be typed or printed below the signature. All pages of the bid except for unamended printed literature where entries or amendments have been made shall be initialed by the person or persons signing the bid.

18.2 The bid shall contain no alterations, omissions, or additions, unless such corrections are initialed by the person or persons signing the bid.

**19. Zero Deviation**

19.1 Bidders shall note that if any deviation are taken to the under mentioned provisions of Bid Document by the Bidder the bid is liable to be rejection.

- i) Do not meet BEC Criteria
- ii) Bid Security
- iii) Performance Security (Contract Performance Bank Guarantee), 3% of Contract/Order value
- iv) Delivery Period
- v) Terms of Payment
- vi) Force Majeure
- vii) Resolution of Dispute/Arbitration
- viii) Termination of Contract,
- ix) Warranty and Guarantee
- x) Offer not submitted for complete scope of work
- xi) Firm prices
- xii) Prices not quoted as per Schedule of Rates formats.
- xiii) Bidder have been banned by Government of India or any its Agency/ Undertaking/ Department of Government of India.
- xiv) Bidder is under liquidation.
- xv) Bids not conforming to technical specification/requirements.
- xvi) Any other such provisions if specifically stipulated elsewhere in the Bid Document.
- xvii) Price Reduction Schedule.

**However, MNGL reserve the right to request the bidder to withdraw the deviations against above mentioned provisions of Bid Documents.**

**20. Mode of Payment**

MNGL has initiated payments to suppliers and Contractors electronically and to facilitate the payments electronically, the bidder should submit his account details in enclosed format (F-17) to facilitate payments through e-Banking/ RTGS/NEFT mode.

**21. Agent/ consultant/ Representative/ Retainer/ Associate - VOID**

**D. SUBMISSION OF BIDS**

**22.0 DEADLINE FOR SUBMISSION OF BID**

22.1 The bid must be submitted on the specified e-tendering portal as specified in IFB not later than the time and date as specified in IFB. The online e-tendering portal will not allow any bid or part thereof whatsoever to be submitted after the due time on



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the due date.

- 22.2 The Purchaser may, in exceptional circumstances and at its discretion, on giving reasonable notice by email or any written communication to all prospective bidders who have been issued the bid document to extend the deadline for the submission of bids in which case all rights and obligations of the Purchaser and bidders, previously subject to the original deadline will thereafter be subject to deadline as extended.

**.23. LATE BIDS/ UNSOLICITED BIDS / BID SUBMISSION AT OTHER PLACE**

Any Bid Security / EMD received by the Purchaser after the deadline for submission of bid may render the bid to be declared “Late” and such bid is liable for rejection; such EMD may be returned unopened to the bidder at the sole discretion of the Purchaser.

Unsolicited bid or bids being submitted in physical form or to address to other than one specifically stipulated in the bid document will not be considered for opening / evaluation /award and will be returned to such bidders.

**24. Late Bids**

- 24.1 Any bid received by MNGL after the deadline for submission of bids prescribed on main body of IFB will be rejected and returned unopened to the bidder. However MNGL reserve the right to consider late bid under special conditions.

**25. Modification and Withdrawal of Bids**

- 25.0 The bidder may modify or withdraw its bid after the bid submission, but, before the due date of submission as per provisions provided on the e-tendering portal. After the bid due date & time however, no modifications whatsoever are allowed in the bid.

- 25.1 No bid shall be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Bid form. In case of request in written by the authorized signatory for withdrawal of a bid during this interval, the Bidder's bid security shall be forfeited.


**E. BID OPENING AND EVALUATION**

**26. Bid Opening**

- 26.1 The Purchaser will open all bids on the e-tendering portal in the presence of bidder(s) representatives who choose to attend, at the time, on the date and place (as specified in IFB). The bidder(s) representatives, who are present, shall sign an attendance sheet evidencing their attendance, if so required by the Purchaser.

- 26.2 The Bidder's names and the presence or absence of requisite Bid Security (EMD) and such other details as the Purchaser, at its discretion, may consider appropriate, will be announced at the opening. No bid shall be rejected at bid opening, except for bids without EMD.

- 26.3 Bids that are not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances. Bidder's specific attention is drawn to this stipulation to enable the representative of the Bidder at the bid opening time to bring out to the attention for the Purchaser any documents pertaining to its bid is not being acknowledged and relevant portions read out.

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- 26.4 The Purchaser will prepare a bid opening statement to be signed by all representatives present during bid opening.
27. **Process to be Confidential**
- 27.1 Information relating to the examination, clarification, evaluation and comparison of bids, and recommendations for the award of a contract, shall not be disclosed to bidders or any other persons officially concerned with such process. Any effort by a bidder to influence the Employer's processing of bids or award decisions may result in the rejection of the bidder's bid.
28. **Contacting the Employer**
- 28.1 From the time of bid opening to the time of Contract award, if any bidder wishes to contact the Employer on any matter related to the bid, it should do so in writing.
- 28.2 Any effort by the bidder to influence the Employer in the Employer's bid evaluation, bid comparison, or Contract award decisions may result in the rejection of the bidder's bid.
29. **Examination of bids and Determination of Responsiveness**
- 29.1 Prior to the detailed evaluation of bids, the Employer will determine whether each bid
- meets the Bid Evaluation Criteria;
  - has been properly signed;
  - is accompanied by the required securities;
  - is substantially responsive to the requirements of the bidding documents; and
  - provides any clarification and/ or substantiation that the Employer may require to determine responsiveness pursuant to Sub-Clause 29.2.
- 29.2 A substantially responsive bid is one which conforms to all the terms, conditions and specifications of the bidding documents without material deviations or reservations. A material deviation or reservation is one
- that affects in any substantial way the scope, quality, or performance of the Works;
  - that limits in any substantial way, inconsistent with the bidding documents, the Employer's rights or the bidder's obligations under the contract; or
  - Whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids.
- 29.3 If a bid is not substantially responsive, it will be rejected by the Employer and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

#### OPENING OF PRICE BID

In case of two-part bidding, the Bidders whose bids are found substantially responsive shall be invited to attend the opening of price bid. Such bidders may be required to attend the price bid opening at a short notice. The place, date and time of price bid opening will be informed to all such Bidders. The Bidder's representatives who are present shall sign a register evidencing their attendance.

The bid prices stated in the price schedules will be announced during price bid opening.

30. **Correction of Errors**



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- 30.1 Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:
- a) where there is a discrepancy between the amounts in words and in figures, the amount in words will govern; and
  - b) where there is a discrepancy between the unit rate and the total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.
- 30.2 The amount stated in the bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount of bid, its bid will be rejected, and the bid security shall be forfeited.
31. **Conversion to Single Currency for Comparison of Bids - NOT APPLICABLE**
32. **Evaluation and Comparison of Bids**
- 32.1 The evaluation and comparison of bids will be done as per the provisions of the bid evaluation criteria as per Annexure – I to ITB (to be separately enclosed along with bidding document against individual tenders).
33. **Preference for Domestic Bidders - VOID**
34. **Purchase Preference - VOID**
35. **Compensation for extended stay - VOID**
- F. AWARD OF CONTRACT**
36. **Award**
- 36.1 Subject to Clause 29, MNGL will award the contract to the successful bidder whose bid has been determined to be substantially responsive and has been determined as the lowest, is determined to be qualified to satisfactorily perform the contract.
37. **Employer's Right to Accept Any Bid and to Reject Any or all Bids**
- 37.1 MNGL reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligations to inform the affected bidder or bidders of the ground for MNGL'S ACTION.
38. **Notification of Award**
- 38.1 Prior to the expiration of period of bid validity MNGL will notify the successful bidder in writing by fax, cable or telex to be confirmed in writing, that his bid has been accepted. The notification of award/ Fax of Intent / Service Order will constitute the formation of the Contract.
- 38.2 Delivery/ completion period shall be counted from the date of notification of award / Fax of Intent / Service Order.

The notification of award will constitute the formation of a Contract, until the Contract has been effected pursuant to signing of Contract as per Clause 39 of ITB.

Upon the successful bidder's furnishing of contract performance security, pursuant to Clause 40



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of ITB, MNGL will promptly notify each unsuccessful bidder and will discharge his bid security, pursuant to Clause 16 of ITB.

**39. Signing of Agreement**

- 39.1 MNGL will award the Contract to the successful bidder, who, within 15 days of receipt of the same, shall sign and return the acceptance copy to MNGL.
- 39.2 The successful bidder shall be required to execute an AGREEMENT in the proforma given in of this standard bidding document on non-judicial paper of appropriate value (the cost of stamp paper shall be borne by the Contractor), within 15 days of the receipt by him of the Notification of Acceptance of Tender. In the event of failure on the part of the successful bidder to sign the AGREEMENT within the above stipulated period, the Bid Security shall be forfeited and the acceptance of the tender shall be considered as cancelled.

**40. Contract Performance Security**

- 40.1 Within 15 days of the receipt of the notification of award/ Service Order from MNGL, the successful bidder shall furnish the contract performance security in accordance with Article 24 of General Conditions of The Contract in the form provided in the bidding documents. The Contract Performance Security shall be in the form of either Banker's Cheque or Demand Draft or Bank Guarantee or Letter of Credit and shall be in the currency of the Contract.
- 40.2 The contract performance security shall be for an amount equal to 3% of the value of the contract towards faithful performance of the contractual obligations and performance of equipment. This Bank Guarantee/ DD/ Letter of Credit shall be from any Indian scheduled bank or a branch of an International bank situated in India and registered with Reserve bank of India as scheduled foreign bank. This Bank Guarantee shall be valid for a period as stated in Article-24 of General Conditions of The Contract.
- 40.3 Failure of the successful bidder to comply with the requirements of this article shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security, in which event MNGL may award the order to the next lowest evaluated bidder or call for new bids.

**41. Corrupt or Fraudulent Practices**

- 41.1 MNGL requires that bidders/ contractors observe the highest standard of ethics during the execution of contracts. In pursuance of this policy, the Employer:
- a) defines, for the purposes of this provision, the terms set forth below as follows:
    - i) "corrupt practice" means the offering, giving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution; and
    - ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition;
  - b) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
  - c) will declare a firm ineligible and put on holiday, either indefinitely or for a stated period of time if it at any time determines that the firm has engaged in corrupt or fraudulent



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practices in competing for, or in executing a contract.

**42. PROCUREMENT FROM A BIDDER WHICH SHARES A LAND BORDER WITH INDIA.**

I. Order (Public Procurement No. 1) dated 23.07.2020, Order (Public Procurement No. 2) dated 23.07.2020 and Order (Public Procurement No. 3) dated 24.07.2020, Department of Expenditure, Ministry of Finance, Govt. of India refers. The same are available at website <https://doe.gov.in/procurement-policy-divisions>.

II. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. For details of competent authority refer to Annexure I of Order (Public Procurement No. 1) dated 23.07.2020. Further the above will not apply to bidders from those countries (even if sharing a land border with India) to which the Government of India has extended lines of credit or in which the Government of India is engaged in development projects. Updated lists of countries to which lines of credit have been extended or in which development projects are undertaken are given in the website of the Ministry of External Affairs, Govt. of India

III. "Bidder" (including the term 'tenderer', 'consultant' 'vendor' or 'service provider' in certain contexts) for purpose of this provision means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency, branch or office controlled by such person, participating in a procurement process.

IV. "Bidder from a country which shares a land border with India" for the purpose of this:


- a. An entity incorporated, established or registered in such a country; or
- b. A subsidiary of an entity incorporated, established or registered in such a country; or
- c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
- d. An entity whose beneficial owner is situated in such a country; or
- e. An Indian (or other) agent of such an entity; or
- f. A natural person who is a citizen of such a country; or
- g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

V. "Beneficial owner" for the purpose of above (IV) will be as under:

i. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person(s), has a controlling ownership interest or who exercises control through other means.

Explanation—

- a) "Controlling ownership interest" means ownership of, or entitlement to, more than twenty-five per cent of shares or capital or profits of the company.
- b) "Control" shall include the right to appoint the majority of the directors

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- or to control the management or policy decisions, including by virtue of their shareholding or management rights or shareholder's agreements or voting agreements.
- ii) In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.
- iii) In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals.
- iv) Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official.
- v) In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- VI. "Agent" for the purpose of this Order is a person employed to do any act for another, or to represent another in dealings with third persons
- VII. The Successful bidder shall not be allowed to subcontract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.
- VIII. SUBMISSION OF CERTIFICATE IN BIDS: Bidder shall submit a certificate in this regard as Format F-18. If such certificate given by a bidder whose bid is accepted is found to be false, this would be a ground for immediate rejection of the bid/termination and further action as per "Procedure for Action in case of Corrupt/Fraudulent/ Collusive / Coercive Practices" of tender document.
- IX. The registration, wherever applicable, should be valid at the time of submission of bids and at the time of acceptance of bids. In respect of supply otherwise than by tender, registration should be valid at the time of placement of order. If the bidder was validly registered at the time of acceptance / placement of order, registration shall not be a relevant consideration during contract execution



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## **2.0 ANNEXURE TO INSTRUCTIONS TO BIDDERS (ITB)**






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### **CONTENTS**

<b>Sl. No.</b>	<b>Description</b>
1)	Annexure-I : Bid Evaluation Criteria
2)	Annexure-II : List of Formats
3)	Annexure-III : Commercial Questionnaire
4)	Annexure-IV : Check List

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## BID EVALUATION CRITERIA

### {Annexure – I TO Instruction to Bidder (ITB)}



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### **EVALUATION / COMPARISON OF BIDS**

- 1.0 The Employer will examine the bids to determine whether the bids are complete as per Check List, Stamped and signed on each page and are in order.
- 2.0 **EARNEST MONEY DEPOSIT**  
The bids without requisite EMD and / or EMD not in the prescribed proforma will not be considered and bids of such bidders shall be rejected.

**Note:**


**The Indian / Domestic firms registered with NSIC / MSME, under its single point registration scheme are exempted from furnishing Bid Security, provided they are registered for the items / work they intend to quote and subject to their enclosing with their bid a copy of latest and current registration certificate.**

- 3.0 **DEVIATION TO STIPULATIONS**  
"It may be noted that since this is zero deviation tender the bidder is advised to quote strictly as per terms & conditions of tender document & not to stipulate any deviation/ exception. Offers requesting deviation shall not be amended for further evaluation & shall be summarily rejected".
- 4.0 **CONFORMANCE TO SCOPE OF WORK**  
Bidder will be required to confirm to the Scope of Work as mentioned under Annexure-I to SCC, Schedule of Rates and Job Specification/ Technical Specifications.
- 5.0 **CONFORMANCE TO SCOPE OF SUPPLY**  
Bidder will be required to confirm to the Scope of Supply as mentioned under Annexure – II to SCC, Schedule of Rates and Jobs Specification/ Technical Specifications.
- 6.0 **DETERMINATION OF RESPONSIVENESS**  
The bid submitted by the bidder should be responsive to the requirements of the Bidding Document. A responsive bid is one which conforms to the terms, conditions and specifications of the Bidding Document and Bid Evaluation Criteria without **Deviation**.
- 7.0 Bidders are advised to quote strictly as per terms and conditions of the Bidding Document and not to stipulate any deviation/ exception as it is "No Deviation" tender. Offers with any Exception/ deviation shall be liable for rejection.
- 8.0 Bidder will be required to establish up to the satisfaction of Owner that the resources proposed to be deployed in Annexure – 9 & 10 of SCC (Technical) by the bidder are in conformity with the WORK REQUIREMENT.

The following requirement must be noted while submitting the resource deployment details.

**i) Construction Equipments**

Mechanized type of construction equipments should be considered. All requisite equipments such as cranes, diesel generators, compressors, welding machines, pumps, tractor-trailor, etc. shall be considered. Deployment of minimum

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equipments must be furnished as per Annexure – 9 to SCC (Technical).

ii) Deployment of Supervisory/ Skilled Personnel

Bidder must furnish a site organization with qualified and experienced personnel in adequate numbers keeping in view the specific requirement for this work. Bidder will prepare & submit these details also keeping in view the minimum no. of skilled personal as per Annexure – 10 to SCC (Technical).

**9.0 EVALUATION OF PRICE BIDS**

- i) The price part of only those bidders will be evaluated whose bid is technically and commercially acceptable to Owner.
- ii) Quoted price for the complete scope of work and supply as per SOR shall be taken into account for arriving at the lowest evaluated price.  
**evaluation & Award of work shall be as per clause no 4 of BEC criteria of ANNEXURE-I to IFB**

**10.0 BIDDERS MUST CHECK THAT THEIR BID IS COMPLETE IN ALL RESPECTS WITH ALL DETAILS AS PER VARIOUS FORMATS ENCLOSED IN INSTRUCTIONS TO BIDDERS, CHECK LIST AND COMMERCIAL QUESTIONNAIRE REPLIED**

Issue of any technical/ commercial questionnaire or having any classificatory discussions, in general, is not envisaged. Bidders in their own interest must ensure that their bid is complete in all respects complying with the requirement of Instructions to Bidders and have furnished all details/ clarifications/ confirmations. Also note that all details/ documents shall be submitted in relevant SECTIONS and mentioned in CHECK LIST.



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## **LIST OF FORMATS**

**{Annexure – II TO Instruction to Bidder (ITB)}**



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**CONTENT**

<b>Sl. No.</b>	<b>Description</b>
1)	F-1 : Bidder's General Information
2)	F-1A : Detail information about bidder (in case of open Tender)
3)	F-2 : Bid Form
4)	F-3 : List of Enclosures
5)	F-3A : Financial Detail
6)	F-4 : Proforma for Bank Guarantee for EMD/ Bid Security • Instruction for Furnishing Bid Guarantee/ Bank Guarantee
7)	F-5 : Letter of Authority
8)	F-6 : No Deviation Confirmation
9)	F-7 : Certificate
10)	F-8 : Details of Similar Work done during past five years
11)	F-9 : Present commitments of the Bidder
12)	F-10 : Proforma of Bank Guarantee for Contract Performance Security
13)	F-11 : Proposed Site Organization Chart
14)	F-12 : Construction Schedule with Bar Chart
15)	F-13 : Confirmation regarding schedule of labour rate
16)	F-14 : Confirmation regarding schedule of equipment rate
17)	F-15 : Rate for Extended Stay Compensation (Loading Schedule for Price Comparison Purpose)
18)	F-16 : Format for No Claim Certificate
19)	F-17 : Real Time Gross Settlement (RTGS)/ National Electronic fund transfer (NEFT)
20)	F-18 : Mandate Undertaking for Procurement from a Bidder which shares a land border with India



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**F-1  
BIDDER'S GENERAL INFORMATION**

To  
M/s Maharashtra Natural Gas  
Pride Purple Coronet,  
301-302, Second Floor,  
Baner Rd, Above Bata  
Showroom,  
Baner, Pune – 411045

- 1.1 Bidder Name : \_\_\_\_\_
- 1.2 Number of Years in Operation : \_\_\_\_\_
- 1.3 Registered Address : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- 1.4 Operation Address : \_\_\_\_\_
- 1.5 if different from above : \_\_\_\_\_
- 1.6 Telephone Number : \_\_\_\_\_  
(Country Code) (Area Code) (TelephoneNo.)
- 1.7 E-mail address & Web Site : \_\_\_\_\_
- 1.8 Telefax Number : \_\_\_\_\_  
(Country Code) (Area Code) (TelephoneNo.)
- 1.9 ISO Certification, if any : {If yes, please furnish details}

**(SIGNATURE OF BIDDER WITH SEAL)**



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**F-1A  
DETAILED INFORMATION ABOUT  
BIDDERS  
(In case of open Tender)**

1. IN CASE OF INDIVIDUAL
  - 1.1 Name of Business
  - 1.2 Whether his business is registered
  - 1.3 Date of commencement of business
  - 1.4 Whether he pays Income Tax over Rs.10,000/- per year
2. IN CASE OF PARTNERSHIP
  - 2.1 Name of Partners
  - 2.2 Whether the partnership is registered
  - 2.3 Date of establishment of firm
  - 2.4 If each of partners of the firm pays Income Tax over Rs. 10,000/- per year and if so, which of them pays the same.
3. IN CASE OF LIMITED LIABILITY COMPANY OR COMPANY LIMITED BY GUARANTEE
  - 3.1 Amount of paid up capital
  - 3.2 Name of Directors
  - 3.3 Date of Registration of Company
  - 3.4 Copies of the balance sheet of the company of the last three years.

**(SEAL AND SIGNATURE OF BIDDER)**





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**F-2**

**BID FORM**

To  
M/s Maharashtra Natural Gas  
Pride Purple Coronet,  
301-302, Second Floor,  
Baner Rd, Above Bata  
Showroom,  
Baner, Pune – 411045

Dear Sir,

After examining / reviewing the Bidding Documents **for appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.** including technical specifications, drawings, General and Special Conditions of Contract and schedule of rates etc. The receipt of which is hereby duly acknowledged, we, the undersigned, pleased to offer to execute the whole of the Job **for appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.** and in conformity with, the said Bid Document, including Addenda Nos. (if any).

We confirm that this bid is valid for a period of four (4) months from the date of opening of Techno-commercial Bid, and it shall remain binding upon us and may be accepted by any time before the expiration of that period.

If our bid is accepted, we will provide the performance security equal to 3% (ten percent) of the Contract Price, for the due performance with in fifteen days of such award.

Until a final Agreement is prepared and executed, the bid together with your written acceptance thereof in your notification of award shall constitute a binding Agreement between us.

We understand that Bid Document is not exhaustive and any action and activity not mentioned in Bid Documents but may be inferred to be included to meet the intend of the Bid Documents shall be deemed to be mentioned in Bid Documents unless otherwise specifically excluded and we confirm to perform for fulfillment of Agreement and completeness of the Work in all respects within the time frame and agreed price.

We understand that you are not bound to accept the lowest priced or any bid that you may receive.

SEAL AND  
SIGNATURE  
DATE: \_\_\_\_\_

Duly authorized to sign bid for and on behalf of \_\_\_\_\_

(SIGNATURE OF  
WITNESS) WITNESS



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

NAME: ADDRESS:



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

**F-3  
LIST OF ENCLOSURES**

To,  
M/s Maharashtra Natural Gas  
Pride Purple Coronet,  
301-302, Second Floor,  
Baner Rd, Above Bata  
Showroom,  
Baner, Pune – 411045,

Dear Sir,

We are enclosing the following documents as part of the bid:

1. Power of Attorney of the signatory to the Bidding Document.
2. QA/OC Manuals.
3. Health Safety and Environment (HSE) Policy and HSE Manual.
4. Document showing annual turnover for the last three years such as annual reports, profit and loss account, net worth etc. along with information as sought in enclosed format F- 3A.
5. Organization chart of the bidder and the structure assigned for execution of the work under this bid.
6. Methodology of execution of work.
7. Execution schedule with interlinking of various activities.
8. Copy of Bidding Documents along with addendum/ corrigendum no. duly signed and sealed on each page, in token of confirmation that Bid Documents are considered in full while preparing the bid and in case of award, work will be executed in accordance with the provisions detailed in Bid Documents.

**(SEAL AND SIGNATURE OF BIDDER)**



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

**F-3A  
FINANCIAL  
DETAIL**

**EACH BIDDER MUST FILL IN THIS FORM**

a) Annual Turnover data for the last 3 years.

Year	Currency	Amount	Ex. Rate (*)	Amount (INR) (*)
Year 1				
Year 2				
Year 3				

1. The information supplied should be the Annual Turnover of the Bidder.
2. A brief note should be appended describing thereby details of turnover along with audited balance sheet with profit & loss account statement for the last 3 years.

b) Annual Net-worth data for the last 3 years.

Year	Currency	Amount	Ex. Rate (*)	Amount (INR) (*)
Year 1				
Year 2				
Year 3				

1. Net Worth = Reserves + Capitals – Accumulated Loss

**(SEAL AND SIGNATURE OF BIDDER)**

**(\*) To be filled by Employer**



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

Sheet 1 of 2

F-4

**PROFORMA FOR BANK GUARANTEE FOR EARNEST MONEY DEPOSIT/ BID SECURITY**

(To be stamped in accordance with the Stamp Act)

Ref: .....

Bank Guarantee No. ....

Date .....

To

**M/s Maharashtra Natural Gas**

Pride Purple Coronet,  
301-302, Second Floor,  
Baner Rd, Above Bata Showroom,  
Baner, Pune – 411045

Dear Sir(s),

In accordance with Letter Inviting Tender under your reference No. \_\_\_\_\_ M/s  
\_\_\_\_\_ having their Registered/ Head Office at \_\_\_\_\_  
\_\_\_\_\_ (hereinafter called the Tenderer) wish to participate in the  
said tender for \_\_\_\_\_

As an irrevocable Bank Guarantee against Earnest Money for the amount of \_\_\_\_\_  
is required to be submitted by the Tenderer as a condition precedent for participation in  
the said tender which amount is liable to be forfeited on the happening of any  
contingencies mentioned in the Tender Document.

We, the \_\_\_\_\_ Bank at \_\_\_\_\_  
\_\_\_\_\_ having our Head Office \_\_\_\_\_  
\_\_\_\_\_ (Local Address) guarantee and  
undertake to pay immediately on demand without any recourse to the tenderers by  
Maharashtra Natural Gas Limited the amount \_\_\_\_\_  
\_\_\_\_\_ without any reservation, protest, demur  
and recourse. Any such demand made by MNGL, shall be conclusive and binding on us  
irrespective of any dispute or difference raised by the Tenderer.

This guarantee shall be irrevocable and shall remain valid up to \_\_\_\_\_ [this date  
should be 6 months after the date finally set out for closing of tender]. If any further  
extension of this guarantee is required, the same shall be extended to such required  
period on receiving instructions from M/s \_\_\_\_\_ whose behalf this guarantee is  
issued.

In witness whereof the Bank, through its authorized officer, has set its hand and stamp on this  
\_\_\_\_\_ day of \_\_\_\_\_ 2022 at \_\_\_\_\_.

WITNESS:

(SIGNATURE)  
(NAME)


(OFFICIAL ADDRESS)

(SIGNATURE)  
(NAME)

Designation with Bank Stamp

Attorney as per

Power of Attorney No. \_\_\_\_\_ Date: \_\_\_\_\_

 <p><b>MAHARASHTRA NATURAL GAS LIMITED</b></p>	<p><b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b></p> <p><b>Bid No.: MNG/CP/2022-23/219</b></p>
--	--

Sheet 2 of 2

**INSTRUCTIONS FOR FURNISHING BID-  
GUARANTEE/ BANK  
GUARANTEE**

1. The Bank Guarantee by bidders will be given on non-judicial stamp paper as per stamp duty applicable. The non-judicial stamp paper should be in the name of the issuing bank. In case of foreign bank, the said banks guarantee to be issued by its correspondent bank in India on requisite non-judicial stamp paper.
2. The expiry date as mentioned in bid document should be arrived at by adding 2 months to the date of expiry of the bid validity unless otherwise specified in the Bid Documents.
3. The bank guarantee by bidders will be given from bank as specified in ITB
4. A letter from the issuing bank of the requisite Bank Guarantee confirming that said bank guarantee/ all future communication relating to the Bank Guarantee shall be forwarded to the Employer at its address as mentioned at ITB.
5. Bidders must indicate the full postal address of the bank along with the bank's E-mail/ Fax. from where the earnest money bond has been issued.



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

**F-5  
LETTER OF AUTHORITY  
PROFORMA FOR LETTER OF AUTHORITY FOR ATTENDING AND SUBSEQUENT  
NEGOTIATIONS/CONFERENCES**

No.:

Date:

To,  
Maharashtra Natural Gas  
Limited, Plot No. 27, 1<sup>st</sup>  
Floor,  
Narveer Tanajiwadi PMPML Bus Depot Commercial Building,  
Shivajinagar, Pune- 411005

Dear Sir,

We \_\_\_\_\_ hereby authorize  
following representative(s) to attend un-priced bid opening and price bid opening and for  
any other correspondence and communication against above Bidding Document:

1) Name & Designation \_\_\_\_\_ Signature \_\_\_\_\_

2) Name & Designation \_\_\_\_\_ Signature \_\_\_\_\_

We confirm that we shall be bound by all commitments made by aforementioned  
authorized representatives.

Yours faithfully, Signature

Name & Designation For

and on behalf of

**Note:** This letter of authority should be on the letterhead of the bidder and should  
be signed by a person competent and having the power of attorney to bind  
the bidder.

Not more than two persons are permitted to attend techno-commercial  
un-priced and price bid opening.



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

**F-6  
NO DEVIATION CONFIRMATION**

**(Tender/ Bid Document No. \_\_\_\_\_)**

**EXCEPTION AND DEVIATION STATEMENT**

NAME OF WORK:

BID DOCUMENT NO. :

Bidder may stipulate exceptions and deviations to Bid Document, if considered unavoidable as per the following format:

SL. NO.	CLAUSE NO.	PAGE NO. OF TENDER DOCUMENT	DEVIATION	REASONS FOR DEVIATION

Any exceptions / deviations brought out by us elsewhere in our Offer shall not be considered as valid and should be ignored by the Owner.

NAME OF BIDDER: \_\_\_\_\_

SIGNATURE OF BIDDER: \_\_\_\_\_ & SEAL





**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

**F-7  
CERTIFICATE**

To,  
M/s Maharashtra Natural Gas  
Pride Purple Coronet,  
301-302, Second Floor,  
Baner Rd, Above Bata Showroom,  
Baner, Pune – 411045


Dear Sir,

If, we become a successful bidder and pursuant to the provisions of the Bidding Documents and contract is awarded to us the following certificate shall be automatically enforceable:

"We agree and acknowledge that the Employer is entering into the Agreement solely on its own behalf and not on behalf of any other person or entity. In particular, it is expressly understood and agreed that the Government of India is not a party to the Agreement and has no liabilities, obligations or rights there under. It is expressly understood and agreed that the Employer is authorized to enter into Agreement, solely on its own behalf under the applicable laws of India. We expressly agree, acknowledge and understand that the Employer is not an agent, representative or delegate of the Government of India. It is further understood and agreed that the Government of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the Agreement. Accordingly, we hereby expressly waive, release and forego any and all actions or claims, including cross claims, VIP claims or counterclaims against the Government of India arising out of the Agreement and covenants not to sue to Government of India as to any manner, claim, cause of action or things whatsoever arising of or under the Agreement."

---

**(SEAL AND SIGNATURE OF BIDDER)**

 <p><b>MAHARASHTRA NATURAL GAS LIMITED</b></p>	<p><b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b></p> <p><b>Bid No.: MNGL/CP/2022-23/219</b></p>
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**F-8**

**DETAILS OF SIMILAR WORK DONE DURING PAST FIVE YEARS**

Description of the work	Location of the work	Full Post Address and Phone nos. of Client & Name of Officer-in charge	Value of Contract	Date of Commencement of work	Scheduled Completion Time (Months)	Date of Actual Completion	Reasons for delay in project completion, if any

Note: Copies of letter of award and completion certificate for the above works to be enclosed.

The work completed earlier than three years need not be indicated here. The list of work, not of similar nature need not be indicated here.

Failing to comply aforementioned instructions may lead to rejection of bid.

---

**(SEAL AND SIGNATURE OF BIDDER)**



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
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CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

**F-9  
PRESENT COMMITMENTS OF THE  
BIDDER**

Full Postal Address and phone nos. of Client & Name of Officer-in- Charge	Description of Work	Date of Commencement of Work	Scheduled Completion Period	%Age Completion as on Date	Expected Date of Completion	Remarks

Note: This list must be a full list of all type of works in hand

---

**(SEAL AND SIGNATURE OF BIDDER)**



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
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**Bid No.: MNGL/CP/2022-23/219**

**Sheet 1 of 2**

**F-10**

**PROFORMA OF BANK GUARANTEE FOR CONTRACT PERFORMANCE SECURITY  
(ON NON-JUDICIAL PAPER OF APPROPRIATE VALUE)**

To,  
M/s Maharashtra Natural Gas  
Pride Purple Coronet,  
301-302, Second Floor,  
Baner Rd, Above Bata Showroom,  
Baner, Pune – 411045

Dear Sir,

M/s \_\_\_\_\_ have been awarded the work of  
\_\_\_\_\_ for Maharashtra Natural Gas Limited, Pune  
vide SO No. \_\_\_\_\_ dated \_\_\_\_\_.

The Contracts conditions provide that the CONTRACTOR shall pay a sum of Rs. \_\_\_\_\_  
(Rupees \_\_\_\_\_) as full Contract Performance Guarantee in the form therein  
mentioned. The form of payment of Contract Performance Guarantee includes guarantee  
executed by Nationalized Bank, undertaking full responsibility to indemnify Maharashtra  
Natural Gas Limited, in case of default.

The said \_\_\_\_\_ has  
approached us and at their request and in consideration of the premises we having our  
office at \_\_\_\_\_

\_\_\_\_\_ have agreed to give such guarantee as  
hereinafter mentioned.

1. We \_\_\_\_\_ hereby undertake and  
agree with you that if default shall be made by M/s \_\_\_\_\_  
in performing any of the terms and conditions of the tender or in payment of any  
money payable to Maharashtra Natural Gas Limited we shall on demand pay  
without any recourse to the contractor to you in such manner as you may direct  
the said amount of Rupees \_\_\_\_\_ only or such portion thereof not  
exceeding the said sum as you may from time to time require.
2. You will have the full liberty without reference to us and without affecting this  
guarantee, postpone for any time or from time to time the exercise of any of the  
powers and rights conferred on you under the contract with the said \_\_\_\_\_  
\_\_\_\_\_ and to enforce or to forbear from endorsing  
any powers or rights or by reason of time being given to the  
\_\_\_\_\_ which under law relating to the sureties would  
but for provision have the effect of releasing us.
3. Your right to recover the said sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_)  
from us in manner aforesaid will not be affected or suspended by reason of the  
fact that any dispute or disputes have been raised by the said M/s \_\_\_\_\_ and/ or  
that any dispute or disputes are pending before any officer, tribunal or court.



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
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**Sheet 2 of 2**


4. The guarantee herein contained shall not be determined or affected by the liquidation or winding up dissolution or changes of constitution or insolvency of the said but shall in all respects and for all purposes be binding and operative until payment of all money due to you in respect of such liabilities is paid.
5. This guarantee shall be irrevocable and shall remain valid up to-----If any further extension of this guarantee is required, the same shall be extended to such required period on receiving instruction from M/s -----on whose behalf this guarantee is issued.
6. The Bank Guarantee's payment of an amount is payable on demand and in any case within 48 hours of the presentation of the letter of invocation of Bank Guarantee. Any dispute arising out of or in relation to the said Bank Guarantee shall be subject to the jurisdiction of Pune or High Court of Mumbai.
7. We have power to issue this guarantee in your favour under Memorandum and Articles of Association and the undersigned has full power to do under the Power of Attorney dated  
\_\_\_\_\_granted to him by the Bank.

Yours faithfully,

-----Bank

By its Constituted Attorney

Signature of a person duly  
authorized to sign on behalf of  
the Bank.

 <p><b>MAHARASHTRA NATURAL GAS LIMITED</b></p>	<p><b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b></p> <p><b>Bid No.: MNGL/CP/2022-23/219</b></p>
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**F-11**

**PROPOSED SITE ORGANIZATION**

The BIDDER is to indicate here the proposed site organization he proposes to set up for execution of the work. It is understood that this will be augmented from time to time depending on the requirements for timely completion of work, as directed by Engineer-in-Charge. The BIDDER is also to furnish the Bio-data of Site-in-Charge and key personnel to be deployed at site.

---

**(SEAL AND SIGNATURE OF BIDDER)**



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
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**Bid No.: MNG/CP/2022-23/219**

**F-12**


**CONSTRUCTION SCHEDULE WITH BAR CHART**

Bidder shall submit Construction Schedule with Bar Chart for complete work covering all the following activities are indicative (not exhaustive)

- 1) Site establishment
- 2) Site Clearance
- 3) Earthwork in cutting and filling
- 4) Sand filling and stone soling
- 5) Brickwork in foundation
- 6) Brickwork in superstructure
- 7) RCC in foundation
- 8) RCC in superstructure
- 9) Compound Wall
- 10) Building Work
- 11) Kerb stone
- 12) Steel Work
- 13) Canopy
- 14) Installing
- 15) Commissioning, Testing

---

**(SEAL AND SIGNATURE OF  
BIDDER)**

 <p><b>MAHARASHTRA NATURAL GAS LIMITED</b></p>	<p><b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b></p> <p><b>Bid No.: MNGL/CP/2022-23/219</b></p>
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**F-13**


**CONFIRMATION REGARDING SCHEDULE OF LABOUR RATES**

We accept Schedule of Labour Rates attached as Annexure-IV to SCC and also confirm acceptance for using the same for analyzing rates for extra items as per Clause No. 60.0 of GCC.

---

**(SEAL AND SIGNATURE OF BIDDER)**



 <b>MAHARASHTRA NATURAL GAS LIMITED</b>	<b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b>  <b>Bid No.: MNGL/CP/2022-23/219</b>
--	--


**F-14**

**CONFIRMATION REGARDING SCHEDULE OF EQUIPMENT RATES**

We accept Schedule of Equipment Rates attached as Annexure-III to SCC and also confirm acceptance for using the same for analyzing rates for extra items as per Clause No. 60.0 of GCC.

---

**(SEAL AND SIGNATURE OF BIDDER)**

 <p><b>MAHARASHTRA NATURAL GAS LIMITED</b></p>	<p><b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b></p> <p><b>Bid No.: MNGL/CP/2022-23/219</b></p>
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**F-15**

**RATE FOR EXTENDED STAY COMPENSATION**

**Not Applicable**



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
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CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNG/CP/2022-23/219**

**F-16**

Format for No Claim Certificate  
[On the Letter-head of  
Contractor]

**NO CLAIM CERTIFICATE**

We, \_\_\_\_\_, a company incorporated under the laws of India, having  
its Registered Office at \_\_\_\_\_ and carrying on  
business  
under the name and style M/s. \_\_\_\_\_ were awarded the Contract by  
Maharashtra Natural Gas Ltd. in reference to Tender No. \_\_\_\_\_ dated \_\_\_\_\_

After completion of the above said Work under the contract, we have scrutinized all our claims,  
contentions, disputes, issues with the project officials and we hereby confirm that after adjusting all  
payments received by us against our R.A. Bills, our balance entitlement under the contract is to a  
sum of Rs. \_\_\_\_\_

(Rupees \_\_\_\_\_ only) as per our Final Bill dated ...  
towards full

and final settlement of all our claims, dues, issues and contentions from Maharashtra Natural Gas  
Ltd.


We confirm and declare that with the receipt of aforesaid monies, all our claims, dues, disputes,  
differences between M/s. \_\_\_\_\_ and  
Maharashtra Natural Gas Ltd. under and with reference to above said contract stands fully and  
finally settled.

We further absolve Maharashtra Natural Gas Ltd. from all liabilities present or future arising  
directly or indirectly out of the contract.

We further confirm that the present settlement has been arrived at after mutual negotiations and is  
freely and fairly entered into between the parties. There is no economic duress or any other  
compulsion on us in entering into this settlement.

**Signature with Seal of**

**Contractor Dated**

 <b>MAHARASHTRA NATURAL GAS LIMITED</b>	<b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b>  <b>Bid No.: MNGL/CP/2022-23/219</b>
--	--

**F-17**

**Real Time Gross Settlement (RTGS)/ National Electronic fundtransfer (NEFT) Mandate  
Form**

- 1. Vendor/customer Name:**
- 2. Vendor/customer Code:**
- 3. Vendor /customer Address:**
- 4. Vendor/customer e-mail id:**
- 5. Particulars of bank account**
  - a) Name of Bank:
  - b) Name of branch:
  - c) Branch code:
  - d) Address:
  - e) Telephone number:
  - f) Type of account (current/saving etc):
  - g) Account Number:
  - h) RTGS IFSC code of the bank branch:
  - i) NEFT IFSC code of the bank branch:
  - J) 9 digit MICR code:

We hereby authorize Maharashtra Natural Gas Limited to release any amount due to me/us in the bank account as mentioned above. I / We hereby declare that the particulars given above are correct and complete. If the transaction is delayed or lost because of incomplete or incorrect information, we would not hold the Maharashtra Natural Gas Limited responsible

-----

(Signature of vendor/ customer)


**BANK CERTIFICATE**

We certify that.....has an Account no .....  
with us and we confirm that the details given above are correct as per our records.

Bank stamp

Date

(Signature of authorized officer of bank)

 <p><b>MAHARASHTRA NATURAL GAS LIMITED</b></p>	<p><b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b></p> <p><b>Bid No.: MNG/CP/2022-23/219</b></p>
--	--

F-18

**UNDERTAKING ON LETTERHEAD**

To,  
M/s Maharashtra Natural Gas Limited,  
Pride Purple Coronet, 2<sup>nd</sup> Floor,  
Baner Road, Baner,  
Pune – 411045

Sub:

Tender No:

Dear Sir,

We have read the clause regarding Provisions for Procurement from a Bidder which shares a land border with India, we certify that, bidder M/s \_\_\_\_\_ (Name of Bidder) is:

- (i) Not from such a country [                      ]
- (ii) If from such a country, has been registered [                      ]  
With the Competent Authority.  
(Evidence of valid registration by the  
Competent Authority shall be attached)

***(Bidder to tick appropriate option above)***

We hereby certify that bidder M/s \_\_\_\_\_ (***Name of bidder***) fulfils all requirements in this regard and is eligible to be considered against the tender.

Place: {Signature of Authorised Signatory of Bidder}  
Date: Name:  
Designation:  
Seal:



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

**FORMAT FOR TENDER ACCEPTANCE LETTER**

(To be given on Company Letter Head)

Date:

To,  
M/s Maharashtra Natural Gas Limited  
Pride Purple Coronet, 2<sup>nd</sup> Floor,  
Baner Raod, Baner, Pune – 411045

Sub: Acceptance of Terms & Conditions of Tender.

Tender Reference No: \_\_\_\_\_

Name of Tender / Work: -

Dear Sir / Madam,

1. I/ We have downloaded / obtained the tender document(s) for the above mentioned  
'Tender/Work' from the web site(s) namely:

\_\_\_\_\_ as per your advertisement, given in the above mentioned website(s).

2. I / We hereby certify that I / we have read the entire terms and conditions of the tender documents from Page No. \_\_\_\_\_ to \_\_\_\_\_ (including all documents like annexure(s), schedule(s), etc.), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.

3. The corrigendum(s) issued from time to time by your department / organization too have also been taken into consideration, while submitting this acceptance letter.

4. I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety.

5. I / We do hereby declare that our Firm has not been blacklisted/ debarred/ terminated/ banned by any Govt. Department/Public sector undertaking.

6. I / We certify that all information furnished by our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/ organization shall without giving any notice or reason thereof summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.

Yours Faithfully,  
(Signature of the Bidder, with Official Seal)



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

## **COMMERCIAL QUESTIONNAIRE**

**{Annexure – III to Instruction to Bidder (ITB)}**



**MAHARASHTRA  
NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out  
Civil, Structural & Electrical works for construction of  
CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

### COMMERCIAL QUESTIONNAIRE

Note:

- 1) The Bidder shall submit reply to each query.
- 2) The bidder's reply/ confirmation as furnished in the Commercial Questionnaire (CQ) shall supercede the stipulation mentioned elsewhere in the Bid.

Sl. No.	MNGL's Query	Bidder's Reply/ Confirmation
1.	Confirm that your Bid is valid for 4(four) month from the last date of submission of Bid.	
2.	Confirm that all details in unpriced part have been submitted. Bidding Document and drawings, signed and stamped on each page shall be submitted in original.	
3.	Confirm that the following documents are submitted with Part-I :	
i)	All documents in relevant Section as per CHECK LIST	
ii)	Schedule of Rates/ Prices without specifying the rates / prices are submitted in unpriced part, exactly as per the priced portion submitted in Part-II. In case some of items have not been quoted, such items should be identified in blank price format.	
iii)	Addendum duly signed and stamped on each page as a token of acceptance (applicable if issued).	
iv)	Confirm Acceptance of Labour rates submitted as per Annexure-IV of SCC.	
4.	Confirm that price has been submitted in 1 ORIGINAL only in a separately sealed envelope super scribing "PRICE PART"	
5.	Rates/ amount must be filled in format for 'Schedule of Rates' enclosed as part of Bidding Document. If quoted in separate typed sheets and any variation in item description, unit or quantity is noticed, the bid is liable to be rejected. In any case, Bidder shall be presumed to have quoted against the tendered description of work and the same shall be binding on the Bidder. Please confirm.	
6.	Confirm that deviation/ terms & conditions are not mentioned in the price part. In case any terms and condition is mentioned in the price part, the same shall be treated as null and void.	
7.	Confirm that correction fluid is not used in the price part. (In case of any correction, the same shall be signed and stamped by authorized signatory).	
8.	Confirm that you have studied complete Bidding Document including Technical and commercial part and your Bid is in accordance with the requirements of the Bidding Document.	
9.	Confirm your compliance to total Scope of Work mentioned in the Bidding Document.	
10.	Confirm your acceptance for 'Scope of Supply' as mentioned in Bidding Document.	
11.	Confirm your compliance to critical stipulations of tender document as mentioned below	
i	Defect Liability Period clause no. 80.0 of GCC	
ii	Contract Performance Security – clause no. 24.0 of GCC	
iii	Schedule of Rates – clause no. 87.0 of GCC	






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<b>Sl. No.</b>	<b>MNGL's Query</b>	<b>Bidder's Reply/ Confirmation</b>
iv	Arbitration – clause no. 107.0 of GCC	
v	Termination – Clause nos. 32.0 A, B, C & D of GCC	
vi	Terms of Payment – as per tender document	
vii	Price Reduction Schedule – Clause no. 27 of GCC	
12.	Confirm your acceptance for 'Time Schedule' as mentioned in the Bidding Document	
13.	Confirm that your quoted price includes following taxes/ duties, insurance etc.	
i)	All taxes, charges and duties assessed or levied in respect of profits earned or income receivable by the Contractor by reason of this Contract.	
ii)	All taxes, duties as per applicable for this WORK in accordance with the provision of General Conditions of Contract and Special Conditions of Contract.	
iii)	All types of insurance as per the provisions of General Conditions of Contract and Special Conditions of Contract.	
14.	Confirm that you have proposed adequate project/ site organization with qualified supervisory personnel having requisite experience including personnel responsible for safety, planning stores, QA/ QC etc.	
15.	Confirm that all costs resulting from safe execution of WORK, such as safety induction, use of protective clothing, safety glasses and helmet, safety precaution taken during monsoon, or any other safety measures to be undertaken by the Contractor for execution of work are included in the quoted rates.	
16.	Confirm the following :	
i)	The planning schedule, manpower estimates, construction equipment deployment schedule etc., submitted by the bidder with his Bid, are indicative and shall not be basis for extra compensation in case actual needs are higher.	
ii)	Detailed planning schedule developed by CONTRACTOR after contract award may be subject to fluctuations depending upon actual progress of the project and available work front.	
iii)	Co-ordination and making available by Contractor of all staff, manpower, construction equipment, tools, cranes, etc. and materials are required for a timely completion of all WORK as per Owner's construction and priority schedule and in accordance with the available work front are included in the quoted rates.	
iv)	Bio-Data of Key Personnel(s), such as Project Manager, Construction Manager, Lead Engineer for all relevant categories have been submitted in your Bid.	
17.	Please confirm that the deployment schedule of supervisory personnel(s) & deployment schedule of construction equipment shall be reviewed and firmed up after award of work	
18.	Please confirm the rate schedule of extra works and recovery rate of equipment as per Annexure – III & IV to SCC Technical is acceptable to you.	

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Sl. No.	MNGL's Query	Bidder's Reply/ Confirmation
	<p>Note: Please note that Schedule of Rates/ Prices embodied in the Bidding Document is deemed to include all activities of work specified under Scope of Work, Scope of Supply, technical specifications, Conditions of Contract, drawings or any other document forming part of Bidding Document, irrespective of whether such activities of work are specified in the Schedule of Rates/ Prices or not.</p>	

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(STAMP & SIGNATURE OF BIDDER)

 <p><b>MAHARASHTRA NATURAL GAS LIMITED</b></p>	<p><b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b></p> <p><b>Bid No.: MNG/CP/2022-23/219</b></p>
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## **CHECK LIST**

{Annexure – IV to Instruction to Bidder (ITB)}



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### CHECK LIST FOR SUBMISSION OF BID

Bidder is requested to fill this check list and ensure that all details/ documents have been furnished as called for in the Bidding Document along with duly filled in, signed & stamped **check list with each copy of the “Unpriced Part”** of his bid.

### OTHER ESSENTIAL DOCUMENTS REQUIRED (to be submitted by the bidder)

SI No.	Tender Clause/Item	Documents Required	Submitted (Yes/No)	Reference in Offer (Refer Page No.)
1.	Letter of Submission	As given in Part-A of the tender document		
2.	EMD/ BID GUARANTEE/ BID SECURITY	As per Tender Proforma F-4 of ITB		
3.	Past Similar work done during last five years	As per Format : F-8 of ITB		
4.	Present Commitments	As per Format : F-9 of ITB		
5.	PF & ESIC Registration Certificate	Relevant documents		
6.	Goods & Service Tax Registration Certificate	Relevant documents		
7.	Power of Attorney in favour of the person who has signed the bid on stamp paper of appropriate value.	Valid power of Attorney		
8.	Partnership Deed in case of partnership firm and Article of Association in case of limited company.	Relevant documents		
9.	Deployment List of Supervisory personnel.	As per tender		
10.	A Tentative Quality Assurance Plan in line with Spec. and Format	As per SCC (Technical)		
11.	Site Organization Chart	As per Format - F-11 of ITB		
12.	Bio-Data of key supervisory personnel such as Project Manager, Construction Manager, QA / QC Manager, lead engineer, site engineer etc.:	Bio-data of all key supervisory personal to be deployed		
13.	An overall schedule in the form of Bar Chart	As per format-12		
14.	Schedule of Labour Rates	As per Format - F-13 & Annexure-IV of SCC(Technical)		
15.	Schedule of equipment rates, Rate for Extra work and recovery rate of equipment.	As per Format – F-14 & Annexure-III of SCC(Technical)		



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<b>SI No.</b>	<b>Tender Clause/Item</b>	<b>Documents Required</b>	<b>Submitted (Yes/No)</b>	<b>Reference in Offer (Refer Page No.)</b>
16.	Health Safety and Environment (HSE) Policy and HSE Manual.	As per SCC (Technical)		
17.	A copy of SOR (without prices) duly signed & stamped as per SOR Format	-		
18.	Original copy of Bidding Document & Drawings along with Addendum, if any, has been submitted along with offer, duly signed and stamped on each page			
19.	No Deviation Confirmation	As per Format - F-6 of ITB		
20.	Reply to commercial questionnaire, with Bidder's reply/ confirmation	As per Annexure-III to ITB		

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**(STAMP & SIGNATURE OF BIDDER)**




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## **PART-C**

### **GENERAL CONDITIONS OF CONTRACT (GCC-WORKS)**

 <p><b>MAHARASHTRA NATURAL GAS LIMITED</b></p>	<p><b>Tender for appointment of an agency for carrying out Civil, Structural &amp; Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.</b></p> <p><b>Bid No.: MNGL/CP/2022-23/219</b></p>
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### **General Conditions of Contract**

#### **Section- I. Definitions**

##### **1. Definition of Terms:**

- 1.1 In this CONTRACT (as here-in-after defined) the following words and expressions shall have the meanings hereby assigned to them except where the context otherwise required.
- 1.1.1 The PURCHASER/OWNER/EMPLOYER/COMPANY/MNGL means MAHARASHTRA NATURAL GAS LIMITED, incorporated under the Company's act 1956 and having its Registered office at Pune and includes its successors and assigns.
- 1.1.2 The "CONTRACTOR" means the person or the persons, firm or Company or corporation whose tender has been accepted by the EMPLOYER and includes the CONTRACTOR's legal Representatives his successors and permitted assigns.
- 1.1.3 The ENGINEER/ENGINEER-IN-CHARGE" shall mean the person designated from time to time by the MNGL and shall include those who are expressly authorized by him to act for and on his behalf for operation of this CONTRACT.
- 1.1.4 The "WORK" shall mean and include all items and things to be supplied/ done and services and activities to be performed by the CONTRACTOR in pursuant to and in accordance with CONTRACT or part thereof as the case may be and shall include all extra, additional, altered or substituted works as required for purpose of the CONTRACT.
- 1.1.5 The "PERMANENT WORK" means and includes works which will be incorporated in and form a part of the work to be handed over to the EMPLOYER by the CONTRACTOR on completion of the CONTRACT.
- 1.1.6 "CONSTRUCTION EQUIPMENT" means all appliances/equipment and things whatsoever nature for the use in or for the execution, completion, operation, or maintenance of the work or temporary works (as hereinafter defined) but does not include materials or other things intended to form or to be incorporated into the WORK, or camping facilities.
- 1.1.7 "CONTRACT DOCUMENTS" means collectively the Tender Documents, Designs, Drawings, Specification, Schedule of Quantities and Rates, Letter of Acceptance and agreed variations if any, and such other documents constituting the tender and acceptance thereof.
- 1.1.8 The "SUB-CONTRACTOR" means any person or firm or Company (other than the CONTRACTOR) to whom any part of the work has been entrusted by the CONTRACTOR, with the written consent of the ENGINEER-IN-CHARGE, and the legal representatives, successors and permitted assigns of such person, firm or company.
- 1.1.9 The "CONTRACT" shall mean the Agreement between the EMPLOYER and the CONTRACTOR for the execution of the works including therein all contract documents.



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- 1.1.10 The "SPECIFICATION" shall mean all directions the various technical specifications, provisions attached and referred to the Tender Documents which pertain to the method and manner of performing the work or works to the quantities and qualities of the work or works and the materials to be furnished under the CONTRACT for the work or works, as may be amplified or modified by the MNGL or ENGINEER-IN-CHARGE during the performance of CONTRACT in order to provide the unforeseen conditions or in the best interests of the work or works. It shall also include the latest edition of relevant Standard Specifications including all addenda/corrigenda published before entering into CONTRACT.
- 1.1.11 The "DRAWINGS" shall include maps, plans and tracings or prints or sketches thereof with any modifications approved in writing by the ENGINEER-IN-CHARGE and such other drawing as may, from time to time, be furnished or approved in writing by the ENGINEER-IN-CHARGE.
- 1.1.12 The "TENDER" means the proposal along with supporting documents submitted by the CONTRACTOR for consideration by the EMPLOYER.
- 1.1.13 The "CHANGE ORDER" means an order given in writing by the ENGINEER-IN-CHARGE to effect additions to or deletion from and alteration in the works.
- 1.1.14 The "COMPLETION CERTIFICATE" shall mean the certificate to be issued by the ENGINEER-IN-CHARGE when the works have been completed entirely in accordance with CONTRACT DOCUMENT to his satisfaction.
- 1.1.15 The "FINAL CERTIFICATE" in relation to a work means the certificate regarding the satisfactory compliance of various provision of the CONTRACT by the CONTRACTOR issued by the ENGINEER-IN-CHARGE/ EMPLOYER after the period of liability is over.
- 1.1.16 "DEFECT LIABILITY PERIOD" in relation to a work means the specified period from the date of COMPLETION CERTIFICATE up to the date of issue of FINAL CERTIFICATE during which the CONTRACTOR stands responsible for rectifying all defects that may appear in the works executed by the CONTRACTOR in pursuance of the CONTRACT and includes warranties against Manufacturing/Fabrication/ Erection/Construction defects covering all materials plants, equipment, components, and the like supplied by the CONTRACTOR, works executed against workmanship defects.
- 1.1.17 The "APPOINTING AUTHORITY" for the purpose of arbitration shall be the MANAGING DIRECTOR or any other person so designated by the EMPLOYER.
- 1.1.18 "TEMPORARY WORKS" shall mean all temporary works of every kind required in or about the execution, completion or maintenance of works.
- 1.1.19 "PLANS" shall mean all maps, sketches and layouts as are incorporated in the CONTRACT in order to define broadly the scope and specifications of the work or works, and all reproductions thereof.
- 1.1.20 "SITE" shall mean the lands and other places on, under, in or through which the permanent works are to be carried out and any other lands or places provided by the EMPLOYER for the purpose of the CONTRACT.



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- 1.1.21 "NOTICE IN WRITING OR WRITTEN NOTICE" shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received by the addressee) by registered post to the latest known private or business address or registered office of the addressee and shall be deemed to have been received in the ordinary course of post it would have been delivered.
- 1.1.22 "APPROVED" shall mean approved in writing including subsequent written confirmation of previous verbal approval and "APPROVAL" means approval in writing including as aforesaid.
- 1.1.23 "LETTER OF INTENT/FAX OF INTENT/SERVICE ORDER" shall mean intimation by a Fax/Letter to Tenderer(s) that the tender has been accepted in accordance with the provisions contained in the letter.
- 1.1.24 "DAY" means a day of 24 hours from midnight to midnight irrespective of the number of hours worked in that day.
- 1.1.25 "WORKING DAY" means any day which is not declared to be holiday or rest day by the EMPLOYER.
- 1.1.26 "WEEK" means a period of any consecutive seven days.
- 1.1.27 "METRIC SYSTEM" - All technical documents regarding the construction of works are given in the metric system and all work in the project should be carried out according to the metric system. All documents concerning the work shall also be maintained in the metric system.
- 1.1.28 "VALUE OF CONTRACT" or "TOTAL CONTRACT PRICE" shall mean the sum accepted or the sum calculated in accordance with the prices accepted in tender and/or the CONTRACT rates as payable to the CONTRACTOR for the entire execution and full completion of the work, including change order.
- 1.1.29 "LANGUAGE FOR DRAWINGS AND INSTRUCTION" All the drawings, titles, notes, instruction, dimensions, etc. shall be in English Language.
- 1.1.30 "MOBILIZATION" shall mean establishment of sufficiently adequate infrastructure by the CONTRACTOR at "SITE" comprising of construction equipments, aids, tools tackles including setting of site offices with facilities such as power, water, communication etc. establishing manpower organization comprising of Resident Engineers, Supervising personnel and an adequate strength of skilled, semi-skilled and un-skilled workers, who with the so established infrastructure shall be in a position to commence execution of work at site(s), in accordance with the agreed Time Schedule of Completion of Work. "MOBILISATION" shall be considered to have been achieved, if the CONTRACTOR is able to establish infrastructure as per Time Schedule, where so warranted in accordance with agreed schedule of work implementation to the satisfaction of ENGINEER-IN-CHARGE/ EMPLOYER.
- 1.1.31 "COMMISSIONING" shall mean pressing into service of the system including the plant(s), equipment(s), vessel(s), pipeline, machinery (ies), or any other section or sub-section of installation(s) pertaining to the work of the CONTRACTOR after successful testing and trial runs of the same.
- "COMMISSIONING" can be either for a completed system or a part of system of



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a combination of systems or sub-systems and can be performed in any sequence as desired by EMPLOYER and in a manner established to be made suited according to availability of pre-requisites. Any such readjustments made by EMPLOYER in performance of "COMMISSIONING" activity will not be construed to be violating CONTRACT provisions and CONTRACTOR shall be deemed to have provided for the same.

**Section-II General Information**

**2. General Information**

2.1 a) Location of Site: The proposed location of Project site is defined in the Special Conditions of Contract.

b) Access by Road: CONTRACTOR, if necessary, shall build other temporary access roads to the actual site of construction for his own work at his own cost. The CONTRACTOR shall be required to permit the use of the roads so constructed by him for vehicles of any other parties who may be engaged on the project site. The CONTRACTOR shall also facilitate the construction of the permanent roads should the construction there of start while he is engaged on this work. He shall make allowance in his tender for any inconvenience he anticipates on such account.

Non-availability of access roads, railway siding and railway wagons for the use of the CONTRACTOR shall in no case condone any delay in the execution of WORK nor be the cause for any claim for compensation against the EMPLOYER.

2.2 Scope of Work: The scope of WORK is defined in the Technical Part of the tender document. The CONTRACTOR shall provide all necessary materials, equipment, labour etc. for the execution and maintenance of the WORK till completion unless otherwise mentioned in the Tender Document.

2.3 Water Supply: Contractor will have to make his own arrangements for supply of water to his labour camps and for works. All pumping installations, pipe network and distribution system will have to be carried out by the Contractor at his own risk and cost.

Alternatively the Employer at his discretion may endeavor to provide water to the Contractor at the Employer's source of supply provided the Contractor makes his own arrangement for the water meter which shall be in custody of the Employer and other pipe networks from source of supply and such distribution pipe network shall have prior approval of the Engineer-in-Charge so as not to interfere with the layout and progress of the other construction works. In such case, the rate for water shall be deducted from the running account bills.

However, the Employer does not guarantee the supply of water and this does not relieve the Contractor of his responsibility in making his own arrangement and for the timely completion of the various works as stipulated.

2.4 Power Supply:

2.4.1 Subject to availability, EMPLOYER will supply power at 400/440 V at only one point at the nearest sub-station, from where the CONTRACTOR will make his own arrangement for temporary distribution. The point of supply will not be more than 500 m away from the CONTRACTOR'S premises. All the works will be done as





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- per the applicable regulations and passed by the ENGINEER-IN-CHARGE. The temporary line will be removed forthwith after the completion of work or if there is any hindrance caused to the other works due to the alignment of these lines, the CONTRACTOR will re-route or remove the temporary lines at his own cost. The CONTRACTOR at his cost will also provide suitable electric meters, fuses, switches, etc. for purposes of payment to the EMPLOYER which should be in the custody and control of the EMPLOYER. The cost of power supply shall be payable to the EMPLOYER every month for Construction Works power which would be deducted from the running account bills. The EMPLOYER shall not, however, guarantee the supply of electricity nor have any liability in respect thereof. No claim for compensation for any failure or short supply of electricity will be admissible.
- 2.4.2 It shall be the responsibility of the CONTRACTOR to provide and maintain the complete installation on the load side of the supply with due regard to safety requirement at site. All cabling, equipment, installations etc. shall comply in all respects with the latest statutory requirements and safety provisions i.e., as per the Central/State Electricity Acts and Rules etc. The CONTRACTOR will ensure that his equipment and Electrical Wiring etc., are installed, modified, maintained by a licensed Electrician/Supervisor. A test certificate is to be produced to the ENGINEER-IN-CHARGE for his approval, before power is made available.
- 2.4.3 At all times, IEA regulations shall be followed failing which the EMPLOYER has a right to disconnect the power supply without any reference to the CONTRACTOR. No claim shall be entertained for such disconnection by the ENGINEER-IN-CHARGE. Power supply will be reconnected only after production of fresh certificate from authorized electrical supervisors.
- 2.4.4 The EMPLOYER is not liable for any loss or damage to the CONTRACTOR's equipment as a result of variation in voltage or frequency or interruption in power supply or other loss to the CONTRACTOR arising there from.
- 2.4.5 The CONTRACTOR shall ensure that the Electrical equipment installed by him are such that average power factors does not fall below 0.90 at his premises. In case power factor falls below 0.90 in any month, he will reimburse to the EMPLOYER at the penal rate determined by the EMPLOYER for all units consumed during the month.
- 2.4.6 The power supply required for CONTRACTOR's colony near the plant site will be determined by the EMPLOYER and shall be as per State Electricity Board's Rules and other statutory provisions applicable for such installations from time to time. In case of power supply to CONTRACTOR's colony, the power will be made available at a single point and the CONTRACTOR shall make his own arrangement at his own cost for distribution to the occupants of the colony as per Electricity Rules and Acts. The site and colony shall be sufficiently illuminated to avoid accidents.
- 2.4.7 The CONTRACTOR will have to provide and install his own lights and power meters which will be governed as per Central/State Government Electricity Rules. The meters shall be sealed by the EMPLOYER.
- 2.4.8 In case of damage of any of the EMPLOYER's equipment on account of fault, intentional or unintentional on the part of the CONTRACTOR, the EMPLOYER reserves the right to recover the cost of such damage from the CONTRACTOR's





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- bill. Cost of HRC Fuses replaced at the EMPLOYER's terminals due to any fault in the CONTRACTOR's installation shall be to CONTRACTOR's account at the rates decided by the ENGINEER- IN-CHARGE.
- 2.4.9 Only motors up to 3 HP will be allowed to be started direct on line. For motors above 3 HP and up to 100 HP a suitable Starting device approved by the ENGINEER- IN- CHARGE shall be provided by the CONTRACTOR. For motors above 100 HP slip ring induction motors with suitable starting devices as approved by the ENGINEER- IN- CHARGE shall be provided by the CONTRACTOR.
- 2.4.10 The CONTRACTOR shall ensure at his cost that all electrical lines and equipment and all installations are approved by the State Electricity Inspector before power can be supplied to the EMPLOYER.
- 2.4.11 The total requirement of power shall be indicated by the tenderer along with his tender.
- 2.5 Land for Contractor's Field Office, Godown and Workshop: The EMPLOYER will, at his own discretion and convenience and for the duration of the execution of the work make available near the site, land for construction of CONTRACTOR's Temporary Field Office, godowns workshops and assembly yard required for the execution of the CONTRACT. The CONTRACTOR shall at his own cost construct all these temporary buildings and provide suitable water supply and sanitary arrangement and get the same approved by the ENGINEER-IN-CHARGE.

On completion of the works undertaken by the CONTRACTOR, he shall remove all temporary works erected by him and have the SITE cleaned as directed by ENGINEER- IN-CHARGE. If the CONTRACTOR shall fail to comply with these requirements, the ENGINEER-IN-CHARGE may at the expenses of the CONTRACTOR remove such surplus, and rubbish materials and dispose off the same as he deems fit and get the site cleared as aforesaid; and CONTRACTOR shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such surplus materials disposed off as aforesaid. But the EMPLOYER reserves the right to ask the CONTRACTOR any time during the pendency of the CONTRACT to vacate the land by giving 7 days notice on security reasons or on national interest or otherwise. Rent may be charged for the land so occupied from contractor by the Employer.

The CONTRACTOR shall put up temporary structures as required by them for their office, fabrication shop and construction stores only in the area allocated to them on the project site by the EMPLOYER or his authorized representative. No tea stalls/canteens should be put up or allowed to be put up by any CONTRACTOR in the allotted land or complex area without written permission of the EMPLOYER.

No unauthorized buildings, constructions or structures should be put up by the CONTRACTOR anywhere on the project site.

For uninterrupted fabrication work, the CONTRACTOR shall put up temporary covered structures at his cost within Area in the location allocated to them in the project site by the EMPLOYER or his authorized representative.

No person except for authorized watchman shall be allowed to stay in the plant area/CONTRACTOR's area after completion of the day's job without prior written permission from ENGINEER-IN-CHARGE.



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- 2.6 Land for Residential Accommodation:-: No Land shall be made available for residential accommodation for staff and labour of CONTRACTOR.

**Section-III. General Instructions to Tenderers**

**3. Submission of Tender:**


- 3.1 TENDER must be submitted without making any additions, alterations, and as per details given in other clauses hereunder. The requisite details shall be filled in by the TENDERER at space provided under "Submission of Tender at the beginning of GCC of Tender Document. The rate shall be filled only in the schedule given in this Tender Document.
- 3.2 Addenda/Corrigenda to this Tender Document, if issued, must be signed, submitted along with the Tender Document. The tenderer should write clearly the revised quantities in Schedule of Rates of Tender Document and should price the WORK based on revised quantities when amendments of quantities are issued in addenda.
- 3.3 Covering letter along with its enclosures accompanying the Tender Document and all further correspondence shall be submitted in duplicate.
- 3.4 Tenderers are advised to submit quotations based strictly on the terms and conditions and specifications contained in the Tender Documents and not to stipulate any deviations.
- 3.5 Tenders should always be placed in double sealed covers, super scribing ["QUOTATION DO NOT OPEN" Tender for \_\_\_\_\_ Project of Maharashtra Natural Gas Limited due for opening on \_\_\_\_\_]. The *Full Name, Address and Telegraphic Address, Fax No. of the Tenderers* shall be written on the bottom left hand corner of the sealed cover.

**4. Documents:**

**4.1 General:**

The tenders as submitted will consist of the following:

- i) Complete set of Tender Documents (Original) as sold duly filled in and signed by the tenderer as prescribed in different clauses of the Tender Documents.
- ii) Earnest money in the manner specified in Clause 6 hereof.
- iii) Power of Attorney or a true copy thereof duly attested by a Gazetted Officer in case an authorized representative has signed the tender, as required by Clause 14 hereof.
- iv) Information regarding tenderers in the proforma enclosed.
- v) Details of work of similar type and magnitude carried out by the Tenderer in the proforma provided in the tender document.
- vi) Organization chart giving details of field management at site, the tenderer proposes to have for this job.
- vii) Details of construction plant and equipments available with the tenderer for using in this work.
- viii) Solvency Certificate from Scheduled Bank to prove the financial ability to carry out the work tendered for.
- ix) Latest Balance Sheet and Profit & Loss Account duly audited.

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- x) Details of present commitment as per proforma enclosed to tender.
  - xi) Data required regarding SUB-CONTRACTOR(s)/ Supplier/ Manufacturers and other technical information the tenderer wish to furnish.
  - xii) Provident fund registration certificate
  - xiii) List showing all enclosures to tender.
- 4.2 All pages are to be Initiated: All signatures in Tender Documents shall be dated, as well as, all the pages of all sections of Tender Documents shall be initialed at the lower right hand corner and signed wherever required in the tender papers by the TENDERER or by a person holding power of attorney authorizing him to sign on behalf of the tenderer before submission of tender.
- 4.3 Rates to be in Figures and Words: The tender should quote in English both in figures as well as in words the rates and amounts tendered by him in the Schedule of Rates of Tender submitted by the CONTRACTOR for each item and in such a way that interpolation is not possible. The amount for each item should be worked out and entered and requisite total given of all items, both in figures and in words. The tendered amount for the work shall be entered in the tender and duly signed by the Tenderer.
- If some discrepancies are found between the RATES in FIGURES and WORDS or the AMOUNT shown in the tender, the following procedure shall be followed:
- a) When there is difference between the rates in figures and words, the rate which corresponds to the amount worked out by the tenderer shall be taken as correct.
  - b) When the rate quoted by the tenderer in figures and words tally but the amount is incorrect the rate quoted by the tenderer shall be taken as correct.
  - c) When it is not possible to ascertain the correct rate by either of above methods, the rate quoted in words shall be taken as correct.
- 4.4 Corrections and Erasures: All correction(s) and alteration(s) in the entries of tender paper shall be signed in full by the TENDERER with date. No erasure or over writing is permissible.
- 4.5 Signature of Tenderer:
- 4.5.1 The TENDERER shall contain the name, residence and place of business of person or persons making the tender and shall be signed by the TENDERER with his usual signature. Partnership firms shall furnish the full names of all partners in the tender. It should be signed in the partnership's name by all the partners or by duly authorized representatives followed by the name and designation of the person signing. Tender by a corporation shall be signed by an authorized representative, and a Power of Attorney in that behalf shall accompany the tender. A copy of the constitution of the firm with names of all partners shall be furnished.
- 4.5.2 When a tenderer signs a tender in a language other than English, the total amount tendered should, in addition, be written in the same language. The signature should be attested by at least one witness.



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- 4.6 Witness: Witness and sureties shall be persons of status and property and their names, occupation and address shall be stated below their signature.
- 4.7 Details of Experience: The tenderer should furnish, along with his tender, details of previous experience in having successfully completed in the recent past works of this nature, together with the names of Employers, location of sites and value of contract,

date of commencement and completion of work, delays if any, reasons of delay and other details along with documentary evidence(s).

- 4.8 Liability of Government of India: It is expressly understood and agreed by and between Bidder or/Contractor and M/s Maharashtra Natural Gas Limited, and that M/s Maharashtra Natural Gas Limited, is entering into this agreement solely on its own behalf and not on behalf of any other person or entity. In particular, it is expressly understood and agreed that the Government of India is not a party to this agreement and has no liabilities, obligations or rights hereunder. It is expressly understood and agreed that M/s Maharashtra Natural Gas Limited is an independent legal entity with power and authority to enter into contracts solely on its own behalf under the applicable Laws of India and general principles of Contract Law. The Bidder/Contractor expressly agrees, acknowledges and understands that M/s Maharashtra Natural Gas Limited is not an agent, representative or delegate of the Government of India. It is further understood and agreed that the Government of India is not and shall not be liable for any acts, omissions, commissions, breaches or other wrongs arising out of the contract. Accordingly, Bidder/Contractor hereby expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Government of India arising out of this contract and covenants not to sue to Government of India as to any manner, claim, cause of action or thing whatsoever arising of or under this agreement.

**5. Transfer of Tender Documents:**

- 5.1 Transfer of Tender Documents purchased by one intending tenderer to another is not permissible.

**6. Earnest Money:**

- 6.1 The bidder must pay Earnest Money as given in the letter / notice inviting tenders and attach the official receipt with the tender failing which the tender is liable to be rejected and representatives of such tenderers will not be allowed to attend the tender opening. Earnest Money can be paid in Demand Drafts or Bank Guarantee or Banker's Cheque or Letter of Credit from any Indian scheduled bank or a branch of an International bank situated in India and registered with Reserve Bank of India as scheduled foreign bank.

The bid guarantee shall be submitted in the prescribed format.

Note: The Bank Guarantee so furnished by the tenderer shall be in the proforma prescribed by the EMPLOYER. No interest shall be paid by the EMPLOYER on the Earnest Money deposited by the tenderer. The Bank Guarantee furnished in lieu of Earnest Money shall be kept valid for a period of "SIX MONTHS" from the date of opening of tender.(TWO MONTHS beyond the bid due date).

The Earnest Money deposited by successful tenderer shall be forfeited if the



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Contractor fails to furnish the requisite Contract Performance Security as per clause 24 hereof and  
/or fails to start work within a period of 15 days or fails to execute the AGREEMENT within 15 days of the receipt by him of the Notification of Acceptance of Tender.

Note: The Earnest Money of the unsuccessful bidder will be returned by EMPLOYER, directly to the tenderer (s), after award of work or the tender is cancelled.

**Note :**

**The Indian / Domestic firms registered with NSIC / MSME, under its single point registration scheme are exempted from furnishing Tender Fee & Bid Security, provided they are registered for the items / work they intend to quote and subject to their enclosing with their bid a copy of latest and current registration certificate.**

**7 Validity:**

- 7.1 Tender submitted by tenderers shall remain valid for acceptance for a period of "4 MONTHS" from the date of opening of the tender. The tenderers shall not be entitled during the said period of 4 months, without the consent in writing of the EMPLOYER, to revoke or cancel his tender or to vary the tender given or any term thereof. In case of tender revoking or canceling his tender or varying any term in regard thereof without the consent of EMPLOYER in writing, the EMPLOYER shall forfeit Earnest Money paid by him along with tender.

**8 Addenda/Corrigenda**

- 8.1 Addenda/ Corrigenda to the Tender Documents will be issued in duplicate prior to the date of opening of the tenders to clarify documents or to reflect modification in design or CONTRACT terms.
- 8.2 Each addendum/ corrigendum issued will be issued in duplicate to each person or organization to whom set of Tender Documents has been issued. Recipient will retain tenderer's copy of each Addendum/Corrigendum and attach original copy duly signed along with his offer. All Addenda/Corrigenda issued shall become part of Tender Documents.

**9 Right of Employer to Accept or Reject Tender:**

- 9.1 The right to accept the tender will rest with the EMPLOYER. The EMPLOYER, however, does not bind himself to accept the lowest tender, and reserves to itself the authority to reject any or all the tenders received without assigning any reason whatsoever. At the option of the Employer, the work for which the tender had been invited, may be awarded to one Contractor or split between more than one bidders, in which case the award will be made for only that part of the work, in respect of which the bid has been accepted. The quoted rates should hold good for such eventualities.

Tenders in which any of the particulars and prescribed information are missing or are incomplete in any respect and/or the prescribed conditions are not fulfilled are liable to be rejected. The Tender containing uncalled for remarks or any additional conditions are liable to be rejected.



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Canvassing in connection with tenders is strictly prohibited and tenders submitted by the Tenderers who resort to canvassing will be liable to rejection.

**10 Time Schedule**

- 10.1 The WORK shall be executed strictly as per the TIME SCHEDULE specified in TENDER/CONTRACT Document. The period of construction given in Time Schedule includes the time required for mobilization as well as testing, rectifications if any, retesting and completion in all respects to the entire satisfaction of the ENGINEER-IN-CHARGE.
- 10.2 A joint programme of execution of the WORK will be prepared by the ENGINEER-IN-CHARGE and CONTRACTOR based on priority requirement of this project. This programme will take into account the time of completion mentioned in 10.1 above and the time allowed for the priority works by the ENGINEER-IN-CHARGE.
- 10.3 Monthly/Weekly construction programme will be drawn up by the ENGINEER-IN-CHARGE jointly with the CONTRACTOR, based on availability of work fronts and the joint construction programme as per 10.2 above. The CONTRACTOR shall scrupulously adhere to these targets / programmes by deploying adequate personnel, construction tools and tackles and he shall also supply himself all materials of his scope of supply in good time to achieve the targets / programmes. In all matters concerning the extent of targets set out in the weekly and monthly programmes and the degree of achievements the decision of the ENGINEER-IN-CHARGE will be final and binding on the CONTRACTOR.

**11 Tenderer's Responsibility**

- 11.1 The intending tenderers shall be deemed to have visited the SITE and familiarized submitting the tender. Non-familiarity with the site conditions will not be considered a reason either for extra claims or for not carrying out the works in strict conformity with the DRAWINGS and SPECIFICATIONS or for any delay in performance.

**12 Retired Government or Company Officers  
VOID**

**13 Signing of the Contract:**

- 13.1 The successful tenderer shall be required to execute an AGREEMENT in the proforma attached with TENDER DOCUMENT within 15 days of the receipt by him of the Notification of Acceptance of Tender. In the event of failure on the part of the successful tenderer to sign the AGREEMENT within the above stipulated period, the Earnest Money or his initial deposit will be forfeited and the acceptance of the tender shall be considered as cancelled.

**14 Field Management & Controlling/Coordinating Authority:**

- 14.1 The field management will be the responsibility of the ENGINEER-IN-CHARGE, who will be nominated by the EMPLOYER. The ENGINEER-IN-CHARGE may also authorize his representatives to assist in performing his duties and functions.





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- 14.2 The ENGINEER-IN-CHARGE shall coordinate the works of various agencies engaged at site to ensure minimum disruption of work carried out by different agencies. It shall be the responsibility of the CONTRACTOR to plan and execute the work strictly in accordance with site instructions to avoid hindrance to the work being executed by other agencies.

**15 Note to Schedule of Rates:**

- 15.1 The Schedule of Rates should be read in conjunction with all the other sections of the tender.
- 15.2 The tenderer shall be deemed to have studied the DRAWINGS, SPECIFICATIONS and details of work to be done within TIME SCHEDULE and to have acquainted himself of the condition prevailing at site.
- 15.3 Rates must be filled in the Schedule of Rates of original Tender Documents. If quoted in separate typed sheets no variation in item description or specification shall be accepted. Any exceptions taken by the tenderer to the Schedule of Rates shall be brought out in the terms and conditions of the offer.
- 15.4 The quantities shown against the various items are only approximate. Any increase or decrease in the quantities shall not form the basis of alteration of the rates quoted and accepted.
- 15.5 The EMPLOYER reserves the right to interpolate the rates for such items of work falling between similar items of lower and higher magnitude.

**16 Policy for Tenders under Consideration:**

- 16.1 Only Those Tenders which are complete in all respects and are strictly in accordance with the Terms and Conditions and Technical Specifications of Tender Document, shall be considered for evaluation. Such Tenders shall be deemed to be under consideration immediately after opening of Tender and until such time an official intimation of acceptance /rejection of Tender is made by MNGL to the Bidder.
- 16.2 Zero Deviation: Bidders to note that this is a ZERO DEVIATION TENDER. MNGL will appreciate submission of offer based on the terms and conditions in the enclosed General Conditions of Contract (GCC), Special Conditions of Contract (SCC), Instructions to Bidders (ITB), Scope of Work, technical specifications etc. to avoid wastage of time and money in seeking clarifications on technical/ commercial aspects of the offer. Bidder may note that no technical and commercial clarifications will be sought for after the receipt of the bids. In case of any deviation/nonconformity observed in the bid, it will be liable for rejection.

**17 Award of Contract:**

- 17.1 The Acceptance of Tender will be intimated to the successful Tenderer by MNGL either by Telex/ Telegram/ Fax or by Letter or like means-defined as LETTER OF ACCEPTANCE OF TENDER.
- 17.2 MNGL will be the sole judge in the matter of award of CONTRACT and the



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decision of MNGL shall be final and binding.

**18 Clarification of Tender Document:**

- 18.1 The Tender is required to carefully examine the Technical Specifications, Conditions of Contract, Drawings and other details relating to WORK and given in Tender Document and fully inform himself as to all conditions and matters which may in any way affect the WORK or the cost thereof. In case the Tenderer is in doubt about the completeness or correctness of any of the contents of the Tender Documents he should request in writing for an interpretation/clarification to MNGL in triplicate. MNGL will then issue interpretation/clarification to Tenderer in writing. Such clarifications and or interpretations shall form part of the Specifications and Documents and shall accompany the tender

which shall be submitted by tenderer within time and date as specified in invitations to tender.

- 18.2 Verbal clarification and information given by MNGL or its employee(s) or its representatives shall not in any way be binding on MNGL.

**19 Local Conditions:**

- 19.1 It will be imperative on each tenderer to inform himself of all local conditions and factors which may have any effect on the execution of WORK covered under the Tender Document. In their own interest, the tenderer are requested to familiarize themselves with the Indian Income Tax Act 1961, Indian Companies Act 1956, Indian Customs Act 1962 and other related Acts and Laws and Regulations of India with their latest amendments, as applicable. MNGL shall not entertain any requests for clarifications from the tenderer regarding such local conditions.
- 19.2 It must be understood and agreed that such factors have properly been investigated and considered while submitting the tender. No claim for financial or any other adjustments to VALUE OF CONTRACT, on lack of clarity of such factors shall be entertained.

**20 Abnormal Rates:**

- 20.1 The tenderer is expected to quote rate for each item after careful analysis of cost involved for the performance of the completed item considering all specifications and Conditions of Contract. This will avoid loss of profit or gain in case of curtailment or change of specification for any item. In case it is noticed that the rates quoted by the tenderer for any item are unusually high or unusually low, it will be sufficient cause for the rejection of the tender unless the EMPLOYER is convinced about the reasonableness after scrutiny of the analysis for such rate(s) to be furnished by the tenderer (on demand).

**Section-IV. General Obligations**

**21 Priority of Contract Documents**

- 21.1 Except if and the extent otherwise provided by the Contract, the provisions of the General Conditions of Contract and Special Conditions shall prevail over those of any other documents forming part of the CONTRACT. Several documents forming the CONTRACT are to be taken as mutually explanatory of one another, but in





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case of ambiguities or discrepancies the same shall be explained and adjusted by the ENGINEER-IN-CHARGE who shall thereupon issue to the Contractor instructions thereon and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:

- 1) The Contract Agreement;
- 2) The Letter of Acceptance;
- 3) The Instructions to Bidders (ITB);
- 4) Special Conditions of Contract (SCC);
- 5) General Conditions of Contract (GCC)
- 6) Any other document forming part of the Contract.

Works shown in the DRAWING but not mentioned in the SPECIFICATIONS OR described in the SPECIFICATIONS without being shown in the DRAWINGS shall

nevertheless, be deemed to be included in the same manner as if they had been specifically shown upon the DRAWINGS and described in the SPECIFICATIONS.

- 21.2 Headings and Marginal Notes: All headings and marginal notes to the clauses of these General Conditions of Contract or to the SPECIFICATIONS or to any other Tender Document are solely for the purpose of giving a concise indication and not a summary of the contents thereof, and they shall never be deemed to be part thereof or be used in the interpretation or construction thereof the CONTRACT.
- 21.3 Singular and Plural: In CONTRACT DOCUMENTS unless otherwise stated specifically, the singular shall include the plural and vice versa wherever the context so requires.
- 21.4 Interpretation: Words implying 'Persons' shall include relevant 'Corporate Companies / Registered Associations/ Body of Individuals/ Firm of Partnership' as the case may be.

**22 Special Conditions of Contract:**

- 22.1 Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract, specification of Work, Drawings and any other documents forming part of this CONTRACT wherever the context so requires.
- 22.2 Notwithstanding the sub-division of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the CONTRACT so far as it may be practicable to do so.
- 22.3 Where any portion of the General Condition of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears the provisions of the Special Conditions of Contract shall be deemed to over-ride the provisions of the General Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.
- 22.4 Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain WORK or provide certain facilities, it is understood that the CONTRACTOR shall do so at his cost and the VALUE OF CONTRACT shall be deemed to have included cost of such performance and provisions, so mentioned.



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- 22.5 The materials, design and workmanship shall satisfy the relevant INDIAN STANDARDS, the JOB SPECIFICATIONS contained herein and CODES referred to. Where the job specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.

**23 Contractor to obtain his own Information:**

- 23.1 The CONTRACTOR in fixing his rate shall for all purpose whatsoever reason may be, deemed to have himself independently obtained all necessary information for the purpose of preparing his tender and his tender as accepted shall be deemed to have taken into account all contingencies as may arise due to such information or lack of same. The correctness of the details, given in the Tender Document to help the CONTRACTOR to make up the tender is not guaranteed.

The CONTRACTOR shall be deemed to have examined the CONTRACT DOCUMENTS, to have generally obtained his own information in all matters whatsoever that might affect the carrying out of the works at the scheduled rates and to have satisfied himself to the sufficiency of his tender. Any error in description of quantity or omission there from shall not vitiate the CONTRACT or release the CONTRACTOR from executing the work comprised in the CONTRACT according to DRAWINGS and SPECIFICATIONS at the scheduled rates. He is deemed to have known the scope, nature and magnitude of the WORKS and the requirements of materials and labour involved etc., and as to what all works he has to complete in accordance with the CONTRACT documents whatever be the defects, omissions or errors that may be found in the DOCUMENTS. The CONTRACTOR shall be deemed to have visited surroundings, to have satisfied himself to the nature of all existing structures, if any, and also as to the nature and the conditions of the Railways, Roads, Bridges and Culverts, means of transport and communication, whether by land, water or air, and as to possible interruptions thereto and the access and egress from the site, to have made enquiries, examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other materials, the sites for disposal of surplus materials, the available accommodation as to whatever required, depots and such other buildings as may be necessary for executing and completing the works, to have made local independent enquiries as to the sub-soil, subsoil water and variations thereof, storms, prevailing winds, climatic conditions and all other similar matters effecting these works. He is deemed to have acquainted himself as to his liability of payment of Government Taxes, Customs duty and other charges, levies etc.

Any neglect or omission or failure on the part of the CONTRACTOR in obtaining necessary and reliable information upon the foregoing or any other matters affecting the CONTRACT shall not relieve him from any risks or liabilities or the entire responsibility from completion of the works at the scheduled rates and times in strict accordance with the CONTRACT.

It is, therefore, expected that should the CONTRACTOR have any doubt as to the meaning of any portion of the CONTRACT DOCUMENT he shall set forth the particulars thereof in writing to EMPLOYER in duplicate, before submission of tender. The EMPLOYER may provide such clarification as may be necessary in writing to CONTRACT, such clarifications as provided by EMPLOYER shall form part of CONTRACT DOCUMENTS.



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No verbal agreement or inference from conversation with any effect or employee of the EMPLOYER either before, during or after the execution of the CONTRACT agreement shall in any way affect or modify and of the terms or obligations herein contained.

Any change in layout due to site conditions or technological requirement shall be binding on the CONTRACTOR and no extra claim on this account shall be entertained.

**24 Contract Performance Security:**

**24.1 The CONTRACTOR shall furnish to the EMPLOYER, within 15 days from the date of notification of award, a security in the sum of 3% of the accepted value of the tender or the actual value of work to be done whichever is applicable due to any additional work or any other reasons, in the form of a Bank draft/Banker's cheque or Bank Guarantee or irrevocable Letter of credit (as per proforma enclosed) as Contract Performance Security with the EMPLOYER which will be refunded after the expiry of DEFECTS LIABILITY PERIOD.**

24.2 CONTRACTOR can furnish the Contract Performance Security in the form of Demand Draft or through a Bank Guarantee or through an irrevocable Letter of Credit from any Indian scheduled bank or a branch of an International bank situated in India and registered with Reserve Bank of India as scheduled foreign bank.

The bank guarantee or the Letter of Credit shall be submitted in the prescribed format.

24.3 If the CONTRACTOR/SUB-CONTRACTOR or their employees or the CONTRACTOR's agents and representatives shall damage, break, deface or destroy any property belonging to the EMPLOYER or others during the execution of the CONTRACT, the same shall be made good by the CONTRACTOR at his own expenses and in default thereof, the ENGINEER-IN-CHARGE may cause the same to be made good by other agencies and recover expenses from the CONTRACTOR (for which the certificate of the ENGINEER- IN-CHARGE shall be final).

24.4 All compensation or other sums of money payable by the CONTRACTOR to the EMPLOYER under terms of this CONTRACT may be deducted from or paid by the encashment or sale of a sufficient part of his Contract Performance Security or from any sums which may be due or may become due to the CONTRACTOR by the EMPLOYER of any account whatsoever and in the event of his Contract Performance Security being reduced by reasons of any such deductions or sale of aforesaid, the CONTRACTOR shall within ten days thereafter make good in cash, bank drafts as aforesaid any sum or sums which may have been deducted from or realized by sale of his Contract Performance Security, or any part thereof. No interest shall be payable by the EMPLOYER for sum deposited as Contract Performance Security.

24.5 Failure of the successful bidder to comply with the requirements of this Clause shall constitute sufficient grounds for the annulment of the award and the forfeiture of bid security.

**25 Time of Performance:**



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**25.1 Time for Mobilization**

The work covered by this CONTRACT shall be commenced within seven (7) days, the date of letter/Fax of Intent or as mentioned in Letter/Fax of Intent and be completed in stages on or before the dates as mentioned in the TIME SCHEDULE OF COMPLETION OF WORK. The CONTRACTOR should bear in mind that time is the essence of this agreement. Request for revision of construction time after tenders are opened will not receive consideration. The above period is included within the overall COMPLETION SCHEDULE, not over and above the completion time to any additional work or any other reasons.

**25.2 Time Schedule of Construction:**

**25.2.1** The general Time Schedule of construction is given in the TENDER DOCUMENT. CONTRACTOR should prepare a detailed monthly or weekly construction program jointly with the ENGINEER-IN-CHARGE within 15 days of receipt of LETTER/FAX OF INTENT or ACCEPTANCE OF TENDER. The WORK shall be executed strictly as per the Time Schedule given in the CONTRACT DOCUMENT. The period of construction given includes the time required for mobilization testing, rectifications, if any, retesting and completion in all respects in accordance with CONTRACT DOCUMENT to the entire satisfaction of the ENGINEER-IN-CHARGE.

**25.2.2** The CONTRACTOR shall submit a detailed PERT network within the time frame agreed above consisting of adequate number of activities covering various key phases of the WORK such as design, procurement, manufacturing, shipment and field erection activities within fifteen (15) days from the date of LETTER/FAX OF INTENT/SERVICE ORDER. This network shall also indicate the interface facilities to be provided by the EMPLOYER and the dates by which such facilities are needed.

**25.2.3** CONTRACTOR shall discuss the network so submitted with the EMPLOYER and the agreed network which may be in the form as submitted with the EMPLOYER or in revised form in line with the outcome of discussions shall form part of the CONTRACT, to be signed within fifteen (15) days from the date of LETTER OF ACCEPTANCE OF TENDER. During the performance of the CONTRACT, if in the opinion of the EMPLOYER proper progress is not maintained suitable changes shall be made in the CONTRACTOR's operation to ensure proper progress.

The above PERT network shall be reviewed periodically and reports shall be submitted by the CONTRACTOR as directed by EMPLOYER.

**26 Force Majeure:**

**26.1 CONDITIONS FOR FORCE MAJEURES**

In the event of either party being rendered unable by Force Majeure to perform any obligations required to be performed by them under the CONTRACT the relative obligation of the party affected by such Force Majeure shall upon notification to the other party be suspended for the period during which Force Majeure event lasts. The cost and loss sustained by the either party shall be borne by the respective parties.

The term "Force Majeure" as employed herein shall mean acts of God, earthquake, war (declared or undeclared), revolts, riots, fires, floods, rebellions, explosions, hurricane, sabotage, civil commotions and acts and regulations of respective Government of the two parties, namely the EMPLOYER and the



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Upon the occurrence of such cause(s) and upon its termination, the party alleging that it has been rendered unable as aforesaid thereby, shall notify the other party in writing immediately but not later than 72 (Seventy-two) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of its claim.

Time for performance of the relative obligation suspended by the Force Majeure shall then stand extended by the period for which such cause lasts.

If deliveries of bought out items and/or works to be executed by the CONTRACTOR are suspended by Force Majeure conditions lasting for more than 2 (two) months the EMPLOYER shall have the option to terminate the CONTRACT or re-negotiate the contract provisions.

**26.2 OUTBREAK OF WAR**

26.2.1 If during the currency of the CONTRACT there shall be an out-break of war whether declared or not, in that part of the World which whether financially or otherwise materially affect the execution of the WORK the CONTRACTOR shall unless and until the CONTRACT is terminated under the provisions in this clause continue to use his best endeavour to complete the execution of the WORK, provided always that the

EMPLOYER shall be entitled, at any time after such out-break of war to terminate or re- negotiate the CONTRACT by giving notice in writing to the CONTRACTOR and upon such notice being given the CONTRACT shall, save as to the rights of the parties under this clause and to the operation of the clauses entitled settlement of Disputes and Arbitration hereof, be terminated but without prejudice to the right of either party in respect of any antecedent breach thereof.

26.2.2 If the CONTRACT shall be terminated under the provisions of the above clause, the CONTRACTOR shall with all reasonable diligence remove from the SITE all the CONTRACTOR's equipment and shall give similar facilities to his SUB-CONTRACTORS to do so.

**27 Price reduction schedule:**

27.1 Time is the essence of the CONTRACT. In case the CONTRACTOR fails to complete the WORK within the stipulated period, then, unless such failure is due to Force Majeure as defined in Clause 26 here above or due to EMPLOYER's defaults, the Total Contract price shall be reduced by ½ % of the total Contract Price per complete week of delay or part thereof subject to a maximum of 5 % of the Total Contract Price, by way of reduction in price for delay and not as penalty. The said amount will be recovered from amount due to the Contractor/ Contractor's Contract Performance Security payable on demand.

The decision of the ENGINEER-IN-CHARGE in regard to applicability of Price Reduction Schedule shall be final and binding on the CONTRACTOR.

27.2 All sums payable under this clause is the reduction in price due to delay in completion period at the above agreed rate.



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**28 Rights of the employer to forfeit contract performance security:**

- 28.1 Whenever any claim against the CONTRACTOR for the payment of a sum of money arises out or under the CONTRACT, the EMPLOYER shall be entitled to recover such sum by appropriating in part or whole the Contract Performance Security of the CONTRACTOR. In the event of the security being insufficient or if no security has been taken from the CONTRACTOR, then the balance or the total sum recoverable, as the case may be shall be deducted from any sum then due or which at any time thereafter may become due to the CONTRACTOR. The CONTRACTOR shall pay to the EMPLOYER on demand any balance remaining due.

**29 Failure by the contractor to comply with the provisions of the contract:**

- 29.1 If the CONTRACTOR refuses or fails to execute the WORK or any separate part thereof with such diligence as will ensure its completion within the time specified in the CONTRACT or extension thereof or fails to perform any of his obligation under the CONTRACT or in any manner commits a breach of any of the provisions of the CONTRACT it shall be open to the EMPLOYER at its option by written notice to the CONTRACTOR:

a) TO DETERMINE THE CONTRACT in which event the CONTRACT shall stand terminated and shall cease to be in force and effect on and from the date appointed by the EMPLOYER on that behalf, whereupon the CONTRACTOR shall stop forthwith any of the CONTRACTOR's work then in progress, except such WORK as the EMPLOYER may, in writing, require to be done to safeguard any property or WORK, or installations from damage, and the EMPLOYER, for its part, may take over the work remaining unfinished by the CONTRACTOR and complete the same through a fresh contractor or by other means, at the risk and cost of the CONTRACTOR, and any of his sureties if any, shall be liable to the EMPLOYER for any excess cost occasioned by such work having to be so taken over and completed by the EMPLOYER over and above the cost at the rates specified in the schedule of quantities and rate/prices.

b) WITHOUT DETERMINING THE CONTRACT to take over the work of the CONTRACTOR or any part thereof and complete the same through a fresh contractor or by other means at the risk and cost of the CONTRACTOR. The CONTRACTOR and any of his sureties are liable to the EMPLOYER for any excess cost over and above the cost at the rates specified in the Schedule of Quantities/ rates, occasioned by such works having been taken over and completed by the EMPLOYER.

- 29.2 In such events of Clause 29.1(a) or (b) above.

a) The whole or part of the Contract Performance Security furnished by the CONTRACTOR is liable to be forfeited without prejudice to the right of the EMPLOYER to recover from the CONTRACTOR the excess cost referred to in the sub-clause aforesaid, the EMPLOYER shall also have the right of taking possession and utilizing in completing the works or any part thereof, such as materials equipment and plants available at work site belonging to the CONTRACTOR as may be necessary and the CONTRACTOR shall not be entitled for any compensation for use or damage to such materials, equipment and plant.





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- b) The amount that may have become due to the CONTRACTOR on account of work already executed by him shall not be payable to him until after the expiry of Six (6) calendar months reckoned from the date of termination of CONTRACT or from the taking over of the WORK or part thereof by the EMPLOYER as the case may be, during which period the responsibility for faulty materials or workmanship in respect of such work shall, under the CONTRACT, rest exclusively with the CONTRACTOR. This amount shall be subject to deduction of any amounts due from the CONTRACT to the EMPLOYER under the terms of the CONTRACT authorized or required to be reserved or retained by the EMPLOYER.
- 29.3 Before determining the CONTRACT as per Clause 29.1(a) or (b) provided in the judgement of the EMPLOYER, the default or defaults committed by the CONTRACTOR is/are curable and can be cured by the CONTRACTOR if an opportunity given to him, then the EMPLOYER may issue Notice in writing calling the CONTRACTOR to cure the default within such time specified in the Notice.
- 29.4 The EMPLOYER shall also have the right to proceed or take action as per 29.1(a) or (b) above, in the event that the CONTRACTOR becomes bankrupt, insolvent, compounds with his creditors, assigns the CONTRACT in favor of his creditors or any other person or persons, or being a company or a corporation goes into voluntary liquidation, provided that in the said events it shall not be necessary for the EMPLOYER to give any prior notice to the CONTRACTOR.
- 29.5 Termination of the CONTRACT as provided for in sub-clause 29.1(a) above shall not prejudice or affect their rights of the EMPLOYER which may have accrued up to the date of such termination.
- 30 Contractor remains liable to pay compensation if action not taken under clause 29:**
- 30.1 In any case in which any of the powers conferred upon the EMPLOYER BY CLAUSE 29.0 thereof shall have become exercisable and the same had not been exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any further case of default by the CONTRACTOR for which by any clause or clauses hereof he is declared liable to pay compensation amounting to the whole of his Contract Performance Security, and the liability of the CONTRACTOR for past and future compensation shall remain unaffected. In the event of the EMPLOYER putting in force the power under above sub- clause (a), (b) or (c) vested in him under the preceding clause he may, if he so desired, take possession of all or any tools, and plants, materials and stores in or upon the works or the site thereof belonging to the CONTRACTOR or procured by him and intended to be used for the execution of the WORK or any part thereof paying or allowing for the same in account at the CONTRACT rates or in case of these not being applicable at current market rates to be certified by the ENGINEER-IN-CHARGE whose certificate thereof shall be final, otherwise the ENGINEER-IN-CHARGE may give notice in writing to the CONTRACTOR or his clerk of the works, foreman or other authorized agent, requiring him to remove such tools, plant, materials or stores from the premises (within a time to be specified in such notice), and in the event of the CONTRACTOR failing to comply with any such requisition, the ENGINEER-IN-CHARGE may remove them at the CONTRACTOR's expense or sell them by auction or private sale on account of the CONTRACTOR and at his risk in all respects without any further notice as to the date, time or place of sale and the certificate of the ENGINEER-IN-CHARGE



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as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the CONTRACTOR.

**31 Change in constitution:**

- 31.1 Where the CONTRACTOR is a partnership firm, the prior approval of the EMPLOYER shall be obtained in writing, before any change is made in the constitution of the firm. Where the CONTRACTOR is an individual or a Hindu undivided family business concern, such approval as aforesaid shall, likewise be obtained before such CONTRACTOR enters into any agreement with other parties, where under, the reconstituted firm would have the right to carry out the work hereby undertaken by the CONTRACTOR. In either case if prior approval as aforesaid is not obtained, the CONTRACT shall be deemed to have been allotted in contravention of clause 37 hereof and the same action may be taken and the same consequence shall ensure as provided in the said clause.

**32 Termination of contract**

**32(A) TERMINATION OF CONTRACT FOR DEATH:**

If the CONTRACTOR is an individual or a proprietary concern and the individual or the proprietor dies or if the CONTRACTOR is a partnership concern and one of the partner dies then unless, the EMPLOYER is satisfied that the legal representative of the individual or the proprietary concern or the surviving partners are capable of carrying out and completing CONTRACT, he (the EMPLOYER) is entitled to cancel the CONTRACT for the uncompleted part without being in any way liable for any compensation payment to the estate of the deceased CONTRACTOR and/or to the surviving partners of the CONTRACTOR'S firm on account of the cancellation of CONTRACT. The decision of the

EMPLOYER in such assessment shall be final and binding on the parties. In the event of such cancellation, the EMPLOYER shall not hold the estate of the deceased CONTRACTOR and/or the surviving partners of the CONTRACTOR'S firm liable for any damages for non-completion of CONTRACT.

**32(B) TERMINATION OF CONTRACT IN CASE OF LIQUIDATION / BANKRUPTCY ETC.**

If the Contractor shall dissolve or become bankrupt or insolvent or cause or suffer any receiver to be appointed of his business or any assets thereof compound with his Creditors, or being a corporation commence to be wound up, not being a member's voluntary winding up for the purpose of amalgamation or reconstruction, or carry on its business under a Receiver for the benefits of its Creditors any of them, EMPLOYER shall be at liberty:-

To terminate the contract forthwith upon coming to know of the happening of any such event as aforesaid by notice in writing to the Contractor or to give the Receiver or liquidator or other person, the option of carrying out the contract subject to his providing a guarantee up to an amount to be agreed upon by EMPLOYER for due and faithful performance of the contract.

- 32 (C)** In case of termination of CONTRACT herein set forth (under clause 29.0) except under conditions of Force Majeure and termination after expiry of contract, the





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CONTRACTOR shall be put under holiday [i.e. neither any enquiry will be issued to the party by Maharashtra Natural Gas Limited against any type of tender nor their offer will be considered by MNGL against any ongoing tender (s) where contract between MNGL and that particular CONTRACTOR (as a bidder) has not been finalized] for three years from the date of termination by Maharashtra Natural Gas Limited to such CONTRACTOR.

**32 (D) Termination for convenience**

MNGL may by written notice sent to contractor, terminate the contract, in whole or part, at any time for its convenience. However, the payment shall be released to the extent to which performance of work executed as determined by MNGL till the date upon which such termination becomes effective.

**33 Members of the employer not individually liable:**

- 33.1 No Director, or official or employee of the EMPLOYER shall in any way be personally bound or liable for the acts or obligations of the EMPLOYER under the CONTRACT or answerable for any default or omission in the observance or performance of any of the acts, matters or things which are herein contained.

**34 Employer not bound by personal representations:**

- 34.1 The CONTRACTOR shall not be entitled to any increase on the scheduled rates or any other right or claim whatsoever by reason of any representation, explanation statement or alleged representation, promise or guarantees given or alleged to have been given to him by any person.

**35 Contractor's office at site:**

- 35.1 The CONTRACTOR shall provide and maintain an office at the site for the accommodation of his agent and staff and such office shall be open at all reasonable hours to receive instructions, notice or other communications. The CONTRACTOR at all time shall maintain a site instruction book and compliance of these shall be communicated to the ENGINEER-IN CHARGE from time to time and the whole document to be preserved and handed over after completion of works.

**36 Contractor's subordinate staff and their conduct**

- 36.1 The CONTRACTOR, on or after award of the WORK shall name and depute a qualified engineer having sufficient experience in carrying out work of similar nature, to whom the equipments, materials, if any, shall be issued and instructions for works given. The CONTRACTOR shall also provide to the satisfaction of the ENGINEER-IN- CHARGE sufficient and qualified staff to superintend the execution of the WORK, competent sub- agents, foremen and leading hands including those specially qualified by previous experience to supervise the types of works comprised in the CONTRACT in such manner as will ensure work of the best quality, expeditious working. Whenever in the opinion of the ENGINEER-IN-CHARGE additional properly qualified supervisory staff is considered necessary, they shall be employed by the CONTRACTOR without additional charge on accounts thereof. The CONTRACTOR shall ensure to the satisfaction of the ENGINEER- IN-CHARGE that SUB- CONTRACTORS, if any, shall provide competent and efficient supervision, over the work entrusted to them.
- 36.2 If and whenever any of the CONTRACTOR's or SUBCONTRACTOR'S agents,



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sub- agents, assistants, foremen, or other employees shall in the opinion of ENGINEER-IN- CHARGE be guilty of any misconduct or be incompetent or insufficiently qualified or negligent in the performance of their duties of that in the opinion of the EMPLOYER or the ENGINEER-IN-CHARGE, it is undesirable for administrative or any other reason for such person or persons to be employed in the works, the CONTRACTOR, is so directed by the ENGINEER-IN-CHARGE, shall at once remove such person or persons from employment thereon. Any person or persons so removed from the works shall not again be employed in connection with the WORKS without the written permission of the ENGINEER-IN-CHARGE. Any person so removed from the WORK shall be immediately replaced at the expense of the CONTRACTOR by a qualified and competent substitute. Should the CONTRACTOR be requested to repatriate any person removed from the works he shall do so and shall bear all costs in connection herewith.

- 36.3 The CONTRACTOR shall be responsible for the proper behavior of all the staff, foremen, workmen, and others, and shall exercise a proper degree of control over them and in particular and without prejudice to the said generality, the CONTRACTOR shall be bound to prohibit and prevent any employees from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighborhood and in the event of such employee so trespassing, the CONTRACTOR shall be responsible therefore and relieve the EMPLOYER of all consequent claims or actions for damages or injury or any other grounds whatsoever. The decision of the ENGINEER-IN-CHARGE upon any matter arising under this clause shall be final. The CONTRACTOR shall be liable for any liability to EMPLOYER on account of deployment of CONTRACTOR's staff etc. or incidental or arising out of the execution of CONTRACT.

The CONTRACTOR shall be liable for all acts or omissions on the part of his staff, Foremen and Workmen and others in his employment, including misfeasance or negligence of whatever kind in the course of their work or during their employment, which are connected directly or indirectly with the CONTRACT.

- 36.4 If and when required by the EMPLOYER and CONTRACTOR's personnel entering upon the EMPLOYER's premises shall be properly identified by badges of a type acceptable to the EMPLOYER which must be worn at all times on EMPLOYER's premises. CONTRACTOR may be required to obtain daily entry passes for his staff/employees from EMPLOYER to work within operating areas. These being safety requirements, no relaxations on this account shall be given to CONTRACTOR.

**37 Sub-letting of works:**

- 37.1 No part of the CONTRACT nor any share or interest therein shall in any manner or degree be transferred, assigned or sublet by the CONTRACTOR directly or indirectly to any person, firm or corporation whatsoever without the consent in writing, of the ENGINEER/EMPLOYER except as provided for in the succeeding sub-clause.

- i) **SUB-CONTRACTS FOR TEMPORARY WORKS ETC.:**  
The EMPLOYER may give written consent to Sub- contract for the execution of any part of the WORK at the site, being entered in to by CONTRACTOR provided each individual Sub- contract is submitted to the



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ENGINEER-IN- CHARGE before being entered into and is approved by him.

- ii) **LIST OF SUB-CONTRACTORS TO BE SUPPLIED:**  
At the commencement of every month the CONTRACTOR shall furnish to the ENGINEER-IN- CHARGE list of all SUB-CONTRACTORS or other persons or firms engaged by the CONTRACTOR and working at the SITE during the previous month with particulars of the general nature of the Subcontract or works done by them.
  - iii) **CONTRACTOR'S LIABILITY NOT LIMITED BY SUBCONTRACTORS:**  
Notwithstanding any sub-letting with such approval as aforesaid and notwithstanding that the ENGINEER-IN-CHARGE shall have received copies of any Subcontracts, the contractor shall be and shall remain solely responsible for the quality, proper and expeditious execution of the Contract in all respects as if such sub-letting or Subcontracting had not taken place, and as if such work had been done directly by the CONTRACTOR  
The CONTRACTOR shall bear all responsibility for any act or omission on the part of sub- contractors in regard to work to be performed under the CONTRACT.
  - iv) **EMPLOYER MAY TERMINATE SUB-CONTRACTS:**  
If any SUB-CONTRACTOR engaged upon the works at the site executes any works which in the opinion of the ENGINEER-IN-CHARGE is not in accordance with the CONTRACT documents, the EMPLOYER may by written notice to the CONTRACTOR request him to terminate such subcontract and the CONTRACTOR upon the receipt of such notice shall terminate such Subcontract and dismiss the SUB-CONTRACTOR(S) and the later shall forthwith leave the works, failing which the EMPLOYER shall have the right to remove such SUB- CONTRACTOR(S) from the site.
  - v) **NO REMEDY FOR ACTION TAKEN UNDER THIS CLAUSE:**  
No action taken by the EMPLOYER under the clause shall relieve the CONTRACTOR of any of his liabilities under the CONTRACT or give rise to any right or compensation, extension of time or otherwise failing which the EMPLOYER shall have the right to remove such SUB- CONTRACTOR(S) from the site.
- 38 Power of entry:**
- 38.1 If the CONTRACTOR shall not commence the WORK in the manner previously described in the CONTRACT documents or if he shall at any time in the opinion of the ENGINEER- IN-CHARGE.
- i) fail to carry out the WORK in conformity with the CONTRACT documents, or
  - ii) fail to carry out the WORK in accordance with the Time Schedule, or
  - iii) substantially suspend work or the WORK for a period of fourteen days without authority from the ENGINEER-IN-CHARGE, or
  - iv) fail to carry out and execute the WORK to the satisfaction of the ENGINEER-IN-CHARGE, or
  - v) fail to supply sufficient or suitable construction plant, temporary works, labour, materials or things, or
  - vi) Commit, suffer, or permit any other breach of any of the provisions of the



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- CONTRACT on his part to be performed or observed or persist in any of the above mentioned breaches of the CONTRACT for fourteen days, after notice in writing shall have been given to the CONTRACTOR by the ENGINEER-IN-CHARGE requiring such breach to be remedied, or
- vii) if the CONTRACTOR shall abandon the WORK or
  - viii) If the CONTRACTOR during the continuance of the CONTRACT shall become bankrupt, make any arrangement or composition with his creditors, or permit any execution to be levied or go into liquidation whether compulsory or voluntary not being merely a voluntary liquidation for the purpose of amalgamation or reconstruction

**then** in any such case, the EMPLOYER shall have the power to enter upon the WORK and take possession thereof and of the materials, temporary WORK, construction plant, and stock thereon, and to revoke the CONTRACTOR's license to use the same, and to complete the WORK by his agents, other CONTRACTORS or workmen or to relate the same upon any terms and to such other person, firm or corporation as the EMPLOYER in his absolute discretion may think proper to employ and for the purpose aforesaid to use or authorize the use of any materials, temporary work, CONSTRUCTION PLANT, and stock as aforesaid, without making payment or allowance to the CONTRACTOR for the said materials other than such as may be certified in writing by the ENGINEER-IN-CHARGE to be reasonable, and without making any payment or allowance to the CONTRACTOR for the use of the temporary said works, construction plant and stock or being liable for any loss or damage thereto, and if the EMPLOYER shall by reason of his taking possession of the WORK or of the WORK being completed by other CONTRACTOR (due account being taken of any such extra work or works which may or be omitted) then the amount of such excess as certified by the ENGINEER-IN-CHARGE shall be deducted from any money which may be due for work done by the CONTRACTOR under the CONTRACT and not paid for. Any deficiency shall forthwith be made good and paid to the EMPLOYER by the CONTRACTOR and the EMPLOYER shall have power to sell in such manner and for such price as he may think fit all or any of the construction plant, materials etc. constructed by or belonging to and to recoup and retain the said deficiency or any part thereof out of proceeds of the sale.

**39 Contractor's responsibility with the mechanical, electrical, intercommunication system, air conditioning contractors and other agencies:**

- 39.1 Without repugnance of any other condition, it shall be the responsibility of the CONTRACTOR executing the work of civil construction, to work in close cooperation and coordinate the WORK with the Mechanical, Electrical, Air-conditioning and Intercommunication Contractor's and other agencies or their authorized representatives, in providing the necessary grooves, recesses, cuts and opening etc., in wall, slabs beams and columns etc. and making good the same to the desired finish as per specification, for the placement of electrical, intercommunication cables, conduits, air-conditioning inlets and outlets grills and other equipments etc. where required. For the above said requirements in the false ceiling and other partitions, the CONTRACTOR before starting- up the work shall in consultation with the Electrical, Mechanical, Intercommunication, Air-conditioning contractor and other agencies prepare and put-up a joint scheme, showing the necessary openings, grooves, recesses, cuts, the methods of fixing required for the WORK of the aforesaid, and the finishes therein, to the



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ENGINEER-IN-CHARGE and get the approval. The CONTRACTOR before finally submitting the scheme to the ENGINEER-IN-CHARGE, shall have the written agreement of the other agencies. The ENGINEER-IN-CHARGE, before communicating his approval to the scheme, with any required modification, shall get the final agreement of all the agencies, which shall be binding. No claim shall be entertained on account of the above.

The CONTRACTOR shall confirm in all respects with provision of any statutory regulations, ordinances or byelaws of any local or duly constituted authorities or public bodies which may be applicable from time to time to the WORK or any temporary works. The CONTRACTOR shall keep the EMPLOYER indemnified against all penalties and liabilities of every kind, arising out of non-adherence to such stains, ordinances, laws, rules, regulations, etc.

**40 Other agencies at site:**

- 40.1 The CONTRACTOR shall have to execute the WORK in such place and conditions where other agencies will also be engaged for other works such as site grading, filling, and leveling, electrical and mechanical engineering works, etc. No claim shall be entertained due to WORK being executed in the above circumstances.

**41 Notice:**

**41.1 TO THE CONTRACTOR:**

Any notice hereunder may be served on the CONTRACTOR or his duly authorized representative at the job site or may be served by registered mail direct to the address furnished by the CONTRACTOR. Proof of issue of any such notice could be conclusive of the CONTRACTOR having been duly informed of all contents therein.

**41.2 TO THE EMPLOYER:**

Any notice to be given to the EMPLOYER under the terms of the CONTRACTOR shall be served by sending the same by Registered mail to or delivering the same at the respective site offices of M/S. MAHARASHTRA NATURAL GAS LIMITED addressed to the HEAD/SITE-IN-CHARGE.

**42 Right of various interests:**

- 42.1 i) The EMPLOYER reserves the right to distribute the work between more than one agency (ies). The CONTRACTOR shall cooperate and afford other agency (ies)

reasonable opportunity for access to the WORK for the carriage and storage of materials and execution of their works.

ii) Wherever the work being done by any department of the EMPLOYER or by other agency(ies) employed by the EMPLOYER is contingent upon WORK covered by this CONTRACT, the respective rights of the various interests involved shall be determined by the ENGINEER-IN-CHARGE to secure the completion of the various portions of the work in general harmony.

**43 Patents and royalties:**



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- 43.1 The CONTRACTOR, if licensed under any patent covering equipment, machinery, materials or compositions of matter to be used or supplied or methods and process to be practiced or employed in the performance of this CONTRACT, agrees to pay all royalties and license fees which may be due with respect thereto. If any equipment, machinery, materials, composition of matters, be used or supplied or methods and processes to be practiced or employed in the performance of this CONTRACT, is covered by a patent under which the CONTRACTOR is not licensed then the CONTRACTOR before supplying or using the equipment, machinery materials, composition method or processes shall obtain such licenses and pay such royalties and license fees as may be necessary for performance of this CONTRACT. In the event the CONTRACTOR fails to pay any such royalty or obtain any such license, any suit for infringement of such patents which is brought against the CONTRACTOR or the EMPLOYER as a result such failure will be defended by the CONTRACTOR at his own expense and the CONTRACTOR will pay any damages and costs awarded in such suit. The CONTRACTOR shall promptly notify the EMPLOYER if the CONTRACTOR has acquired the knowledge of any plant under which a suit for infringement could be reasonably brought because of the use by the EMPLOYER of any equipment, machinery, materials, process and methods to be supplied hereunder. The CONTRACTOR agrees to and does hereby grant to EMPLOYER, together with the right to extend the same to any of the subsidiaries of the EMPLOYER as irrevocable, royalty free license to use in any country, any invention made by the CONTRACTOR or his employee in or as result of the performance of the WORK under the CONTRACT.
- 43.2 All charges on account of royalty, toilage, rent, octroi terminal or sales tax and/or other duties or any other levy on materials obtained for the work or temporary work or part thereof (excluding materials provided by the EMPLOYER) shall be borne by the CONTRACTOR.
- 43.3 The CONTRACTOR shall not sell or otherwise dispose of or remove except for the purpose of this CONTRACT, the sand, stone, clay, ballast, earth, rock or other substances, or materials obtained from any excavation made for the purpose of the WORK or any building or produce upon the site at the time of delivery of the possession thereof, but all such substances, materials, buildings and produce shall be the property of the EMPLOYER provided that the CONTRACTOR may with the permission of the ENGINEER-IN-CHARGE, use the same for the purpose of the work by payment of cost of the same at such a rate as may be determined by the ENGINEER-IN-CHARGE.
- 43.4 The EMPLOYER shall indemnify and save harmless the CONTRACTOR from any loss on account of claims against CONTRACTOR for the contributory infringement of patent rights arising out and based upon the claim that the use of the EMPLOYER of the process included in the design prepared by the EMPLOYER and used in the operation of
- the plant infringes on any patent right. With respect to any subcontract entered into by CONTRACTOR pursuant to the provisions of the relevant clause hereof, the CONTRACTOR shall obtain from the SUB-CONTRACTOR an undertaking to provide the EMPLOYER with the same patent protection that CONTRACTOR is required to provide under the provisions of this clause.

**44 Liens:**





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- 44.1 If, at any time there should be evidence or any lien or claim for which the EMPLOYER might have become liable and which is chargeable to the CONTRACTOR, the EMPLOYER shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify the EMPLOYER against such lien or claim and if such lien or claim be valid, the EMPLOYER may pay and discharge the same and deduct the amount so paid from any money which may be or may become due and payable to the CONTRACTOR. If any lien or claim remain unsettled after all payments are made, the CONTRACTOR shall refund or pay to the EMPLOYER all money that the latter may be compelled to pay in discharging such lien or claim including all costs and reasonable expenses. EMPLOYER reserves the right to do the same.
- 44.2 The EMPLOYER shall have lien on all materials, equipments including those brought by the CONTRACTOR for the purpose of erection, testing and commissioning of the WORK.
- 44.3 The final payment shall not become due until the CONTRACTOR delivers to the ENGINEER-IN-CHARGE a complete release or waiver of all liens arising or which may arise out of his agreement or receipt in full or certification by the CONTRACTOR in a form approved by ENGINEER-IN-CHARGE that all invoices for labour, materials, services have been paid in lieu thereof and if required by the ENGINEER-IN-CHARGE in any case an affidavit that so far as the CONTRACTOR has knowledge or information the releases and receipts include all the labour and material for which a lien could be filled.
- 44.4 CONTRACTOR will indemnify and hold the EMPLOYER harmless, for a period of two years after the issue of FINAL CERTIFICATE, from all liens and other encumbrances against the EMPLOYER on account of debts or claims alleged to be due from the CONTRACTOR or his SUB-CONTRACTOR to any person including SUB- CONTRACTOR and on behalf of EMPLOYER will defend at his own expense, any claim or litigation brought against the EMPLOYER or the CONTRACTOR in connection therewith. CONTRACTOR shall defend or contest at his own expense any fresh claim or litigation by any person including his SUB-CONTRACTOR, till its satisfactory settlement even after the expiry of two years from the date of issue of FINAL CERTIFICATE.

**45 Delays by employer or his authorized agents:**

- 45.1 In case the CONTRACTOR's performance is delayed due to any act or omission on the part of the EMPLOYER or his authorized agents, then the CONTRACTOR shall be given due extension of time for the completion of the WORK, to the extent such omission on the part of the EMPLOYER has caused delay in the CONTRACTOR's performance of his WORK.
- 45.2 No adjustment in CONTRACT PRICE shall be allowed for reasons of such delays and extensions granted except as provided in TENDER DOCUMENT, where the EMPLOYER reserves the right to seek indulgence of CONTRACTOR to maintain the agreed Time Schedule of Completion.

In such an event the CONTRACTOR shall be obliged for working by CONTRACTOR's personnel for additional time beyond stipulated working hours as also Sundays and Holidays and achieve the completion date/interim targets.

**46 Payment if the contract is terminated:**



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46.1 If the CONTRACT shall be terminated as per Tender pursuant to Clause no. 29 of GCC, the CONTRACTOR shall be paid by the EMPLOYER in so far as such amounts or items shall not have already been covered by payments of amounts made to the CONTRACTOR for the WORK executed and accepted by ENGINEER-IN-CHARGE prior to the date of termination at the rates and prices provided for in the CONTRACT and in addition to the following:

- a) The amount payable in respect of any preliminary items, so far as the Work or service comprised therein has been carried out or performed and an appropriate portion as certified by ENGINEER-IN-CHARGE of any such items or service comprised in which has been partially carried out or performed.
- b) Any other expenses which the CONTRACTOR has expended for performing the WORK under the CONTRACT subject to being duly recommended by ENGINEER-IN-CHARGE and approved by EMPLOYER for payment, based on documentary evidence of his having incurred such expenses.

46.2 The CONTRACTOR will be further required to transfer the title and provide the following in the manner and as directed by the EMPLOYER.

- a) Any and all completed works.
- b) Such partially completed WORK including drawings, information and CONTRACT rights as the CONTRACTOR has specially performed, produced or acquired for the performance of the CONTRACTOR.

**47 No waiver of rights:**

47.1 Neither the inspection by the EMPLOYER or any of their officials, employees, or agents nor any order by the EMPLOYER for payment of money or any payment for or acceptance of the whole or any part of the Work by the EMPLOYER nor any extension of time, nor any possession taken by EMPLOYER shall operate as a waiver of any provision of the CONTRACT, or of any power herein reserved to the EMPLOYER, or any right to damages herein provided, nor shall any waiver of any breach in the CONTRACT be held to be a waiver of any other subsequent breach.

**48 Certificate not to affect right of employer and liability of contractor:**

48.1 No interim payment certificate(s) issued by the Engineer-in-Charge of the EMPLOYER, nor any sum paid on account by the EMPLOYER, nor any extension of time for execution of the work granted by EMPLOYER shall affect or prejudice the rights of the Employer against the CONTRACTOR or relieve the CONTRACTOR of his obligations for the due performance of the CONTRACT, or be interpreted as approval of the WORK done or of the equipment supplied and no certificate shall create liability for the EMPLOYER to pay for alterations, amendments, variations or additional works not ordered, in writing, by EMPLOYER or discharge the liability of the CONTRACTOR for the payment of damages

whether due, ascertained, or certified or not or any sum against the payment of which he is bound to indemnify the EMPLOYER.

**49 Language and measures:**





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- 49.1 All documents pertaining to the CONTRACT including Specifications, Schedules, Notices, Correspondence, operating and maintenance Instructions, DRAWINGS, or any other writing shall be written in English language. The Metric System of measurement shall be used in the CONTRACT unless otherwise specified.

**50 Transfer of title:**

- 50.1 The title of Ownership of supplies furnished by the CONTRACTOR shall not pass on to the EMPLOYER for all Supplies till the same are finally accepted by the EMPLOYER after the successful completion of PERFORMANCE TEST and GUARANTEE TEST and issue of FINAL CERTIFICATE.
- 50.2 However, the EMPLOYER shall have the lien on all such works performed as soon as any advance or progressive payment is made by the EMPLOYER to the CONTRACTOR and the CONTRACTOR shall not subject these works for use other than those intended under this CONTRACT.

**51 Release of information:**

- 51.1 The CONTRACTOR shall not communicate or use in advertising, publicity, sales releases or in any other medium, photographs, or other reproduction of the Work under this CONTRACT or description of the site dimensions, quantity, quality or other information, concerning the Work unless prior written permission has been obtained from the EMPLOYER.

**52 Brand names:**

- 52.1 The specific reference in the SPECIFICATIONS and documents to any material by trade name, make or catalogue number shall be construed as establishing standard or quality and performance and not as limited competition. However, TENDERER may offer other similar equipments provided it meets the specified standard design and performance requirements.

**53 Completion of contract:**

- 53.1 Unless otherwise terminated under the provisions of any other relevant clause, this CONTRACT shall be deemed to have been completed at the expiration of the PERIOD OF LIABILITY as provided for under the CONTRACT.

**54 Spares:**

- 54.1 The CONTRACTOR shall furnish to the EMPLOYER all spares required for COMMISSIONING of the plants, recommendatory and/or mandatory spares, which are required essential by the manufacturer/supplier. The same shall be delivered at SITE, 3(Three) months before COMMISSIONING.

Also the CONTRACTOR should furnish the manufacturing drawings for fast wearing spares.

- 54.2 The CONTRACTOR guarantees the EMPLOYER that before the manufacturers of the equipments, plants and machineries go out of production of spare parts for the equipment furnished and erected by him, he shall give at least twelve (12) months' advance notice to the EMPLOYER, so that the latter may order his



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requirement of spares in one lot, if he so desires.

**SECTION-V Performance of Work**

**55 Execution of work:**

- 55.1 All the Works shall be executed in strict conformity with the provisions of the CONTRACT Documents and with such explanatory detailed drawings, specification and instructions as may be furnished from time to time to the CONTRACTOR by the ENGINEER-IN- CHARGE whether mentioned in the CONTRACT or not. The CONTRACTOR shall be responsible for ensuring that works throughout are executed in the most substantial, proper and workmanlike manner with the quality of material and workmanship in strict accordance with the SPECIFICATIONS and to the entire satisfaction of the ENGINEER- IN-CHARGE. The CONTRACTOR shall provide all necessary materials equipment labour etc. for execution and maintenance of WORK till completion unless otherwise mentioned in the CONTRACT.

**56 Co-ordination and inspection of work:**

- 56.1 The coordination and inspection of the day-to-day work under the CONTRACT shall be the responsibility of the ENGINEER-IN-CHARGE. The written instruction regarding any particular job will normally be passed by the ENGINEER-IN-CHARGE or his authorized representative. A work order book will be maintained by the CONTRACTOR for each sector in which the aforesaid written instructions will be entered. These will be signed by the CONTRACTOR or his authorized representative by way of acknowledgement within 12 hours.

**57 Work in monsoon and dewatering:**

- 57.1 Unless otherwise specified elsewhere in the tender, the execution of the WORK may entail working in the monsoon also. The CONTRACTOR must maintain a minimum labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No extra rate will be considered for such work in monsoon.
- 57.2 During monsoon and other period, it shall be the responsibility of the CONTRACTOR to keep the construction work site free from water logging at his own cost and site should be in workable condition.

**58 Work on Sundays and holidays:**

- 58.1 For carrying out Work on Sundays, and Holidays, the CONTRACTOR will approach the ENGINEER-IN-CHARGE or his representative at least two days in advance and obtain permission in writing. The CONTRACTOR shall observe all labour laws and other statutory rules and regulations in force. In case of any violations of such laws, rules and regulations, consequence if any, including the cost thereto shall be exclusively borne by the CONTRACTOR and the EMPLOYER shall have no liability whatsoever on this account.

**59 General conditions for construction and erection work:**

- 59.1 The working time at the site of work is 48 hours per week. Overtime work is permitted in cases of need and the EMPLOYER will not compensate the same. Shift working at 2 or 3 shifts per day will become necessary and the



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CONTRACTOR should take this aspect into consideration for formulating his rates for quotation. No extra claims will be entertained by the EMPLOYER on this account. For carrying out work beyond working hours the CONTRACTOR will approach the ENGINEER-IN-CHARGE or his authorized representative and obtain his prior written permission.

- 59.2 The CONTRACTOR must arrange for the placement of workers in such a way that the delayed completion of the WORK or any part thereof for any reason whatsoever will not affect their proper employment. The EMPLOYER will not entertain any claim for idle time payment whatsoever.
- 59.3 The CONTRACTOR shall submit to the EMPLOYER/ENGINEER-INCHARGE reports at regular intervals regarding the state and progress of WORK. The details and proforma of the report will mutually be agreed after the award of CONTRACT. The CONTRACTOR shall provide display boards showing progress and labor strengths at worksite, as directed by the ENGINEER-IN-CHARGE.

**60 Alterations in specifications, design and extra works:**

- 60.1 The WORK covered under this CONTRACT having to be executed by the CONTRACTOR on a lump sum firm price/item rate quoted by him, the EMPLOYER will not accept any proposals for changes in VALUE OF CONTRACT or extension in time on account of any such changes which may arise to the CONTRACTOR's scope of WORK as a result of detailed Engineering and thereafter during the execution of WORK. The only exception to this will be a case where the EMPLOYER requests in writing to the CONTRACTOR to upgrade the SPECIFICATIONS or the size of any major pieces of equipments, plant or machinery beyond what is normally required to meet the scope of WORK as defined in the CONTRACT DOCUMENT.  
In such cases, a change order will be initiated by the CONTRACTOR at the appropriate time for the EMPLOYER's prior approval giving the full back-up data for their review and for final settlement of any impact on price within 30 (thirty) days thereafter.
- 60.2 The ENGINEER-IN-CHARGE shall have to make any alterations in, omission from, additions to or substitutions for, the Schedule of Rates, the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the WORK and the CONTRACTOR shall be bound to carry out the such altered/ extra/ new items of WORK in accordance with any instructions which may be given to him in writing signed by the ENGINEER-INCHARGE, and such alterations, omissions, additions or substitutions shall not invalidate the CONTRACT and any altered, additional or substituted work which the CONTRACTOR may be directed to do in the manner above specified as part of the WORK shall be carried out by the CONTRACTOR on the same conditions in all respects on which he agreed to do the main WORK. The time of completion of WORK may be extended for the part of the particular job at the discretion of the ENGINEER-IN-CHARGE, for only such alterations, additions or substitutions of the WORK, as he may consider as just and reasonable. The rates for such additional, altered or substituted WORK under this clause shall be worked out in accordance with the following provisions: -

**I. For Item Rate Contract**

- a) If the rates for the additional, altered or substituted WORK are



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specified in the CONTRACT for the WORK, the CONTRACTOR is bound to carry on the additional, altered or substituted WORK at the same rates as are specified in the CONTRACT.

- b) If the rates for the additional, altered or substituted WORK are not specifically provided in the CONTRACT for the WORK, the rates will be derived from the rates for similar class of WORK as are specified in the CONTRACT for the WORK. The opinion of the ENGINEER-IN- CHARGE, as to whether or not the rates can be reasonably so derived from the items in this CONTRACT will be final and binding on the CONTRACTOR.
- c) If the rates for the altered, additional or substituted WORK cannot be determined in the manner specified in sub-clause (a) and (b) above, then the CONTRACTOR shall, within 7 days of the date of receipt of order to carry out the WORK, inform the ENGINEER-IN-CHARGE of the rates which it is his intention to charge for such class of WORK, supported by analysis of the rate or rates claimed, and the ENGINEER-IN-CHARGE shall determine the rate or rates on the basis of the prevailing market rates, labour cost at schedule of labour rates plus 10% to cover contractor's supervision, overheads and profit and pay the CONTRACTOR accordingly. The opinion of the ENGINEER- IN- CHARGE as to current market rates of materials and the quantum of labour involved per unit of measurement will be final and binding on the CONTRACTOR.
- d) Where the item of work will be executed through nominated specialist agency as approved by the ENGINEER-IN-CHARGE, then the actual amount paid to such nominated agency supported by documentary evidence and as certified by ENGINEER-IN-CHARGE shall be considered plus 10% (ten percent) to cover all contingencies, overhead, profits to arrive at the rates.
- e) Provisions contained in the Sub-clause (a) & (d) above shall, however, not apply for the following:-

Where the value of additions of new items together with the value of alterations, additions/deletions or substitutions does not exceed by or is not less than plus/minus (+)25% of the VALUE OF CONTRACT. The item rates in the Schedule of Rates shall hold good for all such variations between the above mentioned limits, irrespective of any increase/decrease of quantities in the individual items of Schedule of Rates.

Where the value of addition of new items together with the value of alterations, additions/deletions or substitutions reduces more than 50% of the contract value but is within the following limits the tenderer shall be paid compensation for decrease in the value of work, as follows:

Sl. No. Range of Variation	Percentage compensation for decrease in the value of work in the respective
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range.

- |    |   |  |
|----|---|--|
| a) | Beyond (+) 25% up to & decrease inclusive of (+) 50% Schedule | No increase and/or shall be applicable for the of Rates (The rates quoted for this increase shall be valid).   |
| b) | Beyond (-) 50% up to & inclusive of (-) 100% compensated by   | For reduction beyond 50% contractor shall be an amount equivalent to 10% of the reduction in value of the contract as awarded. For example if the actual contract value is 40% of awarded value then compensation shall be 10% of (50-40) i.e. 1% of awarded contract value. |

II. For Lump sum Contracts

CONTRACTOR shall, within 7 days of the date of receipt of order to carry out the WORK, inform the ENGINEER-IN-CHARGE of the rates which it is his intention to charge for such class of WORK, supported by analysis of the rate or rates claimed, and the ENGINEER-IN-CHARGE shall determine the rate or rates on the basis of the prevailing market rates, labour cost at schedule of labour rates plus 10% to cover contractor's supervision, overheads and profit and pay the CONTRACTOR accordingly. The opinion of the ENGINEER- IN-CHARGE as to current market rates of materials and the quantum of labour involved per unit of measurement will be final and binding on the CONTRACTOR.

**61 Drawings to be supplied by the employer**

- 61.1 The drawings attached with tender are only for the general guidance to the CONTRACTOR to enable him to visualize the type of work contemplated and scope of work involved. The CONTRACTOR will be deemed to have studied the DRAWINGS and formed an idea about the WORK involved.
- 61.2 Detailed working drawings on the basis of which actual execution of the WORK is to proceed, will be furnished from time to time during the progress of the work. The CONTRACTOR shall be deemed to have gone through the DRAWINGS supplied to him thoroughly and carefully and in conjunction with all other connected drawings and bring to the notice of the ENGINEER-IN-CHARGE discrepancies, if any, therein before actually carrying out the Work.
- 61.3 Copies of all detailed working drawings relating to the WORK shall be kept at the



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CONTRACTOR's office on the site and shall be made available to the ENGINEER-IN-CHARGE at any time during the CONTRACT. The drawings and other documents issued by the EMPLOYER shall be returned to the EMPLOYER on completion of the WORK.

**62 Drawings to be supplied by the contractor:**

- 62.1 The drawings/date which are to be furnished by the CONTRACTOR are enumerated in the special conditions of contract, and shall be furnished within the specified time.
- 62.2 Where approval/review of drawings before manufacture/ construction/fabrication has been specified, it shall be CONTRACTOR's responsibility to have these drawings prepared as per the directions of ENGINEER-IN-CHARGE and got approved before proceeding with manufacture/construction/fabrication as the case may be. Any change that may have become necessary in these drawings during the execution of the work shall have to be carried out by the CONTRACTOR to the satisfaction of ENGINEER-IN- CHARGE at no extra cost. All final drawings shall bear the certification stamp as indicated below duly signed by both the CONTRACTOR and ENGINEER-IN-CHARGE.

"Certified true for \_\_\_\_\_(Name of

Work) Agreement No. \_\_\_\_\_

Signed:

\_\_\_\_\_  
(CONTRACTOR)

\_\_\_\_\_  
(ENGINEER-IN-CHARGE)

- 62.3 The DRAWINGS submitted by the CONTRACTOR shall be reviewed by the ENGINEER- IN-CHARGE as far as practicable within 3 (Three) weeks and shall be modified by the CONTRACTOR, if any modifications and/or corrections are required by the ENGINEER- IN-CHARGE. The CONTRACTOR shall incorporate such modifications and/or corrections and submit the final drawings for approval. Any delays arising out of failure by the CONTRACTOR to rectify the drawing in good time shall not alter the Contract Completion Time.
- 62.4 As built drawings showing all corrections, adjustments etc. shall be furnished by the CONTRACTOR in six copies and one transparent for record purposed to the EMPLOYER.

**63 Setting out works:**

- 63.1 The ENGINEER-IN-CHARGE shall furnish the CONTRACTOR with only the four corners of the Works site and a level bench mark and the CONTRACTOR shall set out the Works and shall provide an efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out.
- 63.2 The CONTRACTOR shall provide, fix and be responsible for the maintenance of all stakes, templates, level marks, profiles and other similar things and shall take all necessary precautions to prevent their removal or disturbance and shall be responsible for the consequence of such removal or disturbance should the same take place and for their efficient and timely reinstatement. The CONTRACTOR shall also be responsible for the maintenance of all existing survey marks, boundary marks, distance marks and center line marks, either existing or supplied





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and fixed by the CONTRACTOR. The work shall be set out to the satisfaction of the ENGINEER-IN-CHARGE. The approval there of joining with the CONTRACTOR by the ENGINEER- IN-CHARGE in setting out the work, shall not relieve the CONTRACTOR of any of his responsibility.

- 63.3 Before beginning the Works, the CONTRACTOR shall at his own cost, provide all necessary reference and level posts, pegs, bamboos, flags, ranging rods, strings and other materials for proper layout of the works in accordance with the schemes for bearing marks acceptable to the ENGINEER-IN-CHARGE. The center, longitudinal or face lines and cross lines shall be marked by means of small masonry pillars. Each pillar shall have distinct mark at the centre to enable theodolite to be set over it. No work shall be started until all these points are checked and approved by the ENGINEER-IN-CHARGE in writing but such approval shall not relieve the CONTRACTOR of any of his responsibilities. The CONTRACTOR shall also provide all labour, material and other facilities, as necessary, for the proper checking of layout and inspection of the points during construction.
- 63.4 Pillars bearing geodetic marks located at the sites of units of WORKS under construction should be protected and fenced by the CONTRACTOR.
- 63.5 On completion of WORK, the CONTRACTOR must submit the geodetic documents according to which the WORK was carried out.

**64 Responsibility for level and alignment:**

- 64.1 The CONTRACTOR shall be entirely and exclusively responsible for the horizontal and vertical alignment, the levels and correctness of every part of the WORK and shall rectify effectively any errors or imperfections therein, such rectifications shall be carried out by the CONTRACTOR, at his own cost, when instructions are issued to that effect by the ENGINEER- IN-CHARGE.

**65 Materials to be supplied by contractor:**

- 65.1 The CONTRACTOR shall procure and provide within the VALUE OF CONTRACT the whole of the materials required for the construction including steels, cement and other building materials, tools, tackles, construction plant and equipment for the completion and maintenance of the WORK except the materials which will be issued by the EMPLOYER and shall make his own arrangement for procuring such materials and for the transport thereof. The EMPLOYER may give necessary recommendation to the respective authority if so desired by the CONTRACTOR but assumes no further responsibility of any nature. The EMPLOYER will insist on the procurement of materials which bear ISI stamp and/or which are supplied by reputed suppliers.
- 65.2 The CONTRACTOR shall properly store all materials either issued to him or brought by him to the SITE to prevent damages due to rain, wind, direct exposure to sun, etc. as also from theft, pilferage, etc. for proper and speedy execution of his works. The CONTRACTOR shall maintain sufficient stocks of all materials required by him.
- 65.3 No material shall be dispatched from the CONTRACTOR's stores before obtaining the approval in writing of the ENGINEER-IN-CHARGE.



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**66 Stores supplied by the employer:**

66.1 If the SPECIFICATION of the WORK provides for the use of any material of special description to be supplied from the EMPLOYER's stores or it is required that the

CONTRACTOR shall use certain stores to be provided by the ENGINEER-IN-CHARGE, such materials and stores, and price to be charged there for as hereinafter mentioned being so far as practicable for the convenience of the CONTRACTOR, but not so as in any way to control the meaning or effect of the CONTRACT, the CONTRACTOR shall be bound to purchase and shall be supplied such materials and stores as are from time to time required to be used by him for the purpose of the CONTRACT only. The sums due from the CONTRACTOR for the value of materials supplied by the EMPLOYER will be recovered from the running account bill on the basis of the actual consumption of materials in the works covered and for which the running account bill has been prepared. After the completion of the WORK, however, the CONTRACTOR has to account for the full quantity of materials supplied to him as per relevant clauses in this document.

66.2 The value of the stores/materials as may be supplied to the CONTRACTOR by the EMPLOYER will be debited to the CONTRACTOR's account at the rates shown in the schedule of materials and if they are not entered in the schedule, they will be debited at cost price, which for the purpose of the CONTRACT shall include the cost of carriage and all other expenses whatsoever such as normal storage supervision charges which shall have been incurred in obtaining the same at the EMPLOYER's stores. All materials so supplied to the CONTRACTOR shall remain the absolute property of the EMPLOYER and shall not be removed on any account from the SITE of the WORK, and shall be at all times open for inspection to the ENGINEER-IN-CHARGE. Any such materials remaining unused at the time of the completion or termination of the CONTRACT shall be returned to the EMPLOYER's stores or at a place as directed by the ENGINEER-IN-CHARGE in perfectly good condition at CONTRACTOR's cost.

**67 Conditions for issue of materials:**

- 67.1
- i) Materials specified as to be issued by the EMPLOYER will be supplied to the CONTRACTOR by the EMPLOYER from his stores. It shall be responsibility of the CONTRACTOR to take delivery of the materials and arrange for its loading, transport and unloading at the SITE of WORK at his own cost. The materials shall be issued between the working hours and as per the rules of the EMPLOYER as framed from time to time.
  - ii) The CONTRACTOR shall bear all incidental charges for the storage and safe custody of materials at site after these have been issued to him.
  - iii) Materials specified as to be issued by the EMPLOYER shall be issued in standard sizes as obtained from the manufacturers.
  - iv) The CONTRACTOR shall construct suitable Godowns at the SITE of WORK for storing the materials safe against damage by rain, dampness, fire, theft etc. He shall also employ necessary watch and ward establishment for the purpose.
  - v) It shall be duty of the CONTRACTOR to inspect the materials supplied to





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him at the time of taking delivery and satisfy himself that they are in good condition. After the materials have been delivered by the EMPLOYER, it shall be the responsibility of the CONTRACTOR to keep them in good condition and if the materials are damaged or lost, at any time, they shall be repaired and/or replaced by him at his own cost according to the instructions of the ENGINEER- IN-CHARGE.

- vi) The EMPLOYER shall not be liable for delay in supply or non-supply of any materials which the EMPLOYER has undertaken to supply where such failure or delay is due to natural calamities, act of enemies, transport and procurement difficulties and any circumstances beyond the control of the EMPLOYER. In no case, the CONTRACTOR shall be entitled to claim any compensation or loss suffered by him on this account.
- vii) It shall be responsibility of the CONTRACTOR to arrange in time all materials required for the WORK other than those to be supplied by the EMPLOYER. If, however, in the opinion of the ENGINEER-IN-CHARGE the execution of the WORK is likely to be delayed due to the CONTRACTOR's inability to make arrangements for supply of materials which normally he has to arrange for, the ENGINEER-IN-CHARGE shall have the right at his own discretion to issue such materials, if available with the EMPLOYER or procure the materials from the market or as elsewhere and the CONTRACTOR will be bound to take such materials at the rates decided by the ENGINEER-IN-CHARGE. This, however, does not in any way absolve the CONTRACTOR from responsibility of making arrangements for the supply of such materials in part or in full, should such a situation occur nor shall this constitute a reason for the delay in the execution of the WORK.
- viii) None of the materials supplied to the CONTRACTOR will be utilized by the CONTRACTOR for manufacturing item which can be obtained as supplied from standard manufacturer in finished form.
- ix) The CONTRACTOR shall, if desired by the ENGINEER-IN-CHARGE, be required to execute an Indemnity Bond in the prescribed form for safe custody and accounting of all materials issued by the EMPLOYER.
- x) The CONTRACTOR shall furnish to the ENGINEER-INCHARGE sufficiently in advance a statement showing his requirement of the quantities of the materials to be supplied by the EMPLOYER and the time when the same will be required by him for the works, so as to enable the ENGINEER-IN-CHARGE to make necessary arrangements for procurement and supply of the material.
- xi) Account of the materials issued by the EMPLOYER shall be maintained by CONTRACTOR indicating the daily receipt, consumption and balance in hand. This account shall be maintained in a manner prescribed by the ENGINEER-IN- CHARGE along with all connected papers viz. requisitions, issues, etc., and shall be always available for inspection in the CONTRACTOR's office at SITE.
- xii) The CONTRACTOR should see that only the required quantities of



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materials are got issued. The CONTRACTOR shall not be entitled to cartage and incidental charges for returning the surplus materials, if any, to the stores wherefrom they were issued or to the place as directed by the ENGINEER-IN-CHARGE.

- xiii) Materials/Equipment(s) supplied by EMPLOYER shall not be utilized for any purpose(s) than issued for.

**68 Material procured with assistance of employer/return of surplus:**

- 68.1 Notwithstanding anything contained to the contrary in any or all the clauses of this CONTRACT where any materials for the execution of the CONTRACT are procured with the assistance of the EMPLOYER either by issue from EMPLOYER's stock or purchases made under order or permits or licenses issued by Government, the CONTRACTOR shall hold the said materials as trustee for the EMPLOYER and use such materials economically and solely for the purpose of the CONTRACT and not dispose them off without the permission of the EMPLOYER and return, if required by the ENGINEER-IN-CHARGE, shall determine having due regard to the condition of the materials. The price allowed to the CONTRACTOR, however, shall not exceed the amount charged to him excluding the storage charges, if any. The decision of the ENGINEER-IN-CHARGE shall be final and conclusive in such matters. In the event of breach of the aforesaid condition, the CONTRACTOR shall, in terms of the licenses or permits and/or criminal breach of trust, be liable to compensate the EMPLOYER at double rate or any higher rate, in the event of those materials at that time having higher rate or not being available in the market, then any other rate to be determined by the ENGINEER-IN-CHARGE and his decision shall be final and conclusive.

**69 Materials obtained from dismantling:**

- 69.1 If the CONTRACTOR in the course of execution of the WORK is called upon to dismantle any part for reasons other than those stipulated in Clauses 74 and 77 hereunder, the materials obtained in the WORK of dismantling etc., will be considered as the EMPLOYER's property and will be disposed of to the best advantage of the EMPLOYER.

**70 Articles of value found:**

- 70.1 All gold, silver and other minerals of any description and all precious stones, coins, treasure relics, antiquities and other similar things which shall be found in, under or upon the SITE, shall be the property of the EMPLOYER and the CONTRACTOR shall duly preserve the same to the satisfaction of the ENGINEER-IN-CHARGE and shall from time to time deliver the same to such person or persons indicated by the EMPLOYER.

**71 Discrepancies between instructions:**

- 71.1 Should any discrepancy occur between the various instructions furnished to the CONTRACTOR, his agent or staff or any doubt arises as to the meaning of any such instructions or should there be any misunderstanding between the CONTRACTOR's staff and the ENGINEER-IN-CHARGE's staff, the CONTRACTOR shall refer the matter immediately in writing to the ENGINEER-IN-CHARGE whose decision thereon shall be final and conclusive and no claim for



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losses alleged to have been caused by such discrepancies between instructions, doubts, or misunderstanding shall in any event be admissible.

**72 Action where no specification is issued:**

- 72.1 In case of any class of WORK for which there is no SPECIFICATION supplied by the EMPLOYER as mentioned in the Tender Documents such WORK shall be carried out in accordance with Indian Standard Specifications and if the Indian Standard Specifications do not cover the same, the WORK should be carried out as per standard Engineering Practice subject to the approval of the ENGINEER-IN-CHARGE.

**73 Inspection of works:**

- 73.1 The ENGINEER-IN-CHARGE will have full power and authority to inspect the WORK at any time wherever in progress either on the SITE or at the CONTRACTOR's premises/workshops wherever situated, premises/ workshops of any person, firm or corporation where WORK in connection with the CONTRACT may be in hand or where materials are being or are to be supplied, and the CONTRACTOR shall afford or procure for the ENGINEER-IN- CHARGE every facility and assistance to carry out such inspection. The CONTRACTOR shall, at all time during the usual working hours and at all other time at which reasonable notice of the intention of the ENGINEER-IN- CHARGE or his representative to visit the WORK shall have been given to the CONTRACTOR, either himself be present or receive orders and instructions, or have a responsible agent duly accredited in writing, present for the purpose. Orders given to the CONTRACTOR's agent shall be considered to have the same force as if they had been given to the CONTRACTOR himself. The CONTRACTOR shall give not less than seven days' notice in writing to the ENGINEER-IN-CHARGE before covering up or otherwise placing beyond reach of inspection and measurement of any work in order that the same may be inspected and measured. In the event of breach of above the same shall be uncovered at CONTRACTOR's expense for carrying out such measurement or inspection.

- 73.2 No material shall be dispatched from the CONTRACTOR's stores before obtaining the approval in writing of the Engineer-in-Charge.

The CONTRACTOR is to provide at all time during the progress of the WORK and the maintenance period, proper means of access with ladders, gangways etc. and the necessary attendance to move and adopt as directed for inspection or measurements of the WORK by the ENGINEER-IN-CHARGE.

- 73.3 The CONTRACTOR shall make available to the ENGINEER-INCHARGE free of cost all necessary instruments and assistance in checking or setting out of WORK and in the checking of any WORK made by the CONTRACTOR for the purpose of setting out and taking measurements of WORK.

**74 Tests for quality of work:**

- 74.1 All workmanship shall be of the respective kinds described in the CONTRACT DOCUMENTS and in accordance with the instructions of the ENGINEER-IN-CHARGE and shall be subjected from time to time to such test at CONTRACTOR's cost as the ENGINEER-IN-CHARGE may direct at the place of manufacture or fabrication or on the site or at all or any such places. The



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CONTRACTOR shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing any workmanship as may be selected and required by the ENGINEER-IN- CHARGE.

74.2 All the tests that will be necessary in connection with the execution of the WORK as decided by the ENGINEER- IN-CHARGE shall be carried out at the field testing laboratory of the EMPLOYER by paying the charges as decided by the EMPLOYER from time to time. In case of non-availability of testing facility with the EMPLOYER, the required test shall be carried out at the cost of CONTRACTOR at Government or any other testing laboratory as directed by ENGINEER-IN-CHARGE.

74.3 If any tests are required to be carried out in conjunction with the WORK or materials or workmanship not supplied by the CONTRACTOR, such tests shall be carried out by the CONTRACTOR as per instructions of ENGINEER-IN-CHARGE and cost of such tests shall be reimbursed by the EMPLOYER.

**75 Samples for approval:**

75.1 The CONTRACTOR shall furnish to the ENGINEER-IN-CHARGE for approval, when requested or if required by the specifications, adequate samples of all materials and finished to be used in the WORK. Such samples shall be submitted before the WORK is commenced and in ample time to permit tests and examinations thereof. All materials furnished and finishes applied in actual WORK shall be fully equal to the approved samples.

**76 Action and compensation in case of bad work:**

76.1 If it shall appear to the ENGINEER-IN-CHARGE that any work has been executed with unsound, imperfect or unskilled workmanship, or with materials of any inferior description, or that any materials or articles provided by the CONTRACTOR for the execution of the WORK are unsound, or of a quality inferior to that contracted for, or otherwise not in accordance with the CONTRACT, the CONTRACTOR shall on demand in writing from the ENGINEER-IN-CHARGE or his authorized representative specifying the WORK, materials or articles complained of notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the WORK so specified and provide other proper and suitable materials or articles at his own cost and in the event of failure to do so within the period specified by the ENGINEER-IN-CHARGE in his demand aforesaid, the CONTRACTOR shall be liable to pay compensation at the rate of 1 % (One percent) of the estimated cost of the whole WORK, for every week limited to a maximum of 10% (ten percent) of the value of the whole WORK, while his failure to do so shall continue and in the case of any such failure the ENGINEER-IN-CHARGE may on expiry of notice period rectify or remove and re- execute the WORK or remove and replaced with others, the materials or articles complained of to as the case may be at the risk and expense in all respects of the CONTRACTOR. The decision of the Engineering-in-charge as to any question arising under this clause shall be final and conclusive.

**77 Suspension of works:**

77.1 i) Subject to the provisions of sub-para (ii) of this clause, the CONTRACTOR shall, if ordered in writing by the ENGINEER-IN-CHARGE, or his representative, temporarily suspend the WORKS or any part thereof for such



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written order, proceed with the WORK therein ordered to be suspended until, he shall have received a written order to proceed therewith. The CONTRACTOR shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of the WORKS aforesaid. An extension of time for completion, corresponding with the delay caused by any such suspension of the WORKS as aforesaid will be granted to the CONTRACTOR should he apply for the same provided that the suspension was not consequent to any default or failure on the part of the CONTRACTOR.

ii) In case of suspensions of entire WORK, ordered in writing by ENGINEER-IN-CHARGE, for a period of more than two months, the CONTRACTOR shall have the option to terminate the CONTRACT.

**78 Employer may do part of work:**

78.1 Upon failure of the CONTRACTOR to comply with any instructions given in accordance with the provisions of this CONTRACT the EMPLOYER has the alternative right, instead of assuming charge of entire WORK, to place additional labour force, tools, equipments and materials on such parts of the WORK, as the EMPLOYER may designate or also engage another CONTRACTOR to carry out the WORK. In such cases, the EMPLOYER shall deduct from the amount which otherwise might become due to the CONTRACTOR, the cost of such work and material with ten percent (10%) added to cover all departmental charges and should the total amount thereof exceed the amount due to the CONTRACTOR, the CONTRACTOR shall pay the difference to the EMPLOYER.

**79 Possession prior to completion:**

79.1 The ENGINEER-IN-CHARGE shall have the right to take possession of or use any completed or partially completed WORK or part of the WORK. Such possession or use shall not be deemed to be an acceptance of any work completed in accordance with the CONTRACT agreement. If such prior possession or use by the ENGINEER-IN-CHARGE delays the progress of WORK, equitable adjustment in the time of completion will be made and the CONTRACT agreement shall be deemed to be modified accordingly.

**80 (Defects liability period) twelve months period of liability from the date of issue of completion certificate:**

80.1 The CONTRACTOR shall guarantee the installation/WORK for a period of 12 months from the date of completion of WORK as certified by the ENGINEER-IN-CHARGE which is indicated in the Completion Certificate. Any damage or defect that may arise or lie undiscovered at the time of issue of Completion Certificate, connected in any way with the equipment or materials supplied by him or in the workmanship, shall be rectified or replaced by the CONTRACTOR at his own expense as deemed necessary by the ENGINEER-IN-CHARGE or in default, the ENGINEER-IN-CHARGE may carry out such works by other work and deduct actual cost incurred towards labour, supervision and materials consumables or otherwise plus 100% towards overheads (of which the certificate of ENGINEER-IN-CHARGE shall be final) from any sums that may then be or at any time thereafter, become due to the CONTRACTOR or from his Contract Performance Security, or the proceeds of sale thereof or a sufficient part on thereof.

80.2 If the CONTRACTOR feels that any variation in WORK or in quality of materials or



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proportions would be beneficial or necessary to fulfill the guarantees called for, he shall bring this to the notice of the ENGINEER-IN-CHARGE in writing.

If during the period of liability any portion of the WORK/equipment, is found defective and is rectified/ replaced, the period of liability for such equipment/ portion of WORK shall be operative from the date such rectification/ replacement are carried out and Contract Performance Guarantee shall be furnished separately for the extended period of liability for that portion of WORK/ equipment only. Notwithstanding the above provisions the supplier's, guarantees/warranties for the replaced equipment shall also be passed on to the EMPLOYER.

**80.3 LIMITATION OF LIABILITY**

Notwithstanding anything contrary contained herein, the aggregate total liability of CONTRACTOR under the Agreement or otherwise shall be limited to 100% of Agreement

/ Contract Value. However, neither party shall be liable to the other party for any indirect and consequential damages, loss of profits or loss of production.

**81 Care of works:**

81.0 From the commencement to completion of the WORK, the CONTRACTOR shall take full responsibility for the care for all works including all temporary works and in case any damages, loss or injury shall happen to the WORK or to any part thereof or to any temporary works from any cause whatsoever, shall at his own cost repair and make good the same so that at completion the WORK shall be in good order and in conformity in every respects with the requirement of the CONTRACT and the ENGINEER-IN- CHARGE's instructions.

**81.1 DEFECTS PRIOR TO TAKING OVER:**

If at any time, before the WORK is taken over, the ENGINEER-IN-CHARGE shall:

- a) Decide that any works done or materials used by the CONTRACTOR or by any SUB-CONTRACTOR is defective or not in accordance with the CONTRACT, or that the works or any portion thereof are defective, or do not fulfill the requirements of CONTRACT (all such matters being hereinafter, called 'Defects' in this clause), and
- b) As soon as reasonably practicable, gives to the CONTRACTOR notice in writing of the said decision, specifying particulars of the defects alleged to exist or to have occurred, then the CONTRACTOR shall at his own expenses and with all speed make good the defects so specified.

In case CONTRACTOR shall fail to do so, the EMPLOYER may take, at the cost of the CONTRACTOR, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure so incurred by the EMPLOYER will be recovered from the amount due to the CONTRACTOR. The decision of the ENGINEER-IN-CHARGE with regard to the amount to be recovered from the CONTRACTOR will be final and binding on the CONTRACTOR. As soon as the WORK has been completed in accordance with the CONTRACT (except in minor respects that do not affect their use for the purpose for which they are intended and except for maintenance there of provided in clause 80.1 of General Conditions of Contract) and have passed the tests on completion, the ENGINEER-IN-CHARGE shall issue a certificate (hereinafter called Completion





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Certificate) in which he shall certify the date on which the WORK have been so completed and have passed the said tests and the EMPLOYER shall be deemed to have taken over the WORK on the date so certified. If the WORK has been divided into various groups in the CONTRACT, the EMPLOYER shall be entitled to take over any group or groups before the other or others and there upon the ENGINEER-IN-CHARGE shall issue a Completion Certificate which will, however, be for such group or groups so taken over only. In such an event if the group /section/ part so taken over is related, to the integrated system of the work, not withstanding date of grant of Completion Certificate for group/ section/ part. The period of liability in respect of such group/ section/ part shall extend 12 (twelve) months from the date of completion of WORK.

**81.2 DEFECTS AFTER TAKING OVER:**

In order that the CONTRACTOR could obtain a COMPLETION CERTIFICATE he shall make good, with all possible speed, any defect arising from the defective materials supplied by the CONTRACTOR or workmanship or any act or omission of the CONTRACT or that may have been noticed or developed, after the works or groups of the works has been taken over, the period allowed for carrying out such WORK will be normally one month. If any defect be not remedied within a reasonable time, the EMPLOYER may proceed to do the WORK at CONTRACTOR's risk and expense and deduct from the final bill such amount as may be decided by the EMPLOYER.

If by reason of any default on the part of the CONTRACTOR a COMPLETION CERTIFICATE has not been issued in respect of any portion of the WORK within one month after the date fixed by the CONTRACT for the completion of the WORK, the EMPLOYER shall be at liberty to use the WORK or any portion thereof in respect of which a completion certificate has not been issued, provided that the WORK or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completing these works for the issue of Completion Certificate.

**82 Guarantee/transfer of guarantee:**

82.1 For works like water-proofing, acid and alkali resisting materials, pre-construction soil treatment against termite or any other specialized works etc. the CONTRACTOR shall invariably engage SUB-CONTRACTORS who are specialists in the field and firms of repute and such a SUB-CONTRACTOR shall furnish guarantees for their workmanship to the EMPLOYER, through the CONTRACTOR. In case such a SUB-CONTRACTOR/ firm is not prepared to furnish a guarantee to the EMPLOYER, the CONTRACTOR shall give that guarantee to the EMPLOYER directly.

**83 Training of employer's personnel:**

83.1 The CONTRACTOR undertakes to provide training to Engineering personnel selected and sent by the EMPLOYER at the works of the CONTRACTOR without any cost to the EMPLOYER. The period and the nature of training for the individual personnel shall be agreed upon mutually between the CONTRACTOR and the EMPLOYER. These engineering personnel shall be given special training at the shops, where the equipment will be manufactured and/ or in their collaborator's works and where possible, in any other plant where equipment manufactured by the CONTRACTOR or his collaborators is under installation or



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test to enable those personnel to become familiar with the equipment being furnished by the CONTRACTOR. EMPLOYER shall bear only the to and fro fare of the said engineering personnel.

**84 Replacement of defective parts and materials:**

- 84.1 If during the progress of the WORK, EMPLOYER shall decide and inform in writing to the CONTRACTOR, that the CONTRACTOR has manufactured any plant or part of the plant unsound or imperfect or has furnished plant inferior to the quality specified, the CONTRACTOR on receiving details of such defects or deficiencies shall at his own expenses within 7 (seven) days of his receiving the notice, or otherwise within such time as may be reasonably necessary for making it good, proceed to alter, re-construct or remove such work and furnish fresh equipments up to the standards of the specifications. In case the CONTRACTOR fails to do so, EMPLOYER may on giving the CONTRACTOR 7 (seven) day's notice in writing of his intentions to do so, proceed to remove the portion of the WORK so complained of and at the cost of CONTRACTOR's,

perform all such works or furnish all such equipments provided that nothing in the clause shall be deemed to deprive the EMPLOYER of or affect any rights under the CONTRACT, the EMPLOYER may otherwise have in respect of such defects and deficiencies.

- 84.2 The CONTRACTOR's full and extreme liability under this clause shall be satisfied by the payments to the EMPLOYER of the extra cost, of such replacements procured including erection/installation as provided for in the CONTRACT; such extra cost being the ascertained difference between the price paid by the EMPLOYER for such replacements and the CONTRACT price portion for such defective plants and repayments of any sum paid by the EMPLOYER to the CONTRACTOR in respect of such defective plant. Should the EMPLOYER not so replace the defective plant the CONTRACTOR's extreme liability under this clause shall be limited to the repayment of all such sums paid by the EMPLOYER under the CONTRACT for such defective plant.

**85 Indemnity**

- 85.1 If any action is brought before a Court, Tribunal or any other Authority against the Employer or an officer or agent of the EMPLOYER, for the failure, omission or neglect on the part of the CONTRACTOR to perform any acts, matters, covenants or things under the CONTRACT, or damage or injury caused by the alleged omission or negligence on the part of the CONTRACTOR, his agents, representatives or his SUB-CONTRACTOR's, or in connection with any claim based on lawful demands of SUB-CONTRACTOR's workmen suppliers or employees, the CONTRACTOR, shall in such cases indemnify and keep the EMPLOYER and/or their representatives harmless from all losses, damages, expenses or decrees arising out of such action.

**86 Construction aids, equipments, tools & tackles:**

- 86.1 CONTRACTOR shall be solely responsible for making available for executing the WORK, all requisite CONSTRUCTION EQUIPMENTS, Special Aids, Barges, Cranes and the like, all Tools, Tackles and Testing Equipment and Appliances, including imports of such equipment etc. as required. In case of import of the same the rates applicable for levying of Custom Duty on such Equipment, Tools,





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& Tackles and the duty drawback applicable thereon shall be ascertained by the CONTRACTOR from the concerned authorities of Government of India. It shall be clearly understood that EMPLOYER shall not in any way be responsible for arranging to obtain Custom Clearance and/or payment of any duties and/or duty draw backs etc. for such equipments so imported by the CONTRACTOR and the CONTRACTOR shall be fully responsible for all taxes, duties and documentation with regard to the same. Tenderer in his own interest may contact, for any clarifications in the matter, concerned agencies/Dept./Ministries of Govt. of India. All clarifications so obtained and interpretations thereof shall be solely the responsibility of the CONTRACTOR.

#### **SECTION-VI Certificates and Payments**

##### **87 Schedule of rates and payments:**

###### **87.1 i) CONTRACTOR'S REMUNERATION:**

The price to be paid by the EMPLOYER to CONTRACTOR for the whole of the WORK to be done and for the performance of all the obligations undertaken by the CONTRACTOR under the CONTRACT DOCUMENTS shall be ascertained

by the application of the respective Schedule of Rates (the inclusive nature of which is more particularly defined by way of application but not of limitation, with the succeeding sub-clause of this clause) and payment to be made accordingly for the WORK actually executed and approved by the ENGINEER-IN-CHARGE. The sum so ascertained shall (excepting only as and to the extent expressly provided herein) constitute the sole and inclusive remuneration of the CONTRACTOR under the CONTRACT and no further or other payment whatsoever shall be or become due or payable to the CONTRACTOR under the CONTRACT.

###### **ii) SCHEDULE OF RATES TO BE INCLUSIVE:**

The prices/rates quoted by the CONTRACTOR shall remain firm till the issue of FINAL CERTIFICATE and shall not be subject to escalation. Schedule of Rates shall be deemed to include and cover all costs, expenses and liabilities of every description and all risks of every kind to be taken in executing, completing and handing over the WORK to the EMPLOYER by the CONTRACTOR. The CONTRACTOR shall be deemed to have known the nature, scope, magnitude and the extent of the WORK and materials required though the CONTRACT DOCUMENT may not fully and precisely furnish them. Tenderer shall make such provision in the Schedule of Rates as he may consider necessary to cover the cost of such items of WORK and materials as may be reasonable and necessary to complete the WORK. The opinion of the ENGINEER-IN-CHARGE as to the items of WORK which are necessary and reasonable for COMPLETION OF WORK shall be final and binding on the CONTRACTOR, although the same may not be shown on or described specifically in CONTRACT DOCUMENTS. Generality of this present provision shall not be deemed to cut down or limit in any way because in certain cases it may and in other cases it may not be expressly stated that the CONTRACTOR shall do or perform a work or supply articles or perform services at his own cost or without addition of payment or without extra charge or words to the same effect or that it may be stated or not stated that the same are included in and covered by the



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Schedule of Rates.

- iii) SCHEDULE OF RATES TO COVER CONSTRUCTION EQUIPMENTS, MATERIALS, LABOUR ETC.:  
Without in any way limiting the provisions of the preceding sub-clause the Schedule of Rates shall be deemed to include and cover the cost of all construction equipment, temporary WORK (except as provided for herein), pumps, materials, labour, insurance, fuel, consumables, stores and appliances to be supplied by the CONTRACTOR and all other matters in connection with each item in the Schedule of Rates and the execution of the WORK or any portion thereof finished, complete in every respect and maintained as shown or described in the CONTRACT DOCUMENTS or as may be ordered in writing during the continuance of the CONTRACT.
- iv) SCHEDULE OF RATES TO COVER ROYALTIES, RENTS AND CLAIMS:  
The Schedule of Rates (i.e., VALUE OF CONTRACT) shall be deemed to include and cover the cost of all royalties and fees for the articles and processes, protected by letters, patent or otherwise incorporated in or used in connection with the WORK, also all royalties, rents and other payments in connection with obtaining materials of whatsoever kind for the WORK and shall include an indemnity to the EMPLOYER which the CONTRACTOR hereby gives against all actions, proceedings, claims, damages, costs and expenses arising from the incorporation in or use on the WORK of any such articles, processes or materials, octroi or other municipal or local Board Charges, if levied on materials, equipment or machineries to be brought to site for use on WORK shall be borne by the CONTRACTOR.
- v) SCHEDULE OF RATES TO COVER TAXES AND DUTIES:  
No exemption or reduction of Customs Duties, Goods & Service Tax, quay or any port dues, transport charges, stamp duties or Central or State Government or local Body or Municipal Taxes or duties, taxes or charges (from or of any other body), whatsoever, will be granted or obtained, all of which expenses shall be deemed to be included in and covered by the Schedule or Rates. The CONTRACTOR shall also obtain and pay for all permits or other privileges necessary to complete the WORK.
- vi) SCHEDULE OF RATES TO COVER RISKS OF DELAY:  
The Schedule of Rates shall be deemed to include and cover the risk of all possibilities of delay and interference with the CONTRACTOR's conduct of WORK which occur from any causes including orders of the EMPLOYER in the exercise of his power and on account of extension of time granted due to various reasons and for all other possible or probable causes of delay.
- vii) SCHEDULE OF RATES CANNOT BE ALTERED:  
For WORK under unit rate basis, no alteration will be allowed in the Schedule of Rates by reason of works or any part of them being modified, altered, extended, diminished or committed. The Schedule of Rates are fully inclusive of rates which have been fixed by the CONTRACTOR and agreed to by the EMPLOYER and cannot be altered.

For lump sum CONTRACTS, the payment will be made according to the



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WORK actually carried out, for which purpose an item wise, or work wise  
Schedule of Rates shall be furnished, suitable for evaluating the value of  
WORK done and preparing running account bill.

Payment for any additional work which is not covered in the Schedule of  
Rates shall only be released on issuance of change order.

**88 Procedure for measurement and billing of work in progress:**

**88.1 BILLING PROCEDURE:**

Following procedures shall be adopted for billing of works executed by the  
CONTRACTOR.

88.1.1 All measurements shall be recorded in sextuplicate on standard measurement  
sheets supplied by EMPLOYER and submitted to EMPLOYER for scrutiny and  
passing.

88.1.2 EMPLOYER shall scrutinize and check the measurements recorded on the sheets  
and shall certify correctness of the same on the measurement sheets.

88.1.3 ENGINEER-IN-CHARGE shall pass the bills after carrying out the comprehensive  
checks in accordance with the terms and conditions of the CONTRACTS, within 7  
days of submission of the bills, complete in all respects and send the same to the  
Employer to effect payment to the CONTRACTOR.

88.1.4 MNGL shall make all endeavour to make payments of undisputed amount of the  
bills submitted based on the joint measurements within 15 (Fifteen) days from the  
date of certification by the Engineer-in-Charge.

88.1.5 Measurements shall be recorded as per the methods of measurement spelt out in  
EMPLOYER SPECIFICATIONS / CONTRACT DOCUMENT. EMPLOYER shall  
be fully responsible for checking the measurements quantitatively and qualitatively  
as recorded in the Measurement Books/ Bills.

88.1.6 While preparing the final bills overall measurements will not be taken again. Only  
volume of work executed since the last measured bill along with summary of final  
measurements will be considered for the final bill. However, a detailed check shall  
be made as to missing measurements and in case there are any missing items or  
measurements the same shall be recorded.

**88.2 SECURED ADVANCE ON MATERIAL:**

Unless otherwise provided elsewhere in the tender, no 'Secured Advance' on  
security of materials brought to site for execution of contracted items(s) shall be  
paid to the Contractor whatsoever.

**88.3 DISPUTE IN MODE OF MEASUREMENT:**

In case of any dispute as to the mode of measurement not covered by the  
CONTRACT to be adopted for any item of WORK, mode of measurement as per  
latest Indian Standard Specifications shall be followed.

**88.4 ROUNDING OF AMOUNTS:**

In calculating the amount of each item due to the CONTRACTOR in every  
certificate prepared for payment, sum of less than 50 paise shall be omitted and  
the total amount on each certificate shall be rounded off to the nearest rupees,



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i.e., sum of less than 50 paise shall be omitted and sums of 50 paise and more up to one rupee shall be reckoned as one rupee.

**89 Lump sum in tender:**

- 89.1 The payment against any Lump sum item shall be made only on completion of that item as per the provision of the CONTRACT after certification by ENGINEER-IN-CHARGE.

**90 Running account payments to be regarded as advance:**

- 90.1 All running account payments shall be regarded as payment by way of advance against the final payment only and not as payments for WORK actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected or be considered as an admission of the due performance of the CONTRACT, or any part thereof, in this respect, or of the occurring of any claim by the CONTRACTOR, nor shall it conclude, determine or affect in any way the powers of the EMPLOYER under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise, or in any other way vary or affect the CONTRACT. The final bill shall be submitted by the CONTRACTOR within one month of the date of physical completion of the WORK; otherwise, the ENGINEER-IN-CHARGE's certificate of the measurement and of total amount payable for the WORK accordingly shall be final and binding on all parties

**91 Notice of claims for additional payments:**

- 91.1 Should the CONTRACTOR consider that he is entitled to any extra payment for any extra/additional WORKS or MATERIAL change in original SPECIFICATIONS carried out by him in respect of WORK he shall forthwith give notice in writing to the ENGINEER-IN- CHARGE that he claims extra payment. Such notice shall be given to the ENGINEER-IN- CHARGE upon which CONTRACTOR bases such claims and such notice shall contain full particulars of the nature of such claim with full details of amount claimed. Irrespective of any provision in the CONTRACT to the contrary, the CONTRACTOR must intimate his intention to lodge claim on the EMPLOYER within 10 (ten) days of the commencement of happening of the event and quantify the claim within 30 (thirty) days, failing which the CONTRACTOR will lose his right to claim any compensation/reimbursement/damages etc. or refer the matter to arbitration. Failure on the part of CONTRACTOR to put forward any claim without the necessary particulars as above within the time above specified shall be an absolute waiver thereof. No omission by EMPLOYER to reject any such claim and no delay in dealing therewith shall be waiver by EMPLOYER of any of these rights in respect thereof.
- 91.2 ENGINEER-IN-CHARGE shall review such claims within a reasonably period of time and cause to discharge these in a manner considered appropriate after due deliberations thereon. However, CONTRACTOR shall be obliged to carry on with the WORK during the period in which his claims are under consideration by the EMPLOYER, irrespective of the outcome of such claims, where additional payments for WORKS considered extra are justifiable in accordance with the CONTRACT provisions, EMPLOYER shall arrange to release the same in the same manner as for normal WORK payments. Such of the extra works so admitted by EMPLOYER shall be governed by all the terms, conditions,



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stipulations and specifications as are applicable for the CONTRACT. The rates for extra works shall generally be the unit rates provided for in the CONTRACT. In the event unit rates for extra works so executed are not available as per CONTRACT, payments may either be released on day work basis for which daily/hourly rates for workmen and hourly rates for equipment rental shall apply, or on the unit rate for WORK executed shall be derived by interpolation/extrapolation of unit rates already existing in the CONTRACT. In all the matters pertaining to applicability of rate and admittance of otherwise of an extra work claim of CONTRACTOR the decision of ENGINEER-IN-CHARGE shall be final and binding.

**92 Payment of contractor's bill:**

92.1 No payment shall be made for works estimated to cost less than Rs.10,000/- till the whole of the work shall have been completed and a certificate of completion given. But in case of works estimated to cost more than Rs.10,000/-, that CONTRACTOR on submitting the bill thereof be entitled to receive a monthly payment proportionate to the part thereof approved and passed by the ENGINEER-IN-CHARGE, whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the CONTRACTOR. This payment will be made after making necessary corrections/deductions as stipulated elsewhere in the CONTRACT DOCUMENT for materials, Contract Performance Security, taxes etc.

92.2 Payment due to the CONTRACTOR shall be made by the EMPLOYER by Account Payee cheque forwarding the same to registered office or the notified office of the CONTRACTOR. In no case will EMPLOYER be responsible if the cheque is mislaid or

misappropriated by unauthorized person/persons. In all cases, the CONTRACTOR shall present his bill duly pre-receipted on proper revenue stamp payment shall be made in Indian Currency.

92.3 In general payment of final bill shall be made to CONTRACTOR within 60 days of the submission of bill on joint measurements, after completion of all the obligations under the CONTRACT.

**93 Receipt for payment:**

93.1 Receipt for payment made on account of work when executed by a firm, must be signed by a person holding due power of attorney in this respect on behalf of the CONTRACTOR, except when the CONTRACTOR's are described in their tender as a limited company in which case the receipts must be signed in the name of the company by one of its principal officers or by some other person having authority to give effectual receipt for the company.

**94 Completion certificate:**

**94.1 APPLICATION FOR COMPLETION CERTIFICATE:**

When the CONTRACTOR fulfils his obligation under Clause 81.1 he shall be eligible to apply for COMPLETION CERTIFICATE.

The ENGINEER-IN-CHARGE shall normally issue to the CONTRACTOR the COMPLETION CERTIFICATE within one month after receiving any application



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therefore from the CONTRACTOR after verifying from the completion documents and satisfying himself that the WORK has been completed in accordance with and as set out in the construction and erection drawings, and the CONTRACT DOCUMENTS.

The CONTRACTOR, after obtaining the COMPLETION CERTIFICATE, is eligible to present the final bill for the WORK executed by him under the terms of CONTRACT.

**94.2 COMPLETION CERTIFICATE:**

Within one month of the completion of the WORK in all respects, the CONTRACTOR shall be furnished with a certificate by the ENGINEER-IN-CHARGE of such completion, but no certificate shall be given nor shall the WORK be deemed to have been executed until all scaffolding, surplus materials and rubbish is cleared off the SITE completely nor until the WORK shall have been measured by the ENGINEER-IN-CHARGE whose measurement shall be binding and conclusive. The WORKS will not be considered as complete and taken over by the EMPLOYER, until all the temporary works, labour and staff colonies are cleared to the satisfaction of the ENGINEER-IN-CHARGE.

If the CONTRACTOR fails to comply with the requirements of this clause on or before the date fixed for the completion of the WORK, the ENGINEER-IN-CHARGE may at the expense of the CONTRACTOR remove such scaffolding, surplus materials and rubbish and dispose off the same as he thinks fit and clean off such dirt as aforesaid, and the CONTRACTOR shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

**94.3 COMPLETION CERTIFICATE DOCUMENTS:**

For the purpose of Clause 94.0 the following documents will be deemed to form the completion documents:

- i) The technical documents according to which the WORK was carried out.
- ii) Six (6) sets of construction drawings showing therein the modification and correction made during the course of execution and signed by the ENGINEER- IN-CHARGE.
- iii) COMPLETION CERTIFICATE for 'embedded' and 'covered' up work.
- iv) Certificates of final levels as set out for various works.
- v) Certificates of tests performed for various WORKS.
- vi) Material appropriation, Statement for the materials issued by the EMPLOYER for the WORK and list of surplus materials returned to the EMPLOYER's store duly supported by necessary documents.

**95 Final decision and final certificate:**

- 95.1** Upon expiry of the period of liability and subject to the ENGINEER-IN-CHARGE





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being satisfied that the WORKS have been duly maintained by the CONTRACTOR during monsoon or such period as hereinbefore provided in Clause 80 & 81 and that the CONTRACTOR has in all respect duly made-up any subsidence and performed all his obligations under the CONTRACT, the ENGINEER-IN- CHARGE shall (without prejudice to the rights of the EMPLOYER to retain the provisions of relevant Clause hereof) otherwise give a certificate herein referred to as the FINAL CERTIFICATE to that effect and the CONTRACTOR shall not be considered to have fulfilled the whole of his obligations under CONTRACT until FINAL CERTIFICATE shall have been given by the ENGINEER-IN- CHARGE notwithstanding any previous entry upon the WORK and taking possession, working or using of the same or any part thereof by the EMPLOYER.

**96 Certificate and payments on evidence of completion:**

- 96.1 Except the FINAL CERTIFICATE, no other certificates or payments against a certificate or on general account shall be taken to be an admission by the EMPLOYER of the due performance of the CONTRACT or any part thereof or of occupancy or validity of any claim by the CONTRACTOR.

**97 Deductions from the contract price:**

- 97.1 All costs, damages or expenses which EMPLOYER may have paid or incurred, which under the provisions of the CONTRACT, the CONTRACTOR is liable/will be liable, will be claimed by the EMPLOYER. All such claims shall be billed by the EMPLOYER to the CONTRACTOR regularly as and when they fall due. Such claims shall be paid by the CONTRACTOR within 15 (fifteen) days of the receipt of the corresponding bills and if not paid by the CONTRACTOR within the said period, the EMPLOYER may, then, deduct the amount from any moneys due i.e., Contract Performance Security or becoming due to the CONTRACTOR under the CONTRACT or may be recovered by actions of law or otherwise, if the CONTRACTOR fails to satisfy the EMPLOYER of such claims.

**SECTION-VII Taxes and Insurance**

**98 Taxes, Duties, Octroi / LBT etc:**

- 98.1 The CONTRACTOR agrees to and does hereby accept full and exclusive liability for the payment of any and all Taxes, Duties, including Goods & Service Tax, octroi / LBT etc. now or hereafter imposed, increased, modified, all the taxes, duties, octroi etc. now in force and hereafter increased, imposed or modified, from time to time in respect of WORKS and materials and all contributions and taxes for unemployment compensation, insurance and old age pensions or annuities now or hereafter imposed by any Central or State Government authorities which are imposed with respect to or covered by the wages, salaries, or other compensations paid to the persons employed by the CONTRACTOR and the CONTRACTOR shall be responsible for the compliance of all SUB-CONTRACTORS, with all applicable Central, State, Municipal and local law and regulation and requirement of any Central, State or local Government agency or authority. CONTRACTOR further agrees to defend, indemnify and hold EMPLOYER harmless from any liability or penalty which may be imposed by the Central, State or Local authorities by reason or any violation by CONTRACTOR or SUB-CONTRACTOR of such laws, suits or proceedings that may be brought against the EMPLOYER arising under, growing out of, or by reason of the work



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provided for by this CONTRACT, by third parties, or by Central or State Government authority or any administrative sub-division thereof.

Tax deductions will be made as per the rules and regulations in force in accordance with acts prevailing from time to time.

**99 Goods & Service tax/turnover tax:**

- 99.1 Tenderer should quote all inclusive prices including the liability of Goods & Service Tax / Turnover Tax whether on the works contract as a whole or in respect of bought out components used by the CONTRACTOR in execution of the CONTRACT. EMPLOYER shall not be responsible for any such liability of the CONTRACTOR in respect of this CONTRACT. Since MNGL would be paying CENVAT, Goods & Service Tax, and claims reimbursement / set off for the same contractor shall furnish appropriate invoice to MNGL for such claims / set off by MNGL.

**100 Statutory variations**

- 100.1 Tenderer should quote prices inclusive of Goods & service tax applicable on finished product. Any statutory variations on all taxes & duties, Goods & Service tax to be included on finished product during the contractual completion period, shall be to the Employer's account for which the Contractor will furnish documentary evidence(s) in support of their claims to MNGL. However, any increase in the rate of these taxes and duties (Goods & Service tax) beyond the contractual completion period shall be to Contractor's account and any decrease shall be passed on to MNGL.

**101 Insurance:**

**101.1 GENERAL**

CONTRACTOR shall at his own expense arrange secure and maintain insurance with reputable insurance companies to the satisfaction of the EMPLOYER as follows:

CONTRACTOR at his cost shall arrange, secure and maintain insurance as may be necessary and to its full value for all such amounts to protect the WORKS in progress from time to time and the interest of EMPLOYER against all risks as detailed herein. The form and the limit of such insurance, as defined here in together with the under works thereof in each case should be as acceptable to the EMPLOYER. However, irrespective of work acceptance the responsibility to maintain adequate insurance coverage at all times during the period of CONTRACT shall be that of CONTRACTOR alone. CONTRACTOR's failure in this regard shall not relieve him of any of his responsibilities and obligations under CONTRACT.

Any loss or damage to the equipment, during ocean transportation, port/custom clearance, inland and port handling, inland transportation, storage, erection and commissioning till such time the WORK is taken over by EMPLOYER, shall be to the account of CONTRACTOR. CONTRACTOR shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/or replacement of the parts of the Work damaged or lost. CONTRACTOR shall provide the EMPLOYER with a copy of all insurance policies and documents taken out by him in pursuance of the CONTRACT. Such copies of document shall





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be submitted to the EMPLOYER immediately upon the CONTRACTOR having taken such insurance coverage. CONTRACTOR shall also inform the EMPLOYER at least 60(Sixty) days in advance regarding the expiry cancellation and/or changes in any of such documents and ensure revalidation/renewal etc., as may be necessary well in time.

Statutory clearances, if any, in respect of foreign supply required for the purpose of replacement of equipment lost in transit and/or during erection, shall be made available by the EMPLOYER. CONTRACTOR shall, however, be responsible for

obtaining requisite licenses, port clearances and other formalities relating to such import. The risks that are to be covered under the insurance shall include, but not be limited to the loss or damage in handling, transit, theft, pilferage, riot, civil commotion, weather conditions, accidents of all kinds, fire, war risk (during ocean transportation only) etc. The scope of such insurance shall cover the entire value of supplies of equipments, plants and materials to be imported from time to time.

All costs on account of insurance liabilities covered under CONTRACT will be to CONTRACTOR's account and will be included in VALUE OF CONTRACT. However, the EMPLOYER may from time to time, during the currency of the CONTRACT, ask the CONTRACTOR in writing to limit the insurance coverage risk and in such a case, the parties to the CONTRACT will agree for a mutual settlement, for reduction in VALUE OF CONTRACT to the extent of reduced premium amounts.

CONTRACTOR as far as possible shall cover insurance with Indian Insurance Companies, including marine Insurance during ocean transportation.

i) EMPLOYEES STATE INSURANCE ACT:

The CONTRACTOR agrees to and does hereby accept full and exclusive liability for the compliance with all obligations imposed by the Employee State Insurance Act 1948 and the CONTRACTOR further agrees to defend, indemnify and hold EMPLOYER harmless for any liability or penalty which may be imposed by the Central, State or Local authority by reason of any asserted violation by CONTRACTOR or SUB-CONTRACTOR of the Employees' State Insurance Act, 1948, and also from all claims, suits or proceeding that may be brought against the EMPLOYER arising under, growing out of or by reasons of the work provided for by this CONTRACTOR, by third parties or by Central or State Government authority or any political sub- division thereof.

The CONTRACTOR agrees to fill in with the Employee's State Insurance Corporation, the Declaration Forms, and all forms which may be required in respect of the CONTRACTOR's or SUB- CONTRACTOR's employees, who are employed in the WORK provided for or those covered by ESI from time to time under the Agreement. The CONTRACTOR shall deduct and secure the agreement of the SUB- CONTRACTOR to deduct the employee's contribution as per the first schedule of the Employee's State Insurance Act from wages and affix the Employees Contribution Card at wages payment intervals. The CONTRACTOR shall remit and secure the agreement of SUB-CONTRACTOR to remit to the State Bank of India, Employee's State Insurance Corporation Account, the Employee's contribution as required by the Act. The CONTRACTOR agrees to



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maintain all cards and Records as required under the Act in respect of employees and payments and the CONTRACTOR shall secure the agreement of the SUBCONTRACTOR to maintain such records. Any expenses incurred for the contributions, making contributions or maintaining records shall be to the CONTRACTOR's or SUB-CONTRACTOR's account.

The EMPLOYER shall retain such sum as may be necessary from the total VALUE OF CONTRACT until the CONTRACTOR shall furnish satisfactory proof that all contributions as required by the Employees State Insurance Act, 1948, have been paid. This will be pending on the CONTRACTOR when the ESI Act is extended to the place of work.

- ii) WORKMEN COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE: Insurance shall be effected for all the CONTRACTOR's employees engaged in the performance of this CONTRACT. If any of the work is sublet, the CONTRACTOR shall require the SUB-CONTRACTOR to provide workman's Compensation and employer's liability insurance for the later's employees if such employees are not covered under the CONTRACTOR's Insurance.
- iii) ACCIDENT OR INJURY TO WORKMEN:  
The EMPLOYER shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the Employment of the CONTRACTOR or any SUB-CONTRACTOR save and except an accident or injury resulting from any act or default of the EMPLOYER, his agents or servants and the CONTRACTOR shall indemnify and keep indemnified the EMPLOYER against all such damages and compensation (save and except and aforesaid) and against all claims, demands, proceeding, costs, charges and expenses, whatsoever in respect or in relation thereto.
- iv) TRANSIT INSURANCE  
In respect of all items to be transported by the CONTRACTOR to the SITE of WORK, the cost of transit insurance should be borne by the CONTRACTOR and the quoted price shall be inclusive of this cost.
- v) COMPREHENSIVE AUTOMOBILE INSURANCE  
  
This insurance shall be in such a form as to protect the Contractor against all claims for injuries, disability, disease and death to members of public including EMPLOYER's men and damage to the property of others arising from the use of motor vehicles during on or off the 'site' operations, irrespective of the Employer ship of such vehicles.
- vi) COMPREHENSIVE GENERAL LIABILITY INSURANCE
  - a) This insurance shall protect the Contractor against all claims arising from injuries, disabilities, disease or death of member of public or damage to property of others due to any act or omission on the part of the Contractor, his agents, his employees, his representatives and Sub- Contractor's or from riots, strikes and civil commotion.

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- b) Contractor shall take suitable Group Personal Accident Insurance Cover for taking care of injury, damage or any other risks in respect of his Engineers and other Supervisory staff who are not covered under Employees State Insurance Act.
- c) The policy shall cover third party liability. The third party (liability shall cover the loss/ disablement of human life (person not belonging to the Contractor) and also cover the risk of damage to others materials/ equipment/ properties during construction, erection and commissioning at site. The value of third party liability for compensation for loss of human life or partial/full disablement shall be of required statutory value but not less than Rs. 2 lakhs per death, Rs. 1.5 lakhs per full disablement and Rs. 1 lakh per partial disablement and shall nevertheless cover such compensation as may be awarded by Court by Law in India and cover for damage to others equipment/ property as approved by the Purchaser. However, third party risk shall be maximum up to Rs. 10(ten) lakhs to death.
- d) The Contractor shall also arrange suitable insurance to cover damage, loss, accidents, risks etc., in respect of all his plant, equipments and machinery, erection tools & tackles and all other temporary attachments brought by him at site to execute the work.
- e) The Contractor shall take out insurance policy in the joint name of EMPLOYER and Contractor from one or more nationalized insurance company from any branch office at Project site.
- f) Any such insurance requirements as are hereby established as the minimum policies and coverages which Contractor must secure and keep in force must be complied with, Contractor shall at all times be free to obtain additional or increased coverages at Contractor's sole expenses.
- vii) ANY OTHER INSURANCE REQUIRED UNDER LAW OR REGULATIONS OR BY EMPLOYER:  
CONTRACTOR shall also carry and maintain any and all other insurance(s) which he may be required under any law or regulation from time to time without any extra cost to EMPLOYER. He shall also carry and maintain any other insurance which may be required by the EMPLOYER.

## **102 Damage to Property or to any Person or any Third Party**

- 102.1 i) CONTRACTOR shall be responsible for making good to the satisfaction of the EMPLOYER any loss or any damage to structures and properties belonging to the EMPLOYER or being executed or procured or being procured by the EMPLOYER or of other agencies within in the premises of all the work of the EMPLOYER, if such loss or damage is due to fault and/or the negligence or willful acts or omission of the CONTRACTOR, his employees, agents, representatives or SUB-CONTRACTOR.
- ii) The CONTRACTOR shall take sufficient care in moving his plants,



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equipments and materials from one place to another so that they do not cause any damage to any person or to the property of the EMPLOYER or any third party including overhead and underground cables and in the event of any damage resulting to the property of the EMPLOYER or of a third party during the movement of the aforesaid plant, equipment or materials the cost of such damages including eventual loss of production, operation or services in any plant or establishment as estimated by the EMPLOYER or ascertained or demanded by the third party shall be borne by the CONTRACTOR. Third party liability risk shall be Rupees One lakh for single accident and limited to Rupees Ten lakhs.

- iii) The CONTRACTOR shall indemnify and keep the EMPLOYER harmless of all claims for damages to property other than EMPLOYER's property arising under or by reason of this agreement, if such claims result from the fault and/or negligence or willful acts or omission of the CONTRACTOR, his employees, agents, representative of SUB-CONTRACTOR.

**SECTION-VIII Labour Laws**

**103 Labour laws:**

- 103.1 i) No labour below the age of 18 (eighteen) years shall be employed on the WORK.
- ii) The CONTRACTOR shall not pay less than what is provided under law to labourers engaged by him on the WORK.
- iii) The CONTRACTOR shall at his expense comply with all labour laws and keep the EMPLOYER indemnified in respect thereof.
- iv) The CONTRACTOR shall pay equal wages for men and women in accordance with applicable labour laws.
- v) If the CONTRACTOR is covered under the Contract labour (Regulation and Abolition) Act, he shall obtain a license from licensing authority (i.e. office of the labour commissioner) by payment of necessary prescribed fee and the deposit, if any, before starting the WORK under the CONTRACT. Such fee/deposit shall be borne by the CONTRACTOR.
- vi) The CONTRACTOR shall employ labour in sufficient numbers either directly or through SUB- CONTRACTOR's to maintain the required rate of progress and of
- quality to ensure workmanship of the degree specified in the CONTRACT and to the satisfaction of the ENGINEER-IN-CHARGE.
- vii) The CONTRACTOR shall furnish to the ENGINEER-INCHARGE the distribution return of the number and description, by trades of the work people employed on the works. The CONTRACTOR shall also submit on the 4th and 19th of every month to the ENGINEER-IN-CHARGE a true statement showing in respect of the second half of the preceding month and the first half of the current month (1) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them and (2)



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the number of female workers who have been allowed Maternity Benefit as provided in the Maternity Benefit Act 1961 on Rules made there under and the amount paid to them.

- viii) The CONTRACTOR shall comply with the provisions of the payment of Wage Act 1936, Employee Provident Fund Act 1952, Minimum Wages Act 1948, Employers Liability Act 1938, Workmen's Compensation Act 1923, Industrial Disputes Act 1947, the Maternity Benefit Act 1961 and Contract Labour Regulation and Abolition Act 1970, Employment of Children Act 1938 or any modifications thereof or any other law relating thereto and rules made there under from time to time.
- ix) The ENGINEER-IN-CHARGE shall on a report having been made by an Inspecting Officer as defined in Contract Labour (Regulation and Abolition) Act 1970 have the power to deduct from the money due to the CONTRACTOR any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfillment of the Conditions of the Contract for the benefit of workers, non-payment of wages or of deductions made from his or their wages which are not justified by the terms of the Contract or non-observance of the said regulations.
- x) The CONTRACTOR shall indemnify the EMPLOYER against any payments to be made under and for the observance of the provisions of the aforesaid Acts without prejudice to his right to obtain indemnity from his SUB-CONTRACTOR's. In the event of the CONTRACTOR committing a default or breach of any of the provisions of the aforesaid Acts as amended from time to time, of furnishing any information or submitting or filling and Form/ Register/ Slip under the provisions of these Acts which is materially incorrect then on the report of the inspecting Officers, the CONTRACTOR shall without prejudice to any other liability pay to the EMPLOYER a sum not exceeding Rs.50.00 as Liquidated Damages for every default, breach or furnishing, making, submitting, filling materially incorrect statement as may be fixed by the ENGINEER-IN-CHARGE and in the event of the CONTRACTOR's default continuing in this respect, the Liquidated Damages may be enhanced to Rs.50.00 per day for each day of default subject to a maximum of one percent of the estimated cost of the WORK put to tender. The ENGINEER-IN-CHARGE shall deduct such amount from bills or Contract Performance Security of the CONTRACTOR and credit the same to the Welfare Fund constitute under these acts. The decision of the ENGINEER-IN-CHARGE in this respect shall be final and binding.

**104 Implementation of apprentices act, 1961:**

- 104.1 The CONTRACTOR shall comply with the provisions of the Apprentices Act, 1961 and the Rules and Orders issued there under from time to time. If he fails to do so, his failure will be a breach of the CONTRACT and the ENGINEER-IN-CHARGE may, at his discretion, cancel the CONTRACT. The CONTRACTOR shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions, of the Act.

**105 Contractor to indemnify the employer:**



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- 105.1 i) The CONTRACTOR shall indemnify the EMPLOYER and every member, office and employee of the EMPLOYER, also the ENGINEER-IN-CHARGE and his staff against all actions, proceedings, claims, demands, costs and expenses whatsoever arising out of or in connection with the matters referred to in Clause 102.0 and elsewhere and all actions, proceedings, claims, demands, costs and expenses which may be made against the EMPLOYER for or in respect of or arising out of any failure by the CONTRACTOR in the performance of his obligations under the CONTRACT DOCUMENT. The EMPLOYER shall not be liable for or in respect of or arising out of any failure by the CONTRACTOR in the performance of his obligations under the CONTRACT DOCUMENT. The EMPLOYER shall not be liable for or in respect of any demand or compensation payable by law in respect or in consequence of any accident or injury to any workmen or other person. In the employment of the CONTRACTOR or his SUB- CONTRACTOR the CONTRACTOR shall indemnify and keep indemnified the EMPLOYER against all such damages and compensations and against all claims, damages, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.
- ii) PAYMENT OF CLAIMS AND DAMAGES:  
Should the EMPLOYER have to pay any money in respect of such claims or demands as aforesaid the amount so paid and the costs incurred by the EMPLOYER shall be charged to and paid by the CONTRACTOR and the CONTRACTOR shall not be at liberty to dispute or question the right of the EMPLOYER to make such payments notwithstanding the same, may have been made without the consent or authority or in law or otherwise to the contrary.
- iii) In every case in which by virtue of the provisions of Section 12, Sub-section (i) of workmen's compensation Act, 1923 or other applicable provision of Workmen Compensation Act or any other Act, the EMPLOYER is obliged to pay compensation to a workman employed by the CONTRACTOR in execution of the WORK, the EMPLOYER will recover from the CONTRACTOR the amount of the compensation so paid, and without prejudice to the rights of EMPLOYER under Section 12, Sub- section (2) of the said act, EMPLOYER shall be at liberty to recover such amount or any part thereof by deducting it from the Contract Performance Security or from any sum due to the CONTRACTOR whether under this CONTRACT or otherwise. The EMPLOYER shall not be bound to contest any claim made under Section 12, Sub-section (i) of the said act, except on the written request of the CONTRACTOR and upon his giving to the EMPLOYER full security for all costs for which the EMPLOYER might become liable in consequence of contesting such claim.

**106 Health and sanitary arrangements for workers:**

- 106.1 In respect of all labour directly or indirectly employed in the WORKS for the performance of the CONTRACTOR's part of this agreement, the CONTRACTOR shall comply with or cause to be complied with all the rules and regulations of the local sanitary and other authorities or as framed by the EMPLOYER from time to time for the protection of health and sanitary arrangements for all workers.





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- 106.2 The CONTRACTOR shall provide in the labour colony all amenities such as electricity, water and other sanitary and health arrangements. The CONTRACTOR shall also provide necessary surface transportation to the place of work and back to the colony for their personnel accommodated in the labour colony.

**SECTION-IX Applicable Laws and Settlement of Disputes**

**107 Arbitration:**

- 107.1 Unless otherwise specified, the matters where decision of the Engineer-in-Charge is deemed to be final and binding as provided in the Agreement and the issues/disputes which cannot be mutually resolved within a reasonable time, all disputes shall be referred to arbitration by Sole Arbitrator.

The Employer [Maharashtra Natural Gas Limited] shall suggest a panel of three independent and distinguished persons to the bidder/contractor/supplier/buyer (as the case may be) to select any one among them to act as the Sole Arbitrator.

In the event of failure of the other parties to select the Sole Arbitrator within 30 days from the receipt of the communication suggesting the panel of arbitrators, the right of selection of the sole arbitrator by the other party shall stand forfeited and the EMPLOYER (MNGL) shall have discretion to proceed with the appointment of the Sole Arbitrator. The decision of Employer on the appointment of the sole arbitrator shall be final and binding on the parties.

The award of sole arbitrator shall be final and binding on the parties and unless directed/awarded otherwise by the sole arbitrator, the cost of arbitration proceedings shall be shared equally by the parties. The Arbitration proceedings shall be in English language and venue shall be Pune, India.

Subject to the above, the provisions of (Indian) Arbitration & Conciliation ACT 1996 and the Rules framed there under shall be applicable. All matters relating to this contract are subject to the exclusive jurisdiction of the court situated at Pune.

Bidders/suppliers/contractors may please note that the Arbitration & Conciliation Act 1996 was enacted by the Indian Parliament and is based on United Nations Commission on International Trade Law (UNCITRAL model law), which were prepared after extensive consultation with Arbitral Institutions and centers of International Commercial Arbitration. The United Nations General Assembly vide resolution 31/98 adopted the UNCITRAL Arbitration rules on 15 December 1976.

**108 Jurisdiction:**

The CONTRACT shall be governed by and constructed according to the laws in force in INDIA. The CONTRACTOR hereby submits to the jurisdiction of the Courts situated Pune in **MAHARASHTRA STATE** as applicable for the purposes of disputes, actions and proceedings arising out of the CONTRACT, the courts at Pune in **MAHARASHTRA**

**STATE** only will have the jurisdiction to hear and decide such disputed, actions and proceedings.

**SECTION-X Safety Codes**



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**109 General:**

- 109.1 CONTRACTOR shall adhere to safe construction practice and guard against hazardous and unsafe working conditions and shall comply with EMPLOYER's safety rules as set forth herein. Prior to start of construction, CONTRACTOR will be furnished copies of EMPLOYER's "Safety Code" for information and guidance, if it has been prepared.

**110 Safety regulations:**

- 110.1 i) In respect of all labour, directly employed in the WORK for the performance of CONTRACTOR's part of this agreement, the CONTRACTOR shall at his own expense arrange for all the safety provisions as per safety codes of C.P.W.D., Indian Standards Institution. The Electricity Act, The Mines Act and such other acts as applicable.
- ii) The CONTRACTOR shall observe and abide by all fire and safety regulations of the EMPLOYER. Before starting construction work CONTRACTOR shall consult with EMPLOYER's safety Engineers or ENGINEER- IN-CHARGE and must make good to the satisfaction of the EMPLOYER any loss or damage due to fire to any portion of the work done or to be done under this agreement or to any of the EMPLOYER's existing property.

**111 First aid and industrial injuries:**

- 111.0 i) CONTRACTOR shall maintain first aid facilities for its employees and those of its SUB-CONTRACTOR.
- ii) CONTRACTOR shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Names of those providing these services shall be furnished to EMPLOYER prior to start of construction and their telephone numbers shall be prominently posted in CONTRACTOR's field office.
- iii) All critical industrial injuries shall be reported promptly to EMPLOYER, and a copy of CONTRACTOR's report covering each personal injury requiring the attention of a physician shall be furnished to the EMPLOYER.


**112 General rules:**

- 112.1 Smoking within the premises of City Gas Station is strictly prohibited. Violators of the no smoking rules shall be discharged immediately.

**113 Contractor's barricades:**

- 113.0 i) CONTRACTOR shall erect and maintain barricades required in connection with his operation to guard or protect:-
- a) Excavations
  - b) Hoisting Areas.
  - c) Areas adjudged hazardous by CONTRACTOR's or EMPLOYER's inspectors.



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- d) EMPLOYER's existing property subject to damage by CONTRACTOR's Operations.
- e) Rail Road unloading spots.
- ii) CONTRACTOR's employees and those of his SUBCONTRACTOR's shall become acquainted with EMPLOYER's barricading practice and shall respect the provisions thereof.
- iii) Barricades and hazardous areas adjacent to, but not located in normal routes of travel shall be marked by red flasher lanterns at nights.

#### **114 Scaffolding:**

- 114.1
- i) Suitable scaffolding should be provided for workmen for all works that cannot safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used an extra Mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying material as well, suitable footholds and handholds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical).
  - ii) Scaffolding or staging more than 4 meters above the ground or floor, swing suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise retarded at least one meter high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
  - iii) Working platform, gangway and stairway should be so constructed that they should not sag unduly or unequally and if the height of platform of the gangway or the stairway is more than 4 meters above the ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as in ii) above.
  - iv) Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing of railing whose minimum heights shall be 1 meter.
  - v) Safe-means of access shall be provided to all working platforms and other working places, every ladder shall be securely fixed. No portable single ladder shall be over 9 meters in length while the width between side rails in rung ladder shall in no case be less than 30 cm for ladder up to and including 3 meters in length. For longer ladder this width should be increased 5mm for each additional foot of length. Uniform steps spacing shall not exceed 30 cms. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed to cause danger or inconvenience to any person or public. The CONTRACTOR shall also provide all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the expenses of defense of every suit, action or other proceeding of law that may be brought by any person for injury



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sustained owing to neglect of the above precautions and pay any damages and costs which may be awarded in any such suit or action or proceeding to any such person or which may with the consent of the CONTRACTOR be paid to compromise any claim by any such person.


**115 Excavation and trenching:**

- 115.1 All trenches 1.2 meters or more in depth shall at all times be supplied with at least one ladder for each 50 meters length or fraction thereof.

Ladder shall be extended from bottom of the trenches to at least 1 meter above the surface of the ground. The sides of the trenches which are 1.5M in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated materials shall not be placed within 1.5 meters of the edge of the trench or half of the trench width whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or under-cutting shall be done.

**116 Demolition/general safety:**

- 116.1 i) Before any demolition work is commenced and also during the progress of the demolition work
- a) All roads and open areas adjacent to the work site shall either be closed or suitably protected.
  - b) No electric cable or apparatus which is liable to be a source of danger shall remain electrically charged.
  - c) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.
- ii) All necessary personal safety equipment as considered adequate by the ENGINEER-IN-CHARGE should be kept available for the use of the persons employed on the SITE and maintained in condition suitable for immediate use, and the CONTRACTOR shall take adequate steps to ensure proper use of equipment by those concerned.
- a) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.
  - b) Those engaged in white washing and mixing or stacking or cement bags or any material which are injurious to the eyes be provided with protective goggles.
  - c) Those engaged in welding and cutting works shall be provided with protective face & eye shield, hand gloves, etc.
  - d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
  - e) When workers are employed in sewers and manholes, which are in use, the CONTRACTOR shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or board to prevent accident to the public.

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- f) The CONTRACTOR shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken.
- 1) No paint containing lead or lead product shall be used except in the form of paste or readymade paint.
  - 2) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.
  - 3) Overalls shall be supplied by the CONTRACTOR to the workmen and adequate facilities shall be provided to enable the working painters to wash them during and on cessation of work.
- iii) When the work is done near any place where there is risk of drowning, all necessary safety equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.
- iv) Use of hoisting machines and tackles including their attachments, anchorage and supports shall conform to the following standards or conditions:
- a) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defect and shall be kept in good working order.
  - b) Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength and free from patent defects.
  - c) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding, winch or give signals to the operator.
  - d) In case of every hoisting machine and of every chain ring hook, shackle, swivel, and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gears referred to above shall be plainly marked with the safe working load of the conditions under which it is applicable and the same shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond safe working load except for the purpose of testing.
  - e) In case of departmental machine, the safe working load shall be notified by the ENGINEER- IN-CHARGE. As regards CONTRACTOR's machines, the CONTRACTOR shall notify the safe working load of the machine to the ENGINEER-IN-CHARGE whenever he brings any machinery to SITE of WORK and get it verified by the Engineer concerned.
- v) Motors, gears, transmission lines, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as to reduce to minimum the accidental descent of the load, adequate precautions



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should be taken to reduce the minimum risk of any part or parts of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves, and boots as may be necessary should be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

- vi) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffolds, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.
- vii) These safety provisions should be brought to the notice of all concerned by displaying on a notice board at a prominent place at the work-spot. The person responsible for compliance of the safety code shall be named therein by the CONTRACTOR.
- viii) To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the CONTRACTOR shall be open to inspection by the Welfare Officer, ENGINEER-IN- CHARGE or safety Engineer of the Administration or their representatives.
- ix) Notwithstanding the above clauses there is nothing in these to exempt the CONTRACTOR for the operations of any other Act or rules in force in the Republic of India. The work throughout including any temporary works shall be carried out in such a manner as not to interfere in any way whatsoever with the traffic on any roads or footpath at the site or in the vicinity thereto or any existing works whether the property of the Administration or of a third party.

In addition to the above, the CONTRACTOR shall abide by the safety code provision as per C.P.W.D. Safety code and Indian Standard Safety Code from time to time.

**117 Care in handling inflammable gas:**

- 117.1 The CONTRACTOR has to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinder/inflammable liquids/paints etc. as required under the law and/or as advised by the fire Authorities of the EMPLOYER

**118 Temporary combustible structures:**

- 118.1 Temporary combustible structures will not be built near or around work site.

**119 Precautions against fire:**

- 119.1 The CONTRACTOR will have to provide Fire Extinguishers, Fire Buckets and drums at worksite as recommended by ENGINEER-IN-CHARGE. They will have to ensure all precautionary measures and exercise utmost care in handling the inflammable gas cylinders/ inflammable liquid/ paints etc. as advised by ENGINEER-IN-CHARGE. Temporary combustible structures will not be built near or around the work-site.



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**120 Explosives:**

- 120.1 Explosives shall not be stored or used on the WORK or on the SITE by the CONTRACTOR without the permission of the ENGINEER-IN-CHARGE in writing and then only in the manner and to the extent to which such permission is given. When explosives are required for the WORK they will be stored in a special magazine to be provided at the cost of the CONTRACTOR in accordance with the Explosives Rules. The CONTRACTOR shall obtain the necessary license for the storage and the use of explosives and all operations in which or for which explosives are employed shall be at sole risk and responsibility of the CONTRACTOR and the CONTRACTOR shall indemnify the EMPLOYER against any loss or damage resulting directly or indirectly there from.

**121 Mines act:**

- 121.1 SAFETY CODE: The CONTRACTOR shall at his own expense arrange for the safety provisions as required by the ENGINEER-IN-CHARGE in respect of all labour directly employed for performance of the WORKS and shall provide all facilities in connection therewith. In case the CONTRACTOR fails to make arrangements and provides necessary facilities as aforesaid, the ENGINEER-IN-CHARGE shall be entitled to do so and recover the costs thereof from the CONTRACTOR.
- 121.2 Failure to comply with Safety Code or the provisions relating to report on accidents and to grant of maternity benefits to female workers shall make the CONTRACTOR liable to pay Company Liquidated Damages an amount not exceeding Rs.50/- for each default or materially incorrect statement. The decision of the ENGINEER-IN-CHARGE in such matters based on reports from the Inspecting Officer or from representatives of ENGINEER-IN-CHARGE shall be final and binding and deductions for recovery of such Liquidated Damages may be made from any amount payable to the CONTRACTOR from all the provisions of the Mines Act, 1952 or any statutory modifications or re-enactment thereof the time being in force and any Rules and Regulations made there under in respect of all the persons employed by him under this CONTRACT and shall indemnify the EMPLOYER from and against any claim under the Mines Act or the rules and regulations framed there under by or on behalf of any persons employed by him or otherwise.

**122 Preservation of place:**

- 122.1 The CONTRACTOR shall take requisite precautions and use his best endeavours to prevent any riotous or unlawful behaviour by or amongst his worker and others employed or the works and for the preservation of peace and protection of the inhabitants and security of property in the neighborhood of the WORK. In the event of the EMPLOYER requiring the maintenance of a Special Police Force at or in the vicinity of the site during the tenure of works, the expenses thereof shall be borne by the CONTRACTOR and if paid by the EMPLOYER shall be recoverable from the CONTRACTOR.

**123 Outbreak of infectious diseases:**

- 123.1 The CONTRACTOR shall remove from his camp such labour and their facilities



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who refuse protective inoculation and vaccination when called upon to do so by the ENGINEER-IN-CHARGE's representative. Should Cholera, Plague or other infectious diseases break out the CONTRACTOR shall burn the huts, beddings, clothes and other belongings or used by the infected parties and promptly erect new huts on healthy sites as required by the ENGINEER-IN-CHARGE failing which within the time specified in the Engineer's requisition, the work may be done by the EMPLOYER and the cost thereof recovered from the CONTRACTOR.

**124 Use of intoxicants:**

- 124.1 The unauthorized sale of spirits or other intoxicants, beverages upon the work in any of the buildings, encampments or tenements owned, occupied by or within the control of the CONTRACTOR or any of his employee is forbidden and the CONTRACTOR shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition.
- In addition to the above, the CONTRACTOR shall abide by the safety code provision as per C.P.W.D. safety code and Indian Standard Code framed from time to time.



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**Annexure-I to GCC**

**PROFORMA OF INDEMNITY BOND FOR SUPPLY OF MATERIALS BY EMPLOYER**

(To be executed on non-judicial stamped paper of appropriate value)

WHEREAS MAHARASHTRA NATURAL GAS LIMITED (hereinafter referred to as MNGL ) which expression shall unless repugnant to the context includes their legal representatives, successors and assigns having their registered office at Pune has entered into a CONTRACT with \_\_\_\_\_(hereinafter referred to as the CONTRACTOR which expression shall unless repugnant to the context include their legal representatives, successors and assigns) for \_\_\_\_\_on the terms and conditions as set out, inter-alia, in the CONTRACT No..... Dated..... and various documents forming part thereof hereinafter collectively referred to as the "CONTRACT" which expression shall include all amendments, modifications and/or variations thereto.


**AND WHEREAS**

- i) MNGL has agreed to supply to the CONTRACTOR, equipment, plants and materials (finished, semi-finished and raw)for the purpose of EXECUTION of the said CONTRACT by the CONTRACTOR (the equipment, plants and materials to be supplied by MNGL to the CONTRACTOR, hereinafter for the sake of brevity referred to as the "said materials") and pending execution by the CONTRACTOR of the CONTRACT incorporating the said materials, the said materials shall be under the custody and charge of the CONTRACTOR and shall be kept, stored, altered, worked upon and/or fabricated at the sole risk and expense of the CONTRACTOR.
- ii) As a pre-condition to the supply of the said materials by MNGL to the CONTRACTOR, MNGL has required the CONTRACTOR to furnish to MNGL an Indemnity Bond in the manner and upon terms and conditions hereinafter indicated.

NOW, THEREFORE, in consideration of the premises aforesaid the CONTRACTOR hereby irrevocably and unconditionally undertakes to indemnify and keep indemnified MNGL from and against all loss, damage and destruction (inclusive but not limited to any or all loss or damage or destruction to or of the said materials or any item or part thereof by theft, pilferage, fire, flood, storm, tempest, lightning, explosion, storage, chemical or physical action or reaction, binding, warping, exposure, rusting, faulty workmanship, faulty fabrication, or faulty method or technique of fabrication, strike, riot, civil commotion, or other act or omission or commission whatsoever within or beyond the control of the CONTRACTOR, misuse and misappropriation (inclusive but not limited to the misuse or misappropriation by the CONTRACTOR and the Contractor's servants and/or agents) whatsoever to, or of in the said materials or any part of them thereof from the date that the same or relative part of item thereof was supplied to the CONTRACTOR up to and until the date of return to MNGL of the said materials or relative part of item thereof or completed fabricated works(s) incorporating the said material and undertake to pay to MNGL forthwith on demand in writing without protest or demur the value as specified by MNGL of the said material or item or part thereof, lost, damaged, destroyed, misused and/or misappropriated, as the case may be or, together with MNGL 'S costs and expenses (inclusive of but not limited to handling, transportation, cartage, insurance, freight, packing and inspection costs/or expenses up to) and aggregate limit of

Rs. \_\_\_\_\_ (Rupees  
\_\_\_\_\_).



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AND THE CONTRACTOR hereby agrees with MNGL that:

- i) This Indemnity/Undertaking shall be a continuing Indemnity/ Undertaking and shall remain valid and irrevocable for all claims of MNGL arising hereunder up to and until the midnight of \_\_\_\_\_. However, if the CONTRACT for which this Indemnity/Undertaking is given is not completed by this date, the CONTRACTOR hereby agrees to extend the Indemnity/Undertaking till such time as is required to fulfill the CONTRACT.
- ii) This Indemnity/Undertaking shall not be determined by any change in constitution or upon insolvency of the CONTRACTOR but shall be in all respects and for all purposes be binding and operative until payment of all moneys payable to MNGL in terms of hereof.
- iii) The mere statement of allegation made by or on behalf of MNGL in any notice or demand or other writing addressed to the CONTRACTOR as to any of the said material or item or part thereof having been lost , damaged, destroyed, misused or misappropriated while in the custody of the CONTRACTOR and/or prior to completion of the completed fabricated work(s) and delivery to job site thereof incorporating the said materials shall be conclusive of the factum of the said material or item or part thereof having been supplied to the CONTRACTOR and/or the loss, damage, destruction, misuse or misappropriation thereof, as the case may be, while in the custody of the CONTRACTOR and/or prior to the completion of the completed fabricated work(s) and delivery to job site thereof incorporating the said materials without necessity on the part of MNGL to produce any documentary proof or other evidence whatsoever in support of this.
- iv) The amount stated in any notice of demand addressed by MNGL to the CONTRACTOR as to the value of such said materials lost, damaged, destroyed, misused or misappropriated, inclusive relative to the costs and expenses incurred by MNGL in connection therewith shall be conclusive of the value of such said materials and the said cost and expenses as also of the amount liable to be paid to MNGL to produce any voucher, bill or other documentation or evidence whatsoever in support thereof and such amount shall be paid without any demur and on demand and no dispute shall be raised concerning the same.

The undersigned has full power to execute this Indemnity Bond on behalf of the CONTRACTOR under the Power of Attorney dated\_\_\_\_\_.

(SIGNED BY COMPETENT AUTHORITY)

Place:

Dated:

Official seal of the CONTRACTOR





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**Annexure-II to GCC**

**PROFORMA FOR CONTRACT AGREEMENT**

SO No. MNGL /

dated -----

Contract Agreement for the work of ----- of Maharashtra Natural Gas Limited made on ---  
----- between (Name and Address)-----, hereinafter called the "CONTRACTOR"  
(which term shall unless excluded by or repugnant to the subject or context include its  
successors and permitted assignees) of the one part and MAHARASHTRA NATURAL  
GAS LIMITED hereinafter called the "EMPLOYER" (which term shall, unless excluded by  
or repugnant to the subject or context include its successors and assignees) of the other  
part.

**WHEREAS**

- A. The EMPLOYER being desirous of having provided and executed certain work mentioned, enumerated or referred to in the Tender Documents including Letter Inviting Tender, General Tender Notice, General Conditions of Contract, Special Conditions of Contract, Specifications, Drawings, Plans, Time Schedule of completion of jobs, Schedule of Rates, Agreed Variations, other documents has called for Tender.
- B. The CONTRACTOR has inspected the SITE and surroundings of WORK specified in the Tender Documents and has satisfied himself by careful examination before submitting his tender as to the nature of the surface, strata, soil, sub-soil and ground, the form and nature of site and local conditions, the quantities, nature and magnitude of the work, the availability of labour and materials necessary for the execution of work, the means of access to SITE, the supply of power and water thereto and the accommodation he may require and has made local and independent enquiries and obtained complete information as to the matters and thing referred to, or implied in the tender documents or having any connection therewith and has considered the nature and extent of all probable and possible situations, delays, hindrances or interferences to or with the execution and completion of the work to be carried out under the CONTRACT, and has examined and considered all other matters, conditions and things and probable and possible contingencies, and generally all matters incidental thereto and ancillary thereof affecting the execution and completion of the WORK and which might have influenced him in making his tender.
- C. The Tender Documents including the Notice Letter Inviting Tender, General Conditions of Contract, Special Conditions of Contract, Schedule of Rates, General Obligations, SPECIFICATIONS, DRAWINGS, PLANS, Time Schedule for completion of Jobs, Letter of Acceptance of Tender and any statement of agreed variations with its enclosures copies of which are hereto annexed form part of this CONTRACT though separately set out herein and are included in the expression "CONTRACT" wherever herein used.

**AND WHEREAS**

The EMPLOYER accepted the Tender of the CONTRACTOR for the provision and the execution of the said WORK at the rates stated in the schedule of quantities of the work and finally approved by EMPLOYER (hereinafter called the "Schedule of Rates") upon the



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terms and subject to the conditions of CONTRACT.

NOW THIS AGREEMENT WITNESSETH AND IT IS HEREBY AGREED AND  
DECLARED AS FOLLOWS:-

1. In consideration of the payment to be made to the CONTRACTOR for the WORK to be executed by him, the CONTRACTOR hereby covenants with EMPLOYER that the CONTRACTOR shall and will duly provide, execute and complete the said work and shall do and perform all other acts and things in the CONTRACT mentioned or described or which are to be implied there from or may be reasonably necessary for the completion of the said WORK and at the said times and in the manner and subject to the terms and conditions or stipulations mentioned in the contract.
2. In consideration of the due provision execution and completion of the said WORK, EMPLOYER does hereby agree with the CONTRACTOR that the EMPLOYER will pay to the CONTRACTOR the respective amounts for the WORK actually done by him and approved by the EMPLOYER at the Schedule of Rates and such other sum payable to the CONTRACTOR under provision of CONTRACT, such payment to be made at such time in such manner as provided for in the CONTRACT.

A N D

3. In consideration of the due provision, execution and completion of the said WORK the CONTRACTOR does hereby agree to pay such sums as may be due to the EMPLOYER for the services rendered by the EMPLOYER to the CONTRACTOR, such as power supply, water supply and others as set for in the said CONTRACT and such other sums as may become payable to the EMPLOYER towards the controlled items of consumable materials or towards loss, damage to the EMPLOYER'S equipment, materials construction plant and machinery, such payments to be made at such time and in such manner as is provided in the CONTRACT.

It is specifically and distinctly understood and agreed between the EMPLOYER and the CONTRACTOR that the CONTRACTOR shall have no right, title or interest in the SITE made available by the EMPLOYER for execution of the works or in the building, structures or work executed on the said SITE by the CONTRACTOR or in the goods, articles, materials etc., brought on the said SITE (unless the same specifically belongs to the CONTRACTOR) and the CONTRACTOR shall not have or deemed to have any lien whatsoever charge for unpaid bills will not be entitled to assume or retain possession or control of the SITE or structures and the EMPLOYER shall have an absolute and unfettered right to take full possession of SITE and to remove the CONTRACTOR, their servants, agents and materials belonging to the CONTRACTOR and lying on the SITE.

The CONTRACTOR shall be allowed to enter upon the SITE for execution of the WORK only as a licensee simpliciter and shall not have any claim, right, title or interest in the SITE or the structures erected thereon and the EMPLOYER shall be entitled to terminate such license at any time without assigning any reason.

The materials including sand, gravel, stone, loose, earth, rock etc., dug up or



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excavated from the said SITE shall, unless otherwise expressly agreed under this CONTRACT, exclusively belong to the EMPLOYER and the CONTRACTOR shall have no right to claim over the same and such excavation and materials should be disposed off on account of the EMPLOYER according to the instruction in writing issued from time to time by the ENGINEER-IN-CHARGE.

In Witness whereof the parties have executed these presents in the day and the year first above written.

Signed and Delivered for and on  
on behalf of EMPLOYER.

Signed and Delivered for and  
on behalf of the CONTRACTOR.

MAHARASHTRA NATURAL GAS LIMITED

(NAME OF THE CONTRACTOR)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Place: \_\_\_\_\_

Place: \_\_\_\_\_

**IN PRESENCE OF TWO WITNESSES**

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1. \_\_\_\_\_

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## **VOLUME II OF**

## **II**

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## **PART - I SCOPE OF WORK CONTENTS**

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## **00.0 INTRODUCTION**

Maharashtra Natural Gas Limited (MNGL) is a joint venture company of M/s GAIL (India) Limited and M/s Bharat Petroleum Corporation Limited (BPCL). MNGL has been set up to supply natural gas to domestic, commercial and industrial sectors including setting up of CNG filling stations to cater to the automobile sector for vehicle in Pune. MNGL has been authorized by M/s PNGRB to lay, build, operate & expand CGD network in Nashik, Sindhudurg, Ramnagara, Nanded & Nizamabad GA of India.

## **01.0 GENERAL INFORMATION**

This tender deals with the development of **New CGS cum mother station at Sinnar in Nashik GA** in the state of Maharashtra.

### **01.01 Bidding Philosophy**

The bidders shall have to quote for the complete SOR as given in the tender.


### **01.02 Evaluation and award of work**

The tender deals with construction of **New CGS cum mother station at Sinnar in Nashik GA**. Evaluation shall be done as per complete SOR (i.e. on total evaluated price).

### **01.03 Facilities envisaged in a CGS cum mother Station in General**

In a CGS cum mother station, the dispensing units will be supplied compressed natural gas through “storage cascade” from a CNG Compressor which will be permanently installed at the station. Each CNG station shall mainly consist of the following facilities as per enclosed drawings:

- i. CNG Compressors
- ii. Dispensers for filling Auto/car
- iii. Stationary Storage Cascades.
- iv. Sales cum utility building.
- v. HCV filling facility
- vi. EV charging facility
- vii. Store shed
- viii. DRS-MRS-Odorizing unit-SV station etc.

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## 02.0 SCOPE OF WORK AT CNG STATION.

The scope of work (activity wise) at CNG Station is as given below:


Location	Civil Building	Equipment foundation	Canopy	Miscellaneous works
New CGS cum mother station at Sinnar in Nashik GA	Sales office cum utility building (Singly storey/Double storey)	RCC foundation for compressor, stationery cascade, DRS, MRS, Odorizing unit, DG set, dispenser island, etc.	Structural steel canopy over CNG dispenser. Shed over store area.	Brick masonry, boundary wall, RCC forecourt, paver block flooring, fencing work, hoarding structure, monolith, Loading-Unloading platform, Cat ladder, LCV fill point, safety signboard, External water supply system, drainage system. Electrical panel work, cabling work, Earthpit work, Earthstrip, termination, polelight, building lighting etc.

### 02.01 Detailed scope of work under the present tender:

Detailed scope of work is divided under different sub-heads. List of sub-heads along with different activities (with brief specification) is evolved and estimated quantities are given. The tenderer has to quote on sub-head wise per unit rate as Mentioned

02.01 Generally the following shall constitute the Contractor's scope of work but not limited to as given herein:

- Development of plot by removing debris/ serviceable/ unserviceable material from the site and filling with sweet earth wherever required as per levels.


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- ii) Construction of all civil (including boundary wall, building, forecourt and structural including canopy structures, hoarding, loading unloading platforms, fencing with gates, LCV stands, safety signboards etc.) , electrical, illumination & architectural works (including supply of materials).
- iii) Obtaining all service connections such as construction power & water connection.
- iv) Preparation and submission of As-built drawings of all categories.

**02.02 Detailed Scope (Reference to be made to the respective clauses of Preamble and Schedule of Quantities).** The actions for procurement, erection and commissioning of Compressors and Dispensers are separately organized by MNGL; it is intended through this tender to construct the CNG station in such a manner that the following activities are covered:

- 02.02.1 Taking over of the site from MNGL; carrying out pre-construction survey, making arrangement of safety, security, temporary water & electrical connections, traffic detour etc. Take over GOOD FOR CONSTRUCTION drawings from MNGL and set out by laying out the plans at site.
- 02.02.2 Development of CNG station i.e. site clearance including demolition of temporary structures, removal of unserviceable material & leveling/ filling up with sweet soil to desired levels; constructing boundary wall and site office taking temporary power and water connections for construction works; making outlet connections to existing drainage and sewerage network etc. and construction of facilities as per schedule for the station.
- 02.02.3 Preparing QAP and taking approval from MNGL including Welder's Qualification Test, Internal Test Plan, and Electrical Test Procedures.
- 02.02.4 Construction of Sales cum Utility Building with electrical room, sales room, store room etc. The building shall be provided with specified finishes, illumination and hydro-insulation of roof etc. complete in all respect.
- 02.03.5 Construction of the canopy for dispenser and dispenser island including finishing tiles / stone works, safety guards, painting etc. complete in all respect.
- 02.03.6 Construction of equipment foundation e.g. compressor, cascades, dispenser, DRS, other auxiliary equipment as per requirement including isolation, grouting and finishes after erection by equipment supplier(s). However, grouting of Mother Compressors shall be done by Equipment suppliers.
- 02.03.7 Forecourt to be completed as per drawing & specification with drainage network, pipe/cable trenches, green area, concrete kerbs, paver blocks etc.




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- 02.03.8 Providing electrical and illumination equipment, cables, cable pits, GI Conduits/PVC conduits (heavy duty), covers, trenches etc.
- 02.03.9 Landscaping/ green cover including its maintenance.
- 02.03.10 Taking over of the site for balance construction/ post-commissioning works in such a manner as not to disturb the operation of the CNG Station after commissioning.
- 02.03.11 Construction of catch drain and joining with existing public works including liaison with local authorities for execution of such works
- 02.03.12 Taking all measures to provide safety to traffic, public, workmen operating staff, equipment, and operation/ maintenance activities, underground/ above services – and providing FIRE PROTECTION measures during construction and any other activity to make the station functional in all respect.
- 02.03.13 To carry out all tests at worksite, approved laboratory and place of manufacture/fabrication; provide all test certificates from manufacturers & supplier and offer inspection at all stages of procurement/ construction.
- 02.03.14 Maintain and observe all statutory requirement with regards to labour laws, taxation laws, local municipal rules and insurance requirements.
- 02.03.15 The site to be cleared, all debris removed to authorized dumping ground and completed work to be handed over to MNGL.
- 02.03.16 To submit daily, weekly and monthly progress reports and attend review meetings, site visits and other discussions with MNGL/ Statutory Authorities.
- 02.03.17 Transfer all Test Certificates, warranties / guarantees including maintenance / performance guarantees of various fittings /fixtures, equipment / material and indemnify MNGL of any liabilities of payments / dues to it's suppliers, manufacturers, agents etc.
- 02.03.18 Marking all as-built details on construction/ fabrication drawings/ data sheets issued by MNGL and submission of as-built details and drawings (of contractor prepared) in six sets in hard copies and one soft copy on CD.

### 03.0 **COMPLETION TIME SCHEDULE**

All works as mentioned in the scope of work shall be completed as per following Time Schedule.

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03.01 The CGS cum mother station shall be completed in all respect within following time schedule from the date of Service Order or the date of handing over of site by the client whichever is later (in case the site is handed over at a later date):

Sr. No.	Name of Site	Work Completion Period (in months)
1	New CGS cum mother station at Sinnar in Nashik GA	9 Months

**Note:** In case any new equivalent / similar site other than the above sites are ready for construction, MNGL will have right to award the same to the contractor as per MNGL's requirement.

#### **04.0 GENERAL INSTRUCTIONS TO THE CONTRACTOR**

- 04.1 Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be approved by MNGL. Set out at site by carrying out a pre- construction survey; establishing the site deviations, requirement of site modifications in construction drawings, earth filling/ cutting requirement, sub-soil data, soil characteristics and re-routing of u/g & overhead services.
- 04.2 MNGL shall issue latest revision of all documents/ drawings at the commencement of work/during the course of construction and execution of work shall be in accordance to them.
- 04.3 In case of any discrepancy between drawings/ documents is found, the same shall be brought to the notice of the Engineer-in-charge before execution of work and decision of the Engineer-in-charge shall be final and binding to the contractor without any extra cost implication to MNGL.
- 04.4 The contractor has to make all shop drawings wherever necessary, at his own cost, and get it approved by MNGL before commencement of that work at site.
- 04.5 Specification and descriptions of various items are for identification of material and works to be carried out under them. No cost shall be quoted against these unless mentioned.
- 04.6 Quantities as mentioned are indicative and can have a variation from the quantities actually executed. The contractor is advised to work out the breakup of individual work items and quantities at his own before quoting any rates. MNGL is not liable for any discrepancies in the quantities and no extra time or cost shall be granted on this pretext.



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- 04.7 The contractor is bound to execute all items (whether mentioned in the tender or otherwise) required for proper completion of work. In case where a specification of any item is not provided, CPWD specifications shall be applicable. In absence of CPWD Specification the same shall be provided by MNGL & shall be followed.
- 04.8 The contractor has to clear the site in all respect before commencement of work and after completion of work including removal of old structures (Brick/RCC/ Steel), roads, trees and bushes etc., without claiming any extra cost from MNGL (except for the works for which items are available in BOQ). All such material shall be appropriately disposed at an authorized dumping ground/disposal stores at the contractor's responsibility.
- 04.9 The contractor has to obtain all types of statutory approvals including 'C' form, 'D' form, completion certificate, approval from electrical inspector for electrical work and DG set, electrical connection, water connection, fire department etc. and all other approvals that might be required to commission the station, from various relevant authorities during the course of work and after completion of works in co-ordination with MNGL without any cost implication to MNGL.
- However, MNGL shall get the Building Plans approved from the Concerned Authority. MNGL shall provide all required documentation for the same and all expenses shall be reimbursed to the contractor on actual basis on presentation of valid receipt.
- 04.10 The contractor has to arrange all tools and plants, site fencing material, lighting arrangements, site office, store, outside name plate, electricity and water at his own cost.
- 04.11 The contractor should quote keeping this in mind that no request for escalation in the cost shall be entertained under any circumstances by Owner after placement of order.
- 04.12 The contractor is bound to carry out all works on any number of sites/cities simultaneously that may be allotted to him.
- 04.13 The tender contain a set of key tender purpose drawings / data. These information/ details are for "Tender Purpose only". The tenderer should visit each location and acquaint himself with site conditions of each site. No deviations and/or claims whatsoever of any kind and nature would be admissible.
- 04.14 The work shall be carried out in city conditions and generally close to the roads and public services conveying a considerable volume of vehicular traffic and human activity. It is deemed necessary that the tenderer considers the "SAFETY" as the MOST IMPORTANT aspect of working conditions and is required to include in his offer all costs (direct and indirect) towards observance, compliance and provision of all safety appurtenances and norms.



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- 04.15 Grassing, paving, roads, drains, concrete, floral beds, fencing, tiles, flooring masonry etc. to be constructed as per MNGL's requirement and satisfaction.
- 04.16 Installing site markers, warning signs, fencing etc. and cleaning all unserviceable materials, debris to designated disposal areas and obtain a No Dues Certificate from the concerned authorities.
- 04.17 Handing over the completed works to MNGL for their operation/ use purposes.
- 04.18 The Contractor has to prepare As-Built drawings, shop drawings, fabrication drawings, wiring diagrams, bar bending schedules and submit them along with test certificates, guarantee cards/ warranty cards/ service schedule any other purchase documents at the time of completion of work.
- 04.19 Any other activity (ies) not mentioned/covered explicitly above, but otherwise required for satisfactory completion/ operation/ safety/ statutory/ maintenance of the works shall also be covered under the Scope of Work and has to be completed by the Contractor within specified Schedule of Items of Works at no extra cost to MNGL.
- 04.20 The contractor has to return all the drawings issued to him from time-to-time along with the final bill to MNGL after marking As-built dimensions and details. The contractor is not permitted to make copies of any drawing/ document provided to him.

**05.0 REFERENCE SPECIFICATION, CODES AND STANDARDS:**

The contractor shall carry out the work in accordance with this Specification, approved construction drawings issued by MNGL's Engineering Standards or relevant BIS code as might be required.

Should the Contractor find any discrepancy, ambiguity or conflict in or between any of the Standards and the contract documents, then this should be promptly referred to the Engineer-in-charge (EIC) for his decision, which shall be considered binding on the contractor.

**06.0 APPROVALS:**

Approval in principle for all work will be obtained from concerned authorities. To ensure smooth execution of the work on a day-to-day basis it will be the Contractors responsibility to liaison with such authorities and obtain necessary approvals.

**07.0 STRUCTURES, SERVICES AND OTHER PROPERTY:**

**07.01 Protection of Structures and Utilities:**

The Contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work.



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**07.02 Interference with Traffic, Street Drainage and General Public:**

The Work shall be executed in such a manner as to cause a minimum of inconvenience to persons requiring to use public or private roads, lanes, thoroughfares, walkways, rights of use or passages through which the works are to be executed. Closure of roads, etc., shall not be permitted without the approval of the EIC.

The Contractor shall comply with all requirements of local authorities to maintain traffic rules and keep roads open to traffic and main access to and within any private property.

The Contractor shall not, in any circumstance, use a private driveway, access track or entrance without the prior approval of the EIC.

The Contractor shall provide suitable access where necessary in the form of temporary bridges, culverts, flumes, etc. of a size and type approved by the EIC.

The Contractor shall comply with all relevant roads laws. Where limits and/or speed limits have been placed in the vicinity of the works, the contractor shall provide for the necessary movement of plant and equipment in accordance with the requirements of the relevant authority.

The Contractor shall not obstruct any drainage pipes or channels in any road but shall deviate them where necessary and use all proper measures to provide for the free passage of water.

The Contractor shall deliver the completed works after proper cleaning of the site.

The contractor shall conduct his operations at all times, with a view to minimising as far as practicable noise from construction and other objectionable nuisances (eg. oil leakage, smoke, fumes.)

**08.0 SAFETY**

The Contractor shall conform to the requirements outlined in Preamble for safety requirements. In addition, the Contractor shall observe safe working practices in the storage and handling of cleaning fluids, flammable fluids, etc., and ensure smoking or naked flames are not permitted in the vicinity when these materials are being used.

Excavation walls shall be battered with sufficient slope in order to minimise a trench collapse. Where there is a danger of an earth slide or collapse.

The Contractor shall also protect all work sites with warning signs, barricades and night lighting. The Contractor shall inspect all fenced excavations daily and maintain them in good order.

Where the EIC determines that the Contractor is performing the work in an



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unsafe manner, he may suspend the work until the Contractor takes corrective action.

Since the work shall be carried out in city conditions and generally close to the highways/roads and public services conveying a considerable volume of vehicular traffic and human activity, it is deemed necessary that the tenderer considers the "SAFETY" as the MOST IMPORTANT aspect of working conditions and is required to include in his offer all costs (direct and indirect) towards observance, compliance and provision of all safety appurtenances and norms.

**09.0 PROGRESS OF WORK**

The Contractor shall proceed with the Work under the Contract with due expedition and without delay.

The EIC may direct in what order and at what time the various stages or parts of the work under the Contract shall be performed.

If the Contractor can reasonably comply with this direction, the Contractor shall do so. If the Contractor cannot reasonably comply, the Contractor shall notify the EIC in writing giving reasons.

**10.0 MATERIAL, LABOUR, PLANT AND EQUIPMENT**

**10.01 Supplied by MNGL**

The Contractor may be required to use MNGL supplied materials, base frames, bolts and other fixtures. The Contractor shall not use material from any other source of supply other than MNGL except with written approval from the EIC.

**10.02 Supplied by the contractor**

The Contractor shall provide the labor, tools, plant and equipment necessary for the proper execution of the work. This will include but not limited to list of specialized items included.

**10.03 Plant and Equipment**

All vehicular and rotary type machinery shall be in good working order and shall not cause spillage of oil or grease. To avoid damage to paved surfaces the Contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

**10.04 Backfill Material**

The Contractor shall be responsible to arrange the supply of any backfill material including approved Sweet Earth/ Coarse Sand/Aggregate/Quarry spoils.

**10.05 Other Materials**

The Contractor shall supply the following items where required.

- All materials required for formwork, trench support.
- All signs, barricades, lights and protective equipment.

All minor items not expressly mentioned in the Contract but which are



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necessary for the satisfactory completion and performance of the work under this Contract.



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## **PART – II**

### **SPECIAL CONDITIONS OF CONTRACTS**



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## **1.0 GENERAL:**

- 1.1 Special Conditions of Contract shall be read in Conjunction with the General Conations of Contract, specification of work, Drawings and any other documents forming part of this contract wherever so requires.
- 1.2 Notwithstanding the sub-division of the documents into these separate sections and volumes, even part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into contract so far as it may practicable to do so.
- 1.3 Where any portion of the General Conditions of Contract is repugnant to or at variance with any provision of the Special Conditions of Contract, unless a different intention appears, the provisions of the Special Conditions of Contract shall be deemed to over- ride the provisions of the General Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.
- 1.4 Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain work or provide certain facilities, it is understood that the CONTRACTOR shall do so at this cost and the value of contract shall be deemed to have included cost of such performance and provision, so mentioned.
- 1.5 The material, design and workmanship shall satisfy the relevant INDIAN STANDARDS, the JOB SPECIFICATION contained herein and CODES referred to. Where the job specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.
- 1.6 In case of an irreconcilable conflict between Indian or other applicable standards General Conditions of Contract, special Conditions of Contract, Specifications, Drawings or Schedule of Rates, the following shall prevail to the extent of such irreconcilable conflict in order of precedence:
  - i) Letter of acceptance / FOI / SO along with statement of agreed variations.
  - ii) Schedule of Rates as enclosures to letter of Acceptance.
  - iii) Scope of work.
  - iv) Drawings.
  - v) Technical / material Specifications.
  - vi) Special Conditions of Contract
  - vii) Instruction to Bidders
  - viii) General conditions of contract
  - ix) Indian standards
  - x) Other applicable standards
- 1.7 It will be the CONTRACTOR's responsibility to bring to the notice of Engineer– in–charge any irreconcilable conflict in the contract documents before starting the work(s) or making the supply with reference which the



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conflict exists.

- 1.8 In the absence of any specification covering any material, design of work(s) the same shall be performed/ supplied/ executed in accordance standards engineering practice as per the instructions/ directions of the Engineer-in-charge which will be binding on the CONTRACTOR.
- 2.0 **SITE LOCATION**  
**New CGS cum mother station at Sinnar in Nashik GA.**
- 3.0 **SCOPE OF WORK**  
Civil, Structural & Electrical works for development of **New CGS cum mother station at Sinnar in Nashik GA** as described in the SCOPE OF WORK, Volume II of II.
- 4.0 **WORKS CONTRACT**  
The entire work as per scope of work covered under this contract shall be treated as "Work Contract".
- 5.0 **TIME OF COMPLETION & PROGRESS REPORT**
- 5.1 The work shall be executed strictly as per time schedule given at clause 03.00 of Part – I of Vol-II of II. The period of completion given includes the time required for mobilization as well as rectifications, if any, and completion in all respects to the entire satisfaction of the Engineer-in-charge.
- 5.2 A Joint programme of execution of work will be prepared by the Engineer-in-charge and CONTRACTOR. This programme will take into account the time of completion mentioned above.
- 5.3 Monthly/ weekly construction programme will be drawn up by the Engineer-in-charge jointly with the CONTRACTOR based on availability of work fronts and the joint construction programme. The contractor shall scrupulously adhere to these targets/ programme by deploying adequate personnel, construction tools & tackles and he shall also supply all materials of his scope of supply in good time to achieve the targets set out in the weekly and monthly programme. In all matters concerning the extent of targets set out in the weekly/ monthly programme and achievements, the decision of the Engineer-in-charge shall be final & binding on the CONTRACTOR.
- 5.4 CONTRACTOR shall give everyday report on category wise labour and equipment deployed along with the progress of work done on previous day in the performa prescribed by the Engineer-in-charge.
- 5.5 Besides above CONTRACTOR shall submit the following:
- i) By the 10th (tenth) of each month, CONTRACTOR shall furnish the OWNER a detailed report covering the progress as of the last day of the previous month. These reports will indicate actual and scheduled percentage of completion of construction as well as general comments if interest or the progress of various phase of



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the WORK. The frequency of progress reporting by the CONTRACTOR shall be weekly.

- ii) Once a week, CONTRACTOR shall submit a summary of the work accomplished during the preceding week in form of percentage completion of the various phase of the work, to the OWNER.
- iii) Progress reports shall be supplied by CONTRACTOR with documents such as chart, networks, photographs, test certificates etc. Such progress reports shall be in the form and size as may be required by the OWNER and shall be submitted in at least 3(three) copies.

Signing of Contract Agreement by the CONTRACTOR.

**6.0 RECRUITMENT OF PERSONNEL BY CONTRACTOR**

The Contractor shall not recruit personnel of any category from among those who are already employed by the other agencies working at the sites but shall make maximum use of local labour available.

**7.0 CONSTRUCTION WATER AND POWER SUPPLY**

- 7.1 No water and power will be provided by the owner. It should be the responsibilities of the contractor to arrange water and power at his own cost.

**8.0 LAND FOR RESIDENTIAL ACCOMMODATION**

Owner shall not provide any land for residential accommodation of contractors staff and labour.

**9.0 MEASUREMENT OF WORKS:**

- 9.1 Payment will be made on the basis of joint measurements, taken by Contractor and certified by Engineer-in-charge. Measurement shall be based on "Approved for Construction" drawings, to the extent that the work conforms to the drawings and details are adequate.
- 9.2 Wherever works is executed based on instruction of Engineer-in-charge, or details are not available or inadequate, physical measurements will be taken by the CONTRACTOR in the presence of the Representative of the Engineer-in- charge.
- 9.3 Indian Standard Methods of Measurement (IS 1200), as last amended, shall be referred for measurement purposes, wherever, applicable.
- 9.4 Measurement of weights shall be in Metric Tonnes, correct to the nearest kilogram. Measurement of lengths shall be in Meters, correct to the nearest centimeter.
- 9.5 Bolts, nuts, washer and weld metal weights shall not be added on for structural work and no deduction shall be made for holes drilled. Weights



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shall be assessed from fabrication drawings/ bills of material prepared by Contractor and reviewed/ approved by Engineer-in-charge, on the basis of IS/ manufacturers hand book. No allowance shall be made for rolling tolerance

**10.0 INCOME TAX**

Income Tax at the prevailing rate as applicable from time to time shall be deducted from CONTRACTORS bills as per Income Tax Act and quoted Rates shall be deemed to include this

**11.0 TAXES, DUTIES, OCTROI / LBT, LEVIES ETC.**

The quoted prices shall be deemed to be inclusive of all taxes, duties, octroi / LBT, levies work contract tax if any etc. till the completion of the contract and contractor shall not be eligible for any compensation on this account. No statutory variation on this account will be payable by Owner.

- 11.1 Contractor shall be registered with Goods & Service Tax Authority and shall furnish his Goods & Service Tax Regn. No. In case he fails to get himself registered with Goods & Service Tax Authority, Work Order may be cancelled at the option of OWNER. Till the time he is not registered with State Goods & Service Tax Authority, no progress payment shall be released to him.
- 11.2 Any Indian Income Tax/Goods & Service Tax on Works Contract which Purchaser may be required to deduct by law or statute, shall be deducted at source and the same shall be paid to Income Tax/Goods & Service Tax Authorities on account of Contractor. Purchaser shall provide the Contractor a certificate for such deduction of tax. The Contractor shall indicate their Permanent Account no. with the relevant Income Tax Authority for this purpose to Purchaser.
- 11.3 Royalties for construction materials where applicable is included in the unit rates and shall be borne and paid by the Contractor to concerned government authorities of State/ Centre. Owner shall bear no liability in respect of this.
- 11.4 In case of any dispute about labour content of the Contract Price by the Assessing Authority while computing Goods & Service Tax on Works Contracts, OWNER/PURCHASER will bear no liability in this respect and the Contractor shall settle the same with Assessing Authority without any claim on OWNER/PURCHASER on this account.
- 11.5 The Contractor shall produce documentary evidence as may be called for Purchaser in respect of taxes, duties, etc., paid by the contractor, along with RA Bill.
- 12.0 REGISTRATION UNDER GOODS & SERVICE TAX ACT**
- Attested copy of certificate for registration under State Government Goods



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& Service Tax Act in the Performa prescribed by State Govt. should accompany the tender. The registration should be in the name of the Firm / Individual quoting for the work. In absence of the above registration, tenderer may not be awarded the work tendered for, in the light of State Govt. directive / instruction.

**13.0 TERMS OF PAYMENT:**

Pending completion of the whole works, provisional progressive payments for the part of work executed by the contractor shall be made by Owner on the basis of said work completed and certified by the Owner's representative as per the agreed milestone payment schedule and the percentage break-ups given below.

Contractor shall submit his invoices in triplicate to the Owner's representative fortnightly in the manner as instructed by Owner. Each invoice will be supported by documentation acceptable to Owner and certified by the Owner's representative. Payments made by owner to the contractor for any part of the work shall not deem that the Owner has accepted the work. The progress payment shall be considered only as an advance against the work done. However these payments shall be finally adjusted against full and final contract value to be made to the contractor.

Payment will be made through account payee cheque payable at Pune City (in Maharashtra) against the invoice to be submitted by Contractor on fortnightly basis against the work done during the preceding fortnight on the basis of accepted unit rates as per Contract in the following manner:

- i) The payment will be released within 15 days of submission of invoice along with necessary document as per contract.
- ii) 80% of the executed work duly certified by Engineer-in-charge on pro-rata basis and against submission of other requisite documents against fortnightly bills.
- iii) 10% of the executed work duly certified by Engineer-in-charge on prorata basis, on completion of works required for commissioning of CNG dispensing system as per commissioning minima & after issuance of provisional completion certificate.
- iv) 10% of contract price after completion of works at the station in totality and handing over to MNGL and issuance of Completion Certificate by Engineer-in-charge.

**13.1 For the purpose of release of progressive payment against the Lumpsum items following shall be considered.**

**1. Building:**

- i) 20% on completion up to plinth level.
- ii) 20% on completion up to Roof level (ie, after casting of roof slab)
- iii) 20% on completion of brickwork, lintel, chajja including door frames.
- iv) 20% on completion of external and internal finishing works including painting.
- v) 10% on completion of works required for commissioning of



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CNG station & issuance of provisional completion certificate.

- vi) 10% on completion of works in totality and handing over to MNGL & issuance of completion certificate.

**2. Boundary wall:**

- i) 40% on completion up to top level (including coping slab)
- ii) 25% on completion of plastering.
- iii) 15% on completion of final painting.
- iv) 10% on completion of works required for commissioning of CNG station & issuance of provisional completion certificate.
- v) 10% on completion of works in totality and handing over to MNGL & issuance of completion certificate.

**3. SS tube trench:**

- i) 60% on completion of PCC, RCC sidewalls, plastering, angle grouting and finishing.
- ii) 20% on supplying and fixing of SFRC covers on the constructed trench.
- iii) 10% on completion of works required for commissioning of CNG station & issuance of provisional completion certificate.
- iv) 10% on completion of works in totality and handing over to MNGL & issuance of completion certificate.

**4. Structural Steel Canopy:**

- i) 15% on erection of columns of canopy.
- ii) 25% structures and completion of grouting
- ii) 20% on completion of roofing, sheeting & false ceiling..
- iv) 20% on completion of ACM work.
- v) 10% on completion of works required for commissioning of CNG station & issuance of provisional completion certificate.
- vi) 10% on completion of works in totality and handing over to MNGL & issuance of completion certificate.


**5. Fencing Works:**

- i) 60% on supply, erection and fixing in place by grouting.
- ii) 20% on painting and finishing complete in all respect.
- iii) 10% on completion of works required for commissioning of CNG station & issuance of provisional completion certificate.
- iv) 10% on completion of works in totality and handing over to MNGL & issuance of completion certificate.

**6. Pole-light work & Panel work :**

- i) 60% on supply, erection and fixing in place electrical pole-lights.



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- ii) 20% on testing and commissioning of electrical pole-lights.
- iii) 10% on completion of works required for commissioning of CNG station & issuance of provisional completion certificate.
- iv) 10% on completion of works in totality and handing over to MNGL & issuance of completion certificate.

**7. U/G water tank:**

- i) 40% on excavation & brickwork/RCC work..
- ii) 40% on finishing, piping work, manhole cover fixing completed in all respect.
- iii) 10% on completion of works required for commissioning of CNG station & issuance of provisional completion certificate.
- iv) 10% on completion of works in totality and handing over to MNGL & issuance of completion certificate.

**8 Soak pit & septic tank:**

- i) 40% on excavation & brickwork/RCC work..
- ii) 40% on finishing, piping work, manhole cover fixing completed in all respect.
- iii) 10% on completion of works required for commissioning of CNG station & issuance of provisional completion certificate.
- iv) 10% on completion of works in totality and handing over to MNGL & issuance of completion certificate.

**14.0 PROVIDENT FUND ACT:**

14.1 The Contractor shall strictly comply with the provisions of Employees Provident Fund Act and register themselves with RPFC before commencing work. The Contractor shall deposit Employees and Employers contributions to the RPFC every month. The contractor shall furnish along with final bill of each site, the challan/receipt for the payment made to the RPFC for the preceding months.

14.2 In case the RPFC's challan/receipt, as above, is not furnished, Owner shall deduct 16 % (Sixteen percent) of the payable amount from contractor's final bill and retain the same as a deposit. Such retaining amounts shall be refunded to Contractor on production of RPFC challan/receipt for the period covered by the related total construction of each site.

**15.0 MOBILIZATION ADVANCE: NOT APPLICABLE**

**16.0 SITE CLEANING:**

16.1 The Contractor shall clean and keep clean the work site from time to time to the satisfaction of the Engineer-in-Charge for easy access to work site and to ensure safe passage, movement and working.



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- 16.2 If the work involves dismantling any existing structure in whole or part, care shall be taken to limit the dismantling up to the exact point and/or lines as directed by the Engineer-in-Charge and any damage caused to the existing structure beyond the said line or point shall be repaired and restored to the original at the Contractors cost and risk to the satisfaction of the Engineer-in-Charge, whose decision shall be final and binding upon the Contractor. The Contractor shall be custodian of the dismantled materials till the Engineer-in- Charge takes charge thereof.
- 16.3 The Contractor shall dispose off the unserviceable materials, debris etc. to any area within the site premises as decided by the Engineer-in-Charge.
- 16.4 The Contractor shall sort out, clear and stack the serviceable material obtained from dismantling at places as directed by the Engineer-in-Charge.
- 16.5 No extra payment shall be paid on this account.

**17.0 CONSTRUCTION**

OWNER reserves the right to inspect all phases of CONTRACTOR's operations to ensure conformity to the SPECIFICATIONS. Owner will have Engineers, Inspectors or other duly authorized representatives, made known to the CONTRACTOR present during progress of the WORK and such representatives shall have free access to the WORK at all times. The presence or absence of a OWNER's representative does not relieve the CONTRACTOR of the responsibility for quality control in all phases of the WORK. In the event that any of the WORK being done by the CONTRACTOR or any SUB-CONTRACTOR is found by OWNER's representatives to be unsatisfactory or not in accordance with the DRAWINGS, procedures and SPECIFICATIONS, the CONTRACTOR shall, upon verbal notice of such, revise the work in a manner to conform to the relevant DRAWINGS, procedures and SPECIFICATIONS.

**17.1 Rules & Regulations**

CONTRACTOR shall observe in addition to Codes specified in respective specification, all National and Local Laws, Ordinances, Rules and Regulations and requirements pertaining to the WORK and shall be responsible for extra costs arising from violations of the same.

**17.2 Procedures**

Various procedures and method statements to be adopted by CONTRACTOR during the construction as required in the respective specifications shall be submitted to OWNER in due time for APPROVAL. No such construction activity shall commence unless approved by OWNER in writing.

**17.3 Field Inspection**

CONTRACTOR shall have at all times during the performance of the





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WORK, a Competent Superintendent on the premises. Any instruction given to such superintendent shall be construed as having been given to the CONTRACTOR.

**17.4 Erection and Installation**

The CONTRACTOR shall carry out required supervision and inspection as per quality Assurance plan and furnish all assistance required by the OWNER in carrying out inspection work during this phase. The OWNER will have engineers, inspectors or other authorized representatives present who are to have free

access to the WORK at all times. If an OWNER's representative notifies the CONTRACTOR's authorized representative not lower than a Foreman of any deficiency, or recommends action regarding compliance with the SPECIFICATIONS, the CONTRACTOR shall make every effort to carry out such instructions to complete the WORK conforming to the SPECIFICATIONS and approved DRAWINGS in the fullest degree consistent with best industry practice

**18.0 DOCUMENTATION**

**18.1 "AS BUILT" DRAWINGS**

Notwithstanding the provisions contained in standard specifications, upon completion of WORK, the CONTRACTOR shall complete all the related drawings to the "AS BUILT" stage and provide the OWNER, the following:-

- a) One complete set of all original tracings.
- b) Two sets of all drawings provided by the consultant after incorporating the changes undergone during construction.
- c) Six sets of all piping, tubing, cable layout, fabrication & construction drawings prepared by the contractor.
- d) Six complete bound sets of CONTRACTOR's specifications.
- e) Six complete sets, in the form of hand bound volumes, of the manufacturer's data book for all the bought out equipments, instruments etc. including certified prints and data, by the contractor. Data books shall be completed with index as to tag numbers associated with manufacturer's data shown, Equipment data shall include as a minimum requirement the principle and descriptions of operations, installation and maintenance instructions, drawings and dimensions, parts list and priced purchase orders including those of major sub-vendors and suppliers. Requirements pertaining to "VENDOR DATA REQUIREMENT" attached with standard specifications for the documents to be included in the Data Book for each equipment, instruments etc. shall also be complied with.
- f) Six bound copies each of the Spare Parts Data Books and the Lubricants Inventory Schedule.
- g) Soft copy of all the as built drawings, contractor's fabrication / construction drawings prepared in AutoCAD in one set of re-writable compact Disc along with measured activities at site.
- h) All as-built drawings as mentioned in specification for documentation enclosed elsewhere in the tender.



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**18.2 Completion Document**

The following documents shall be submitted in hard binder by the CONTRACTOR in THREE sets, as a part of completion documents: -

- a) Welding Procedure Qualification Report.
- b) Welder Qualification Report.
- c) Radiographic Procedure Qualification.
- d) Radiographic Report alongwith radiographs (Radiographs only with the original).
- e) Batch Test Certificate from manufacturers for electrodes.
- f) Pre-testing and final Hydrostatic and other Test results and reports.
  
- g) All other requirements as specified in the respective specifications.
- h) Test results and reports.
- i) Pre-commissioning/commissioning check list.
- j) Completion Certificate issued by Owner's Site Engineer.
- k) No claim certificate by the Contractor.
- l) Consumption statements of steel and cement certified by Owner's Site Engineer.
- m) Completion certificate for embedded and covered up works wherever applicable.
- n) Material re-conciliation statement of all materials free issued and consumed.
- o) Recovery statement, if any.
- p) Statement for reconciliation of all the payments and recoveries made in the progress bills.
- q) Copies of deviation statement and order of extension of time, if granted.
- r) Copy of statutory clearance as applicable, from competent authority w.r.t. ESIC, EPF. District / central labour authority.
- s) Copy of sales tax assessment from competent authority.

**19.0 SURVEY AND LEVEL/SETTING OUT WORK:**

- 19.1 Before the WORK or any part thereof are begun, the CONTRACTOR's agent and the Engineer-in-Charge's representative shall together survey and take levels of the SITE and decide all particulars on which the survey is to be made, and on which measurements of the WORK are to be based. Such particulars shall be plotted by the CONTRACTOR and after agreement the drawings shall be signed by the Engineer-in-Charge.
- 19.2 The CONTRACTOR shall be entirely responsible for the horizontal and vertical alignment, the level and correctness of every part of the WORK and shall rectify any errors or imperfections therein. Such rectifications shall be carried out by the CONTRACTOR at his own cost, when instructions are issued to this effect by the Engineer-in-Charge or his representative.
- 19.3 The Engineer-in-Charge shall furnish the relevant existing grid point with Bench Mark on the land. It shall be CONTRACTOR's responsibility to set out the necessary control points in and to set out the alignment of the



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various works. The CONTRACTOR shall have to employ efficient survey team for this purpose and the accuracy of such setting out work shall be CONTRACTOR's responsibility.

- 19.4 The CONTRACTOR shall give the Engineer-in-Charge not less than 24 (twenty four) hours notice in writing of his intention to set out or give levels for any part of the WORK so that arrangements may be made checking the same.
- 19.5 WORK shall be suspended for such times as necessary for checking lines and levels on any part of the WORK.
- 19.6 The CONTRACTOR shall at his own expense provide all assistance, which the Engineer-in-Charge may require for checking the setting out the WORKS.
- 19.7 Before commencement of any activity, contractor's quality control set up duly approved by company must be available at site.

**20.0 ORDER OF WORKS/PERMISSIONS/RIGHT OF ENTRY/CARE OF EXISTING SERVICES.**

- 20.1 The order in which the WORK shall be carried out shall be subject to the approval of the Engineer-in-charge and shall be so as to suit the detailed method of construction adopted by the CONTRACTOR, as well as the agreed joint programme. The WORK shall be carried out in a manner so as to enable the other contractors, if any, to work concurrently.

OWNER reserves right to fix up priorities which will be conveyed by Engineer-in- Charge and the CONTRACTOR shall plan and execute work accordingly

**20.0 Existing Service:**

The Contractor will familiarize himself with and obtain information and details from the Owner in respect of all existing structures, overhead lines, existing pipelines and utilities existing at the job site before commencing work.

- 20.0.1 Drains, pipes, cables, overhead wires and similar services encountered in course of the works shall be guarded from injury by the CONTRACTOR at his own cost, so that they may continue in full and uninterrupted use to the satisfaction of the Owners thereof, or otherwise occupy any part of the SITE in a manner likely to hinder the operation of such services.
- 20.0.2 Should any damage be done by the CONTRACTOR to any mains, pipes, cables or lines (whether above or below ground etc.), whether or not shown on the drawings the CONTRACTOR must make good or bear the cost of making good the same without delay to the satisfaction of the Engineer-in-Charge.



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**21.0 QUALITY ASSURANCE / QUALITY CONTROL PROGRAMME:**

21.1 Bidder shall include in his offer the Quality assurances Programme containing the overall quality management and procedures which is required to be adhered to during the execution of contractor. After the award of the contract detailed quality assurance programme to be followed for the execution of contract under various divisions of work will be mutually discussed and agreed to.

21.2 The Contractor shall establish document and maintain an effective quality assurance system as outlines in recognized codes.

21.3 Quality Assurance system plans/procedures of the Contractor shall be furnished in the form of a QA manual. This document should cover details of the personnel responsible for the Quality Assurance, plans or procedures to be followed for quality control in respect of design, Engineering, Procurement, Supply, Installation, Testing and Commissioning. The quality assurance system should indicate organizational approach for quality control and quality assurance of the construction activities, at all stages of work at site as well as the manufacture's works and dispatch of materials.

21.4 The Owner/Consultant or their representative reserve the right to inspect witness, review any or all stages of work at shop/site as deemed necessary for quality assurance.

21.5 The Contractor has to ensure the deployment of quality Assurance and Quality Control Engineer(s) depending upon the quantum of work. This QA/ QC group shall be fully responsible to carry out the work as per standards and all code requirements. In case Engineer-in-charge feels that contractor's QA/QC Engineer(s) are incompetent or insufficient, contractor has to deploy other experienced Engineer(s) as per site requirement and to the full satisfaction of Engineer-in-charge.

21.6 In case contractor fails to follow the instructions of Engineer-in-charge with respect to above clauses, next payment due to him shall not be released unless until he complies with the instructions to the full satisfaction of Engineer-incharge.

**22.0 DEDUCTION FROM CONTRACT PRICE:**

All costs, damages or expenses which the OWNER may have paid, for which under the CONTRACT the CONTRACTOR is liable, shall be cleared by the OWNER. All such claims shall be billed by the OWNER to the CONTRACTOR, regularly as and when they fall due. Such bills shall be supported by appropriate and certified vouchers or explanations, to enable the CONTRACTOR to properly identify such claims. Such claims shall be paid by the CONTRACTOR within fifteen (15) days of the receipt of corresponding bills and if not paid by the CONTRACTOR within the said



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period, the OWNER may then deduct the amount, from any amount due or becoming due by the OWNER to the CONTRACTOR under the Contract may be recovered by actions of law or otherwise, if the CONTRACTOR fails to satisfy the OWNER of such claims.

**23.0 CONSTRUCTION AIDS, EQUIPMENT, TOOLS & TACKLES:**

CONTRACTOR shall be solely responsible for making available for executing the work, all requisite Construction Equipments, Special Aids, Cranes, Tools, Tackles and testing equipments and appliances. Such construction equipments etc. shall be subject to examination by owner and approval for the same being in first class operating condition. Any discrepancies pointed out by OWNER shall be immediately got rectified, repaired or the equipment replaced altogether, by CONTRACTOR. OWNER shall not in any way be responsible for providing any such equipment, machinery, tools and tackles.

The OWNER reserves the right to rearrange such deployment depending upon the progress and priority of work in various sections.

Tie-end between main line and starting point of terminal is included in the scope of contract, as and when main line section is available for Tie-ins.

**24.0 MATERIALS**

All materials to be brought by the contractor must be of good quality and the contractor must satisfy the architect/ Engineer-in-charge with test reports at his own cost.

- a) Brick test – strength and porosity.
- b) Course sand – sieve test as per IS 456.
- c) Fine sand – silt as per IS 456.
- d) Cement concrete – cube test as per IS 456
- e) Water – hardness and chloride level.
- f) Mortar – Sump test
- g) Steel – Bend test as per IS 1786

The Contractor must carry out the above tests and any other tests as demanded by Architect/ Engineer/ Engineer-in-charge and produce a test report from a reputed/ approved test lab. And attach a copy of these reports with the Running Bill, failing which, works carried out with that material will not be considered fit for billing.

Shuttering for concrete work shall be defect free steel plates and/or new ply wood. No material should be dumped on the road and any thoroughfare shall be kept clear for smooth traffic movement.

**25.0 MAKE OF MATERIALS**

The materials required to be supplied by the contractor under this contract shall be procured only from Owner approved vendors. Where the makes of materials are not indicated in the tender document contractor shall furnish the details of makes and shall obtain prior approval of Engineer-in-



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charge of sub-vendors before placing order.

**26.0 TEST CERTIFICATES**

Bidders shall be required to submit recent test certificates for the material being used in works from the recognized laboratories. These certificates should indicate all properties of the materials as required in relevant IS Standards or International Standards.

Contractor shall also submit the test certificate with every batch of material supplied which will be approved by Engineer-in-charge. In case any test is to be carried out, the same shall be got done in the approved laboratory at the cost of contractor.

**27.0 EXECUTION OF ELECTRICAL WORKS**

The Contractor shall engage an approved electrical agency for execution of electrical works, holding valid electrical contractor license. In case electrical works are executed by contractor himself then valid electrical contractor license shall be arranged by him before start of electrical works at site

**28.0 LEADS**

For the various works, in case of contradiction, leads mentioned in the Schedule of Rates shall prevail over those indicated in the Technical Specifications.

**29.0 CONTRACT AGREEMENT**

- 29.1 The Contractor is required to execute a formal Agreement as per the Form of Contract, with the Owner. For execution of the Agreement, Stamp Paper of appropriate value shall be provided by the Contractor after ascertaining its value.

Till the time, the Contract is executed between Owner & Contractor, the following documents shall be deemed to constitute the Contract:

- i) Letter/Fax of Acceptance / Service Order.
- ii) Bidding Document alongwith set of drawings.
- iii) Addendum to Bidding Document, if any.
- iv) Bid of Contractor consisting of:
  - a) Schedule of Rates as accepted by Owner.
  - b) Deployment Schedule of Supervisory Personnel
  - c) Deployment Schedule of Construction Equipment
  - d) Organisation Chart
  - e) Any other document of Bidder's offer as decided by Owner.

The documents as mentioned at Sl. No. b, c & d shall be considered as indicative and shall be augmented from time to time to complete the Work within the stipulated time.

**30.0 ADDITIONAL WORKS/EXTRA WORKS**





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OWNER reserves their right to execute any additional works/extra works, during the execution of work, either by themselves or by appointing any other agency even though such works are incidental to and necessary for the completion of works awarded to the contractor. In the event of such decisions taken by OWNER, contractor is required to extend necessary cooperation, and act as per the instructions of Engineer-in-Charge.

**31.0 INSPECTION OF SUPPLY ITEMS**

All inspections and tests shall be made as required by the specifications forming part of this contract. Contractor shall advise Owner/ Consultant in writing at least 10 days in advance of the date of final inspection/tests. Manufactures inspection or testing certificates for equipment and materials supplied, may be considered for acceptance at the discretion of Owner/ Consultant. All costs towards testing etc. shall be borne by the contractor within their quoted rates. All inspection of various items shall be carried out based on Quality Assurance Plan, which will be submitted by the Contractor and duly approved by Owner/ Consultant.

**32.0 ESCALATION**

The Unit Rates quoted shall be kept firm till completion of work, and no price escalation shall be tenable.

**33.0 PRELIMINARY EXAMINATION:**

33.1 The OWNER will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.

33.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If the Bidder does not accept the correction of the errors, its Bid will be rejected. If there is a discrepancy between words and figures, the amount in words will prevail.

33.3 Prior to the detailed evaluation, the OWNER will determine the substantial responsiveness of each Bid with reference to the Bidding Documents. For this purpose a substantially responsive Bid is one which confirms to all other terms and Conditions of the Bidding documents without material deviations. The OWNER'S determination of a Bids responsiveness is to be based on the contents of the Bid itself without recourse to extrinsic evidence.

33.4 The OWNER may waive any minor informality or non- conformity or irregularity in a Bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

**34.0 CONTRACT PERFORMANCE SECURITY**



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The Contractor shall furnish to the Employer, within 15 days from the date of notification of award / handing over of site, a security in the sum of 10% of the accepted value of the work of each site or the actual value of work to be done whichever is applicable due to any additional work or any reasons, in the form of a Bank Draft/ Banker's cheque or Bank Guarantee (as per Performa enclosed) as Contract Performance Security with the Employer which will be refunded after the expiry of DEFECTS LIABILITY PERIOD.

**35.0 CLARIFICATION OF BIDS:**

After opening of the Bids to assist in the examination, evaluation and comparison of Bids, the OWNER may, at its discretion, ask the Bidder for a clarification of its Bid. The request for such clarification and the response shall be in writing and no change in the price or substance of Bids shall be sought, offered or permitted.

**36.0 DETAILED EVALUATION:**

**36.1 CRITERIA FOR DETAILED EVALUATION**

Pre-qualified Bids which are technically / commercially acceptable shall be considered for detailed evaluation and will be evaluated as mentioned hereunder

**36.1.1 Earnest Money Deposit (EMD)**

Tenders received without Earnest Money Deposit (EMD) or EMD not in the prescribed Performa as provided in the Bid Document will be rejected.

**Note :**

**The Indian / Domestic firms registered with NSIC / MSME, under its single point registration scheme are exempted from furnishing Tender Fee & Bid Security, provided they are registered for the items / work they intend to quote and subject to their enclosing with their bid a copy of latest and current registration certificate.**

**36.1.2 Experience**

As detailed in NIT (if applicable)/ alternatively previous experience shall be furnished by the bidder for evaluation by Owner.

**36.1.3 Construction Resources**

Contractor shall furnish a list of equipments to be deployed at site along with the tender document for our scrutiny. In case, if the list is not found adequate/ sufficient, contractor has to modify the same to the satisfaction of the Owner.

The tenderer should confirm availability of these required construction equipments and should furnish list of equipments owned by him and also list of construction equipments proposed to be deployed for this work with details whether the same are owned or hired, enclosed with the bid





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document for ensuring timely completion of work. If equipments are to be hired then the source should be indicated. Bidder should also furnish documentary evidence such as Memorandum of Understanding (MOU) with the associates from whom these equipments are proposed to be hired. In the absence of such evidence equipments owned by the tenderer only shall be considered for qualification. The equipment should be in good running condition and desert worthy. The equipment may be physically checked for good running condition against the list furnished by the bidder, shortly after the opening of unpriced bid at the discretion of Owner.

**36.1.4 Manpower**

Contractor shall furnish the bio-data of the key personnel along with the site organization chart proposed to be deployed for the Project. The Project Manager proposed to be deputed should possess B.E. / B. Tech. qualification with minimum 2 years OR Diploma qualification with minimum 5 years of related construction experience. A list of the minimum personnel required to be deployed on the project shall be furnished by the Contractor for our scrutiny. In case, if the list is not adequate / sufficient, Contractor has to modify the same to the satisfaction of the Owner. The bidder should provide adequate qualified and experienced manpower for ensuring required quality control and timely completion of Project

**37.0 COMPENSATION FOR EXTENDED STAY – Not applicable**

**38.0 COMPUTERISED CONTRACTORS BILLING SYSTEM**

Without prejudice to stipulation in General Condition of Contract, Contractor should follow following billing system.

The bills will be prepared by the Contractor on their own PCs as per the standard formats and codification scheme proposed by MNG. The Contractor will be provided with data entry software to capture the relevant billing data for subsequent processing. Contractor will submit these data to MNG in an electronic media along with the hard copy of the bill, necessary enclosures and documents. The Contractor will also ensure the correctness and consistency of data so entered with the hard copy of the bill submitted for payment.

Owner will utilize these data for processing and verification of the Contractor's of Bills".

**39.0 DOCUMENTS TO BE SUBMITTED/ PRODUCED ALONGWITH R.A. BILLS**

- i) Computerized R.A. Bill/ Manual Bill, with IT No./ GST No./ Labour Licence No. printed thereon.
- ii) Photocopy of the measurement book to be attached with R.A. Bills.
- iii) Any other document required for the purpose of processing the bills.
- iv) Registration Certificate with Sales tax authorities of state concerned.



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#### **40.0 LABOUR, LABOUR LAWS AND SITE REQUIREMENTS**

##### **40.1 Labour**

- 40.1.1 The Contractor shall make his own arrangements for the engagement of all labour for doing the work at site or in respect of or in connection with the execution of work as also for the transport, housing, feeding and payment thereof.
- 40.1.2 The Contractor shall provide on the site, an adequate supply of drinking and other water for the use of the Contractor's staff and labours.
- 40.1.3 The Contractor shall not import, sell, give, barter or otherwise dispose of any alcoholic liquor, or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his sub-contractor/s, his/their servants, agents or employees.
- 40.1.4 The Contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid by his sub-contractor/s, his/their servants, agents or employees.
- 40.1.5 The Contractor shall in all dealings with labour in his employment have due regard to all recognised festivals, days of rest and religious or other customs.
- 40.1.6 In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with any carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary
- 40.1.7 The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riots or disorderly conduct by or amongst his employees/labour and for the preservation of peace and protection of persons and property in the neighborhood of the works against the same.
- 40.1.8 The Contractor shall at all times during the continuance of the contract comply fully with all existing Acts, Regulations and by laws including all statutory amendments and re-enactment of State or Central Government and other local authorities and the Central Government or local authority, including Indian Workmen's Compensation Act., Contract labour (Regulation and Abolition) Act., 1970 and Equal Remuneration Act, 1976, Factories Act, Minimum wages Act, provident Fund act, etc., and sanitary arrangement for the said Act. Health and sanitary Arrangements for workmen, Insurance and other benefits etc., and shall indemnify and keep the Owner/Engineer-in-charge indemnified in case any proceedings are taken or commenced by any authority against the Owner/Engineer-in-Charge for any contravention of any of the laws, by laws or scheme by the Contractor. If as a result of Contractor's failure, negligence, omission, default or non-observance of any provisions of any laws, the Owner/ Engineer-in-Charge is called upon by any authority to pay or reimburse or required to pay or reimburse any amount, the Owner/Engineer-in-Charge shall be entitled to deduct the same from any



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money due or that may become due to the Contractor under this contract or any other contract or otherwise recover from the Contractor any sums which the Owner/Engineer-in-Charge is required or called upon to pay or reimburse on behalf of the Contractor. All registration and statutory inspection fees in respect of his work pursuant to the contract shall be paid by the Contractor.

- 40.1.9 The Contractor shall pay the laborers engaged by him on the work not less than a fair wage, which expression shall mean, whether for time or piece work, rates of wages as may be fixed by the Public Work Department as fair wages for Pune Region payable to the different categories of laborers or those notified under the Minimum Wages Act for corresponding employees of the Owner/Engineer-in-Charge whichever may be higher.
- 40.1.10 The Contractor shall notwithstanding the provisions of any contract to the contrary, cause to be paid a fair wage to the laborers indirectly engaged by sub-Contractors in connection with the said works as if the laborer had been directly employed by him.
- 40.1.11 The contractor shall, before he commences the work, display and correctly maintain in a clean and legible condition at a conspicuous place on the site notices in English and in a local language spoken by the majority of the workers, stating therein the rate of wages which have been fixed as fair wages and the hours of work for which such wages are earned and send a copy of such notices to the Owner/Engineer-in-Charge.
- 40.1.12 The Contractor shall maintain records of wages and other remuneration paid to his employees in such form as may be convenient and to the satisfaction of the Owner/Engineer-in-Charge and the Conciliation Officer (Central), Ministry of Labour, Government of India, or such other authorised person appointed by Central or State Government.
- 40.1.13 The Contractor shall provide a wage slip for each worker employed on the works.
- 40.1.14 The wage records and wage slips shall be preserved by the Contractor for minimum period of 12 months after the last entry or such time as the Owner/Engineer-in-Charge may fix in that behalf.
- 40.1.15 The Contractor shall allow inspection of the aforesaid wage records and wage slip to the Owner/Engineer-in-Charge at a convenient time and place after notice is received by him from the Owner/Engineer-in-Charge demanding such inspection.
- 40.1.16 The Owner/Engineer-in-Charge or any other person authorised by him on his behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of the Fair wages Clauses. The Owner/Engineer-in-Charge shall also have the power to investigate into any complaint regarding any default made by the Contractor or his sub-Contractor in regard to such provision.



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40.1.17 The Owner/Engineer-in-Charge shall have the right to deduct from the moneys due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of nonpayment of fair wage, except any deductions that may be permissible under any law for the time being in force.

**40.2 Labour Law**

40.2.1 Under the provisions of Employees Provident Funds and Misc. Provision Act- 1952, every employee is entitled to and required to become a member of the PF from the beginning of the month following that in which he completes three months continuous service or has actually worked for not less than 80 days during the period of three months or less whichever is earlier. The Contractor is to fulfill statutory obligations regarding Employees Provident Fund.

**40.0 Labour License**

40.0.1 Before starting of work at site, Contractor shall obtain a license from concerned authorities under the Contract Labour (Abolition and Regulation) Act 1970, and furnish copy of the same to Owner.

**40.1 Labour Relations**

40.1.1 In case of labour unrest/labour dispute arising out of non-implementation of any law, the responsibility shall solely lie with the Contractor and he shall remove/resolve the same satisfactorily at his cost and risk.

40.1.2 The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his staff and labour and to preserve peace and protection of persons and property in the neighborhood of the Works against such conduct.

**40.2 Employment of Local Labour**

40.2.1 The Contractor shall ensure that local labour, skilled and/or unskilled, to the extent available shall be employed in this work.

40.2.2 The Contractor shall not recruit personnel of any category from among those who are already employed by the other agencies working at site but shall make maximum use of local labour available.

**40.3 Access to Site**

The Contractor shall obtain prior permission of the Owner/Engineer-in-Charge before any person not directly connected with the works visits the site. Contractor shall obtain prior permission for his workers gate pass/for materials etc., as may be required to carry out the works at site from the Owner/Engineer-in-Charge and shall follow the rules and regulations of CISF/Owner/Engineer-in-Charge which may be enforced from time to time for entry or exit.

**40.4 Contractor's Labourers to Leave Site on Completion of the Work**



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The Contractor's labourers must leave the location of the project site after the work is tapered/ completed to avoid creation of a slum in the areas adjoining the project.

**40.5 VOID**

**40.6 Fuel Requirement of Workers:**

40.6.1 Contractor shall be responsible to arrange at his own cost for the fuel requirement of his workers and staff. Cutting of trees etc. shall not be permitted for this purpose.

**40.7 Protection of Existing Facilities:**

40.7.1 Contractor shall obtain plans and full details of all existing and planned underground services from the relevant Deptt. of Owner and shall follow these plans closely at all times during the performance of work. Contractor shall be responsible for location and protection of all underground lines and structures at his own cost.

40.2.2 Despite all precautions, should any damage to any structure/ utility etc. occur, the Owner/ authority concerned shall be contacted by the Contractor and repair shall forthwith be carried out by Contractor at his expenses under the direction and to the satisfaction of Engineer-in-charge and the concerned Owner/ authority.

40.2.3 The Contractor shall not store any materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services.

40.2.4 Contractor shall obtain all safety clearance (viz. Excavation, Hot/ Cold work permit) from the Owner prior to start of work. Work without safety permit shall not be carried out.

40.2.5 Contractor shall in consultation with Owner and the concerned authorities, take adequate measures for strengthening the existing electric poles, telephone poles etc. in the proximity of the pipeline alignment. Contractor shall take adequate protective measures to prevent damage to these facilities during construction. Contractor shall have to adopt such method of construction as will be suitable for working in these areas using the limited space available and without causing any damage to these facilities. Contractor shall be deemed to have taken cognizance of all such constraints, etc. while working in this area and Contractor shall not be entitled to claim any extra at a later stage.

**40.11 Fronts for Work; Where Other Agencies are involved**

The work involved under this Contract may include such works as have to be taken up and completed after other agencies have completed their jobs. The Contractor will be required and bound to take up and complete such works as and when the fronts are available for the same and no claim of any sort whatsoever shall be admissible to the Contractor on this account. Only extension of time limit shall be admissible, if the



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availabilities of work fronts to the Contractor are delayed due to any reason not attributable to the Contractor.

It is to be noted that other contractors will be working during the currency of this Contract. The Contractor shall co-ordinate with such other contractor(s) and ensure that the work of other contractor(s) is not effected, The Engineer in- Charge will decide the priority and the same shall be binding without any cost and time effect.

**40.12 Payment of Wages:**

40.12.1 The Contractor shall ensure payment of wages to all workmen employed, by him or sub-contractor or by any other agency on his behalf in connection with the work before the expiry of the 7th day after the last day of wage period in respect of which the wages are paid and shall ensure wages standards, period and provisions (including the provision of wages, privilege and facilities) for all workmen in this behalf, prescribed under the payment of wages Act, the Contract Labour (Regulation & Abolition) Act-1970 and rules framed there under, the

Minimum Wages Act and any other applicable law, rule or regulation in this behalf including but not limited to the following:

**40.12.1.1 Weekly off with Wages**

The labour must be given weekly off with wages as admissible.

**40.12.1.2 National Holidays**

Three National Holidays viz. Republic Day (26th January), Independence Day (15th August) and Gandhi Jayanti (2nd October) must be granted to all the workers with wages.

**40.12.1.3 Payment of Overtime Wages**

Labour governed under the provision of Factories Act- 1948 (working inside the battery areas) shall be paid overtime wages at double the normal rate of wages for working beyond 08 (Eight) hours in a day and 48 hours in a week.


Labour in general should not be engaged for duty for more than 08 hours in a day except in case of exigencies of work. If they are engaged for performing duty for more than 08 hours they should be paid overtime wages at the rates applicable.

**40.13 Site Facilities:**

40.13.1 The Contractor shall arrange for the following facilities at site, for workmen deployed/engaged by him/his sub-contractor, at its own cost.

- (i) Arrangement for First Aid.
- (ii) Arrangement for clean & potable drinking water.
- (iii) Toilet.
- (iv) Canteen where tea & snacks are available



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- (v) A creche where 10 or more women workers are having children below the age of 6 years.
- (vi) Any other facility/utility as may be required under the Contract.

**41.0 Rounding off**

All payments to and recoveries from the Contractor shall be rounded off to the nearest rupee. Wherever the amount to be paid/recovered consists of a fraction of rupee (paise), the amount shall be rounded off to the next higher rupee if the fraction consists of 50 (fifty) paise or more and if the fraction of a rupee is less than 50 (fifty) paise, the same shall be ignored.

**42.0 Leads**

For the various works, in case of contradiction, leads mentioned in the Schedule of Rates shall prevail over those indicated in the Technical Specifications.

**43.0 Insurance for Personal injuries**

The Contractor shall at his own costs and expenses obtain and shall cause any sub-Contractor to obtain such insurances as may be necessary' to cover the

liability of the Contractor or as the case may be of such subcontractor in respect of personal injuries and death arising out of or in the course of or caused during the execution of the works and shall produce or cause any such subcontractor to produce for inspection the relevant policy or policies together with receipt for the premium paid under such policy/policies as and when required by the Owner/Engineer-in-Charge.

**44.0 Strike/Lock out by Contractor's Employees:**

No availability of labour or strike by the Contractor's employees or lock out shall not be a ground or any excuse for not completing the works within the stipulated time nor shall be a ground or any excuse; for extension of period of completion of works.


**45.0 Preamble to Schedule of Rates**

Preamble to schedule of rates attached with SOR is only indicative & shall not be the basis for any extra item at a later date.

**45.1 Completion Documents**

The following documents shall also be submitted by the Contractor in triplicate as a part of completion documents:

- a) Test certificate / and analysis certificate of various civil and electrical items involved in work.
- b) Guarantee/Warranty certificates of materials.
- c) Test certificate from manufacturers for any other material supplied by the Contractor.
- d) Insurance policy as per relevant clauses of contract agreement.

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- e) ESI/EPF clearance certificate for the period during which work was carried out.
- f) Attendance register & salary records of work period.
- g) Three set of construction drawing showing therein the execution of the work duly approved by the Engineer-in-Charge along with one set of reproducible on tracing paper (drawings prepared by Contractor).
- h) Other documents as mentioned in Technical Specification

#### **46.0 SETTLEMENT OF DISPUTE BETWEEN GOVERNMENT DEPARTMENT/ PUBLIC SECTOR UNDERTAKINGS AND PUBLIC SECTOR UNDERTAKINGS:**

In the event of any disputes or differences between the Contractor and the Owner, if the Contractor is a Government department, a Government company or an undertaking in the public sector, then such disputes or differences shall be resolved amicably by mutual consultation or through the good offices or empowered agencies of the Government, If such resolution is not possible, then the unresolved disputes or differences shall be referred to arbitration of an arbitrator to be nominated by the Secretary, Department of legal affairs (Law Secretary) in terms of the Office Memorandum No.55/3/1/75-CF dated 19th December, 1975 issued by the Cabinet Secretariat (Deptt. of Cabinet Affairs) as modified from time to time. The Arbitration Conciliation Act 1996 shall not be applicable to the arbitrator under this clause. The award of the arbitrator shall be binding upon parties to the dispute, provided, however any party aggrieved by such award may make a further reference for setting aside or revision of the award to Law Secretary whose decision shall bind the parties finally and conclusively.

#### **47.0 DEFINITIONS**

- 47.1 “Bid” means the offer (unpriced as well as priced) submitted by a Bidder in response to the Invitation to Bid.
- 47.2 “Bidding Document” also referred to as Tender Document means the document issued to a prospective bidder to enable him to submit his Bid. This shall include all documents as per the Master Index.
- 47.3 “Addendum/Amendment” means a document issued to Bidders which incorporates changes/corrections/additions to the Bidding Document. This shall form part of Bidding Document.
- 47.4 “OWNER”, “Client”, ‘Company’ or “MNGL” appearing anywhere in this Bidding Document shall mean the Maharashtra Natural Gas Ltd. having its registered office at Plot No. 27, 1<sup>st</sup> Floor, Narveer Tanajiwadi PMPML Bus Depot Commercial Building, Shivajinagar, Pune – 411005 and includes its successors and assigns.





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47.5 "Bidder"/"Tenderer" shall mean any company, firm or body who submit the bid consequent upon issue of Bidding Document.

**48.0 CONSTRUCTION WATER & POWER SUPPLY**

**48.1 Construction Power**

Clause No. 2.4 of GCC stand modified to the following extent only:

Construction power shall not be provided by Owner. Contractor shall make his own arrangement at his cost for Construction Power and quoted prices shall be deemed to have been included the same.

Contractor shall arrange power required for construction for the Project on behalf of the Owner. All associated activities for obtaining necessary approvals and sanctions from local authorities for construction power shall be coordinated by the Contractor, the cost of which shall be deemed to be included in the quoted rates under various items of work of the "Schedule of Rates" and nothing extra shall be paid on this account. The renewal of the construction power connection at regular intervals shall also be the responsibility of the Contractor. All installations/ fixtures and fittings/fittings/cabling for construction power shall be the responsibility of the Contractor without any additional cost to the Owner.

**48.2 Construction Water**

Clause No. 2.3 of GCC stand modified to the following extent only:

Construction water will not be supplied by Owner, Contractor shall make his own arrangement at his own cost for water required for construction work as well as drinking purposes required by labour force at site and the quoted prices shall be deemed to have been included the same. The Contractor shall get approval from the Owner/Engineer-in-Charge regarding suitability of water for construction purposes.


**49.0 LAND FOR SITE OFFICE**

49.1 Clause No. 2.5 of General Conditions of Contract is modified to the following extent:-

Land for contractor's site office, godown, workshop, fabrication yard or labour colony etc. shall not be provided by Owner. Contractor shall make his own arrangement for any and all land required by him for the execution of the works and the quoted prices shall be deemed to have been included the same.

**50.0 ADDITION TO GCC:**

- i) extended to the following extent:-  
In case of range of variation up to inclusive of range of +50% & - 25% no increase and' or decrease shall be applicable in Schedule of Rates.

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**ii) Abnormally High Rated Item (AHR)**

In items rate contract where the quoted rates for the item, exceed 50% of the owners estimated rates, such items will be considered as Abnormally High Rates Items (AHR) and payment of AHR items beyond the BOQ stipulated quantities shall be made at the least of the following rates :-

1. Rates as per BOQ, quoted by the Contractor.
2. Rate of the item, which shall be delivered as follows :
  - a) Based on rate of machine and labour as available from the contract (which is including 15% cover towards contractor's profit overhead and other expenses).
  - b) Based on prevailing market rate of machine materials and labour plus 15% to cover contractors profit, overhead and other expenses, when the rates are not available in the contracts.


iii) Notwithstanding the provisions contained in Clause (ii) above, MNGL would have the right to negotiate all such AHR items before the award of the work.

51 THIS BEING "NO DEVIATION" TENDER, NO DEVIATIONS/STIPULATIONS SHALL BE ENTERTAINED. OFFERS CONTAINING ANY DEVIATIONS SHALL BE LIABLE FOR REJECTION.

52 BONUS CLAUSE

**Not Applicable for this tender.**

**53.0 EXTENDED STAY  
COMPENSATION Not Applicable for  
this tender.**

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## ANNEXURES TO THE SCC

### ANNEXURE-I

#### DETAILS OF SIMILAR WORKS DONE DURING PAST FIVE YEARS

Sl. No.	Full Postal Address of Client & Name of Officer-in-charge	Description of the Work	Value of Contract	Date of Commencement of Work	Actual Completion Time (Months)	Schedule Completion Time (Months)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(SIGNATURE OF BIDDER)



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**ANNEXURE-II**

**CONCURRENT COMMITMENTS OF THE BIDDER**

Sl. No.	Full Postal Address of Client & Name of Officer- in- charge	Description of the Work	Value of Contract	Date of Commencement of Work	Scheduled Completion Period	%age completion as on date	Expected date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

**(SIGNATURE OF BIDDER)**



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**ANNEXURE-III EQUIPMENT HOURLY RENTAL RATES FOR  
EXTRA WORKS**

<b>Sl. No.</b>	<b>Description of Equipment</b>	<b>Hourly rental rates for Extra Works including consumables</b>
1	Dozers	Rs.1,000/-
2	Back Hoe 0.7 m <sup>3</sup>	Rs.1,000/-
3	Boring machine	Rs.700/-
4	Bending Machine	Rs.400/-
5	Electro-fusion machine with Generator	Rs.300/-
6	Compressors 210 CFM	Rs.500/-
7	Crane upto 15 T	Rs.1,000/-
8	Dewatering Pumps	Rs.100/-
9	Clamps	Rs.50/-
10	Diesel operated power generators	Rs.150/-
11	Compressor 600 CFM Capacity	Rs.750/-
12	Trucks	Rs.150/-
13	Car/Jeep	Rs.125/-
14	Tractor with trolley	Rs.150/-
15	Tripod with 5 Tons Chain Pulley Block	Rs.75/-
16	Pipe Trailor 20 T capacity	Rs.400/-
17	Dumper	Rs.250/-

**SIGNATURE OF BIDDER**

Note: Rates are final and Tenderer is to sign without deviation.



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**ANNEXURE-IV**

**SCHEDULE OF LABOUR RATES**

Sl. No.	Classification Personnel	Rates in INR for 8 hours	
		Standard Time (Rs.)	Overtime (Rs.)
1	Engineer	2500	Double Rates
2	Surveyor Foreman	2000	
3	Pipe Fitter	750	
4	Pipe Welder (Mainline)	850	
5	Pipe Welder (Terminal)	850	
6	Gas Cutter	700	
7	Grinder	700	
8	Mason	520	
9	Plumber	500	
10	Carpenter	500	
11	Painter	500	
12	Electrician	600	
13	Cable Jointer	780	
14	Instrument Technician	1000	
15	Rigger	400	
16	Watchman/Helper	390	
17	Concrete Mixer Operator	520	
18	Heavy Machine Operator	700	

**SIGNATURE OF BIDDER**

Note: Rates are final and Tenderer is to sign only without deviation.



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NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**



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## **PART – III**

# **TECHNICAL SPECIFICATION**

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## **0.0 CIVIL & STRUCTURAL WORKS**

### **0.1 Material Specifications**

#### **0.2 Brick**

Bricks for masonry work shall confirm to IS:1077 specification for common burn clay building bricks and crushing strength not less than 75 Kg/cm<sup>2</sup>. Specific requirements like dimensions, tolerances and other common requirements shall confirm to IS:1077. Bricks shall have smooth, rectangular faces with sharp corners and shall be well burn, sound, hard, tough and uniform in color. These shall be free from cracks, chips, flaws and Florence. All tests shall confirm as per the requirements of IS 5454 and IS 3495. Water absorption shall not be more than 20% by its dry weight when soaked in cold water for 24 hours.

#### **0.3 Cement**

Cement to be used for Civil & Structural work shall be of 43 grade/53 grade Ordinary Portland Cement confirming to IS:8112/IS:12269 respectively.

#### **0.4 Steel**

All Steel bars, sections, plates and other miscellaneous steel materials shall be free from rust, oil, mud, paint or other coatings. Reinforcement bars to be used for Civil & Structural work shall be of High Strength Deformed Steel Bars of grade Fe 415 confirming to IS: 1786.

#### **0.5 Aggregates**

Coarse & fine aggregates for Civil & Structural work shall confirm in all respects to IS: 383 latest.

#### **0.6 Water**

Water used for Civil & Structural work shall be cleaned and free from injurious amount of oil, acids, alkalis, organic, matters or other harmful substances which may be deleterious to concrete, masonry or steel. Potable water shall be considered satisfactory.

Tests on water samples shall be carried out in accordance with IS:3025 and they shall fulfil all the guidelines and requirements given in IS:456:2000.

## **1.0 Earthwork & Backfilling**

### **1.1 Back filling for Plot & Construction of Embankment**

**Sweet Earth** : Sweet earth is the clayey earth to be obtained from borrow areas indicated in the drawings or, prospecting and soil testing to be carried out by the Contractor as per detailed specifications and direction of the Owner. Earth obtained from the excavation of the plot may be used for plot filing, if found suitable (as per relevant IS code) by laboratory tests.

All materials required for the backfill etc shall be obtained from the designated borrow areas to be prospected & soil tested by the Contractor as per specification and as shown in construction drawings or as designated by the



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Owner.

The depth of cut in all borrow areas will be designated by the Owner and the cuts shall be made to such designated depths only. Shallow cuts will be permitted in the borrow areas if un-stratified materials with uniform moisture contents are encountered. Each designated borrow area shall be fully exploited before switching over to the next designated borrow area. Haphazard exploitation of borrow pits shall not be permitted. The type of equipment used and the operations in the excavation of materials in borrow areas shall be such as will produce the required uniformity of mixture of materials for the embankment.

Note: All permission to procure borrow earth, royalties, cess and transportation, etc. shall be contractors' responsibility.

## **1.2 Tamping:**

Earth fill shall be spread in layers of not more than 150 mm. in thickness when loose and shall be moistened to have the required moisture content as specified. When each layer of material has been conditioned to have the required moisture content, it shall be compacted to the specified density by rollers, mechanical tampers or by other approved methods. All equipment and methods used shall be subject to approval based on evidence of actual performance and field compaction tests.

The capacity of mechanical roller/tamper and number of passes required to achieve the specified [95% of MDD] shall be determined based on field tests [to match the OMC & MDD for the borrow material as determined at Approved Laboratory] before taking up the filling of earth.

## **1.3 Laboratory Facilities:**

The Contractor shall set up and maintain a well equipped **field laboratory** [core cutter M/c with moisture measurement device etc] and shall place a qualified person in charge of the laboratory during the entire period of construction. He shall also engage services of an **Approved Laboratory** to conduct all tests required including those mentioned specifically in this chapter.

The **Field Laboratory** shall have equipment in conjunction with **approved Laboratory** test facilities [in adequate numbers] for conducting the following tests:

- i) Moisture content of soil [Field Lab & Approved Laboratory.]
- ii) Proctor compaction test for establishing optimum moisture content and dry density [at Approved Laboratory.]
- iii) Equipment to take undisturbed samples from compacted fills [Field Lab] to measure O.M.C and dry density [ at Approved Laboratory] .
- iv) Atterberg limits [at Approved Laboratory.]
- v) In-situ density test, in-situ moisture content tests [Field Laboratory].

## **1.4 Excavation & back filling for foundation, pits, walls etc.**

Excavation shall be carried out to true line and levels in all types of soil and hard rock as per specified in SOR and shall be carried out for all lifts as required by



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the work.

The Contractor shall provide suitable drainage arrangement to keep the pits dry. He shall also carry out all de-watering required within the quoted rate.

If excavation is made in excess of the depth required, the contractor shall at his own expenses fill up to the required level with lean concrete of mix 1:5:10 (1 cement:5 coarse sand:10 aggregate) or as decided by site-in-charge.

The Contractor shall make necessary arrangements for lighting, fencing and other suitable measures for protection against risk of accidents due to open excavation at his own expense.

All shoring and strutting required holding the sides of excavation from collapse are included in the quoted rates.

No excavated material shall be deposited within 1.5M of edge of excavation.

The Contractor shall not undertake any concreting in foundation until the excavation pit is approved by the site-in-charge.

The Contractor shall not backfill around any work until it has been approved by the site-in-charge.

Back filling shall be carried out of selected earth coming out of excavation.

Back filling shall be carried out in layers of 150 mm and compacted to achieve 95% maximum dry density of the soil being used.

Any surplus earth generated shall be transported to areas designated by the Engineer-in-charge.

#### **1.5 Straw / Coir / Jute Reinforced Geosynthetics**

This material shall be used for providing protection to the downstream slopes and stabilization to the turfing.

The material shall be of good design, origin and approved manufacturer confirming to the relevant Indian Standards. The origin of material shall be Indian / Bangladesh and it should be environment friendly / biodegradable. The fibre shall be laid on a cellulose base and reinforced with approved quality polypropylene netting properly secured by stitching.

#### **1.6 Humus Earth with Manure**

This is required for covering the downstream slopes to support the growth of green turfing. The best quality organic manure with natural occurring humus earth that can support growth of turfing/ scudding shall be used. This material shall be selected by an expert horticulturist / arboriculturist.



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**1.7 Borrow Areas:**

**General**

All materials required for the construction of the embankment and backfill etc. which are not available from required excavations and serviceable debris materials shall be obtained from the designated borrow areas to be prospected & soil tested by the Contractor as per specification and as shown in construction drawings or as designated by the Owner.

The limits of each borrow area to be used in the various zones of embankment shall be flagged in the field.

The depth of cut in all borrow areas will be designated by the Owner and the cuts shall be made to such designated depths only. Shallow cuts will be permitted in the borrow areas if unstratified materials with uniform moisture contents are encountered. Each designated borrow area shall be fully exploited before switching over to the next designated borrow area. Haphazard exploitation of borrow pits shall not be permitted. The type of equipment used and the operations in the excavation of materials in borrow areas shall be such as will produce the required uniformity of mixture of materials for the embankment.

Borrow pits shall not be opened within a distance of 10 (ten) times the height of the pond embankment from the upstream toe or 5 (five) times the height from the downstream toe. Borrow pits shall be operated so as not to impair the usefulness or mar the appearance of any part of the work or any other property. The surface of wasted materials shall be left in a reasonably smooth and even condition.

**1.8 Stripping Borrow Areas**

Borrow area shall be stripped of top soil, sod and any other matter which is unsuitable for the purpose for which the borrow area is to be excavated. Stripping operations shall be limited only to designated borrow areas. Materials from stripping shall be disposed off in exhausted borrow areas or in the approved adjacent areas, as directed by the Owner and or local authorities.

**1.9 Embankment General**

The embankment shall be constructed to the lines and grades shown in the construction drawings. Placement of fill as shown in the drawings shall be performed in an orderly sequence and in an efficient and workmanlike manner, so as to produce, fills having such qualities of density and strength as will ensure the highest practicable degree of stability and performance of the whole embankment.

No bushes, roots, sods, or other perishable or unsuitable materials shall be placed in the embankment. The suitability of each part of the foundation for placing embankment materials thereon and of all material for use in embankment construction will be determined by the field laboratory.

The embankment shall be maintained in continuous and approximately horizontal layers in the reach programmed for construction in the said period. The



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embankment may be constructed in discontinuous portions of reaches, provided that the slopes of the bonding surface parallel between the previously completed portions of the embankment and materials to be placed in each zone shall not be steeper than 3 to 1 (3 horizontal and 1 vertical).

#### **1.10 Dressing Slopes**

The outside slopes of the embankment shall be neatly dressed to lines as the placing of fill progresses. Compaction shall extend over the full width of the embankment, and material in earth slopes shall be compacted to ensure proper compaction on the edge. The cross-section of the filling during construction shall be kept suitably wider and the cross-section be dressed to the designed requirement after compaction.

All humps and hollows varying more than 15 cm. from the neat lines of the embankment shall be re-graded. Material used to fill depression shall be thoroughly compacted and bonded to the original surface. Slope shall be maintained until final completion and acceptance. Any material that is lost by rains, weathering or other cause shall be replaced.

The rate for embankment construction shall allow for such extra widening of the cross section and its subsequent dressing to the required cross section. Both dry weather and monsoon flow in the basin of the existing area and its natural drainage system shall be properly diverted or routed during the entire construction period. Adequate facilities shall be made by the Contractor for this before taking up construction work.

Note : The cost of such diversion for taking care of flow both during monsoon and dry weather shall be included in the rate quoted for construction against various items of the Schedule of Quantities.

#### **1.11 Settlement Allowance**

In the earthfill embankments, settlement allowance of 2% will be provided. The base width of the embankment will not be increased to maintain the design slopes indicated in the drawings for the additional height as settlement allowance, but the following procedure will be adopted. Settlement allowance will be calculated at various levels where the slope is to be changed and the elevations, including settlement allowance, will be derived, the embankment widths at the designed levels remaining same. The edges of embankment at the increased elevations (including settlement) when joined with the point where the

slope has changed earlier below shall give the slope to be adopted for construction.

#### **1.12 Protection of Geosynthetics**

All backfill placements must insure the integrity of the underlying geosynthetics, where present on downstream slopes. The contractor is responsible for all damages or presumed damaged to the geosynthetics. Resulting damage localization and reparation cost will be charged to the contractor.



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The contractor is responsible for the construction of any temporary structures that are necessary for to obtain proper working conditions.

**2.0 Sand filling in plinth/foundations/etc.**

Filling shall be carried out in layers not exceeding 15cms and shall be compacted mechanically or by saturation to specified grade and level and to obtain 90% laboratory maximum dry density or as specified in schedule or rates.

Compaction by flooding may be accepted at the discretion of the Engineer-in-charge, provided the required compaction is achieved.

The Contractor shall not commence filling in and around any work until it has been permitted by the Engineer-in-charge.

**3.0 Damp Proof Course – (DPC)**

The 40mm thick Damp Proof Course shall consist of plain cement concrete of nominal 1:2:4 volume (1 Cement: 2 Coarse Sand: 4 Crushed Stone Aggregates) with 10mm and down size graded aggregate, unless otherwise specified.

The Damp Proof Course shall be laid at plinth level of masonry walls, flush with the floor surface and shall not be carried across doorways.

Before laying, the top surface of wall shall be thoroughly cleaned and watered. The D.P.C. shall be laid in layers of 20mm thickness retaining the edges by necessary framework and shall be well tamped and trowelled to smooth finish. The layer shall be cured by keeping the surface wet for 40 hours and after it had dried, two coats of hot bitumen of grade A90/S90 conforming to IS:73 shall be applied over it at the rate of 1.7Kg./m<sup>2</sup>. Over this, the second layer of 20mm thick concrete shall be laid and cured as described in case of the first layer and two coats of hot bitumen at the rate of 1.7Kg./m<sup>2</sup> shall be applied again in a similar manner. Over this, dry coarse sand shall be sprinkled evenly before hardening of second coat of bitumen paint.

**4.0 Stone Soling:**

**4.1** Stone soling shall be carried out at all the places as shown in the drawing and as per direction of EIC

**4.2** Material:

The stone ballast of 115-150 mm shall be used for carrying out the stone soling. The gaps in the stone soling shall be filled in with crush sand or grit as approved by EIC.

**4.3** The stone soling shall be carried out in layers of 300 mm thickness with specified stones and filling material and compaction including watering shall be carried out up to satisfaction and as per direction of EIC

**4.4** It will be contractors responsibility to get every layer of stone soling checked from EIC representative.





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## **5.0 Plain and Reinforced Cement Concrete**

The cement and steel reinforcement is in the contractor's scope of supply. Engineer-in-Charge may require tests to be carried out by the contractor as a part of his quoted rates to ensure conformity with the relevant standards.

Engineer-in-charge may reject such of the cement supplied in the event of either unsatisfactory tests or in the event of deterioration due to age, bad storage etc. Decision of Engineer-in-charge shall be final in this regard.

Water used for concreting work shall be suitable for drinking and shall conform to IS 456:2000. It shall be free from injurious substances.

Source of Coarse and fine aggregates shall be approved by Engineer-in-Charge.

- i) Contractor shall store each type and grade of aggregate separately. He shall maintain at site of work adequate quantities to ensure conformity of work. Wet aggregate delivered to site shall be stored for 24 hrs to facilitate drying before being used.

Admixtures shall be used only with the specific permission of Engineer-in-charge and where used shall be conforming to the instruction of the manufacturer.

## **5.1 Grades & Proportioning**

The grades indicated in drawing and schedules shall conform to IS : 456:2000, the strengths being indicated below:

### **SPECIFIED CHARACTERISTIC COMPRESSIVE STRENGTH**

## **5.2 Grade strength of 15 cm cube in N/MM<sup>2</sup>**

	28 days	7 days,
M – 20 (Nominal mix)	20	13.5
M – 25 (Nominal mix)	25	16.5

### **Modulus of Rupture by Beam Test at Minimum**

	72 + 2 hours	7 days
M – 20 (Nominal mix)	1.7	2.4
M – 25 (Nominal mix)	2.1	2.8

The water cement ratio, coarse aggregates and grading for each mix shall be predetermined from the results of cube tests of trial mixes. The mix proportions determined thus shall be followed at site and shall in no way relieve the contractor of his responsibility as regards the prescribed strength mix. The mix proportions, however, shall be revised if the results of the cube tests during the construction show consistently lower than the prescribed one. No claim to alter the rates of concrete work will be entertained due to such changes in mix designs, as the contractor will be responsible to produce the concrete of required grade. The aggregates shall be measured by volume.

All concrete shall be controlled concrete conforming to IS:456:2000. For mud-mat





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and filling purpose, ordinary concrete of 1:4:8 for proportion or as specified may be used as indicated in drawings.

**5.3**     **Mixing**

Mixing should be carried out in mechanical mixers. Hand mixing can however be permitted by Engineer-in-charge in special cases subject to additional 10% extra cement without extra cost. Water cement ratio shall be rigidly controlled during mixing. Mixers shall be fitted with automatic devices to discharge measured quantity of water directly to the mixing pan. The water shall not be admitted to the drum until all the cement and aggregate constituting the batch are thoroughly mixed. Mixing shall continue until the concrete is uniform in colour and not less than 2 minutes after all the materials and water are in the drum.

**5.4**     **Placing**

The place where concrete is to be poured should be clean and free from all loose dirt, wooden pieces, dust, standing water etc. The form-work must be right and rigid, with all holes and crevices stopped effectively, to prevent cement slurry from running out.

Walking on reinforcement layers is not permissible. Walkways of wooden planks or similar can be placed with removable supports and should be independent of the reinforcement. The reinforcement position should not be disturbed nor should it sag during carriage and placement of concrete.

Placing and vibration should not take totally more than 20 minutes from time of mixing. Method of placing should be got approved by Engineer-in-charge. Segregation during carriage and placement should be avoided if during carriage concrete segregates, it should be re-mixed before placement.

Concrete should not be dropped from a height of over 1.5M.

To ensure bond and water tightness between old concrete surface and fresh concrete to be placed, the surface should be cleaned and roughened by "initial green out" by wire brushing or chipping. The initial green cutting may be done by wire brush after 6 hours of placing concrete in order to facilitate the work. Chipping can be done only after 48 hours. A layer of cement slurry with 1:1 mix (1 cement : 1 sand) should be poured to obtain a uniform coating on old concrete. Immediately thereafter, the fresh concrete should be poured.

Concrete shall be placed in a single operation to the full thickness of slabs, beams and similar members and shall be placed in horizontal layers not exceeding 1.5m deep in walls, columns and similar members. Concrete shall be placed continuously until completion of the part of the work between construction joints or as directed by Engineer-in-Charge.

**5.5**     **Placing in the inclement Weather**

All precautions shall be taken for concreting in extreme weather in accordance with relevant clause of IS:456:2000. Due protection shall be provided to prevent cement being blown away while proportioning and mixing during windy weather. No concreting shall be carried out in continuous heavy rains and necessary



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arrangements to cover the freshly poured concrete shall be provided, to protect it from the direct rays of the sun and from drying winds.

All concreting placements should be coordinated with placement of conduits, inserts, and embedded parts etc. executed either by same agency or separately.

Concrete in standing water shall be executed strictly as per IS : 456:2000. This shall be paid as a separate item where applicable.

#### **5.6 Vibration**

Concrete shall be compacted by means of vibrators of approved type under proper supervision as directed by the Engineer-in-Charge. The whole mass of concrete shall be well vibrated until a dense mass with a jelly like appearance and consistency and water just appearing on the surface is obtained. Over vibration and vibration of very wet mixes shall be avoided. Care should be taken to avoid segregation and formation of air bubbles.

#### **5.7 Construction Joint**

Construction joints shall be made in the position as indicated in drawings and as approved by Engineer-in-charge. Such joints shall be truly vertical or horizontal as the case may be except that in an inclined or curved member the joint shall be strictly at right angles to the axis of the member.

#### **5.8 Curing & Protection**

The concrete shall be kept constantly wet for at least seven days from the date of placing of concrete. In very hot weather precaution shall be taken to see that temperature of wet concrete does not exceed 38°C while placing.

Concrete shall not be disturbed after initial setting has started. For freshly laid concrete formwork shall not be jarred. Concrete placed below ground surface shall be protected from falling earth during and after placing.

#### **5.9 Finishes**

On striking the formwork, all blow holes and honeycombing observed shall be brought to the notice of Engineer-in-Charge. The Engineer-in-charge may at his discretion allow such honey combing or blow holes to be rectified by necessary chipping and packing or grouting with concrete or cement mortar.

If mortar is used, it shall be 1:3 mix or as specified by Engineer-in-Charge. However, if honey-combing or blow holes are of such extent as being undesirable the Engineer-in-Charge may reject the work totally and his decision shall be binding on the contractor. No extra payment shall be made for rectifying these defects. All burrs and uneven faces shall be rubbed smooth by carborundum stone.

The surface of non-shuttered faces shall be smoothened with a wooden float to give a finish equal to that of the rubbed down shuttered faces. Concealed concrete faces shall be left as from the shuttering except that honey combed surface shall be made good as detailed above. The top faces of slabs not



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intended to be surfaced shall be leveled and floated smooth at the levels or slopes shown on drawings. The floating shall not be executed to the extent of bringing excess fine materials to the surface. The top faces of slab intended to be covered with screed, granolithic or similar surface shall be left with a rough finish. Sides and soffits to be later covered with plaster shall be suitably roughened.

**5.10 V-Bee Test/Slump Test of Concrete**

At least one Vee-Bee Test/Slump Test shall be made for every compressive strength test carried out. More frequent tests shall be made if there is a distinct change in working conditions or if required by the Engineer-in-Charge .

**5.11 Strength Test of Concrete**

Samples from fresh concrete shall be taken as per IS:1199 and cubes shall be made, cured and tested at 28 days in accordance with IS:516.

In order to get a relatively quicker idea of the quality of concrete, optional tests on beams for modulus of rupture at 72+2 hours or at 7 days, or compressive strength tests at 7 days may be carried out in addition to 28 days compressive strength tests. For this purpose, the values as given may be taken for general guidance in the case of concrete made with Ordinary Portland Cement. In all cases, the 28 days compressive strength as specified shall alone be the criterion for acceptance or rejection of the concrete from strength consideration. If, however, from tests carried out in a particular work over a reasonably long period, it has been established to the satisfaction of Engineer-in-Charge that a suitable ratio between 28 days compressive strength and modulus of rupture at 72+2 hours or compressive strength at 7 days compressive strength as specified

provided the expected strength values at the specified early age are consistently met. However, set of test cubes for 28 days strength test shall always be taken and maintained to cater to any contingencies in the event of failure of 7 days strength.

**5.12 Procedure**

A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested, that is the sampling should be spread over the entire period of concreting and cover all mixing units.

**5.13 Frequency of Sampling**

The minimum frequency of sampling of concrete for each grade shall be in accordance with the following:

Quantity of concrete in the work in m <sup>3</sup>	Number of samples
1-5	1
6-15	2
16-30	3
31-50	4
51 & above	4 plus one additional sample for each additional 50 m <sup>3</sup> or part thereof



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**Note:** At least one sample shall be taken from each shift. Wherever concrete is produced at continuous production unit, such as ready –mixed plant, frequency of sampling may agreed upon mutually by suppliers and Engineer-in-charge.

**5.14 Test Specimen**

Three test specimens shall be made from each sample for testing at 28 days. Additional cubes may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking the form work, or to determine the duration of curing, or to check the testing error. Additional cubes may also be required for testing cubes cured by accelerated methods as described in IS:9013. The specimen shall be tested as described in IS:516.

**5.15 Test Strength of Sample**

The test strength of the sample shall be the average of the strength of three specimens. The individual variation should not be more than  $\pm 15$  percent of the average.

1. The concrete test failing to attain the specified strength.
2. Suspected over loading construction of the structure.
3. Shuttering being prematurely removed and not as per time specified in IS:456:2000.
4. Concrete improperly cured.

The contractor shall carry out tests at his own cost. If the results of the loading test be unsatisfactory, the Engineer-in- Charge may instruct the contractor to demolish and reconstruct the structure or part thereof at the contractor's cost.

**6.0 Formwork & Centering**

Formwork in general shall conform to IS 456:2000.

For complicated work, the contractor shall submit his proposal of formwork before starting the work for the approval of the Engineerin- Charge. The number of props, their sizes and dispositions shall be such as to be able to safely carry the full dead load and constructional loads. However, approval of the Engineer-in-Charge to this effect shall not relieve the contractor of his responsibility for proper work and safety.

All forms of beams, slabs and similar members shall be so designed and erected that the sides can be removed without disturbing the soffit shutter and supports there to.

Beam soffit shall be provided with an upward, camber of 6mm for each 3M of horizontal span or as directed by the Engineer-in- Charge. Vertical props shall be supported on wedges or sole plates or other measures where by the props can be gently lowered while commencing to remove the shuttering. Columns shuttering shall not be over 1.5M in height apiece.

Before removal of the shuttering the concrete shall be examined and it removal order taken from the Engineer-in-Charge. In no circumstances shall forms be



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struck until the concrete reaches a strength of at least twice the stress to which the concrete may be subjected at the time of striking.

Shuttering shall not be removed until the number of clear days specified in IS:456:2000 have elapsed since the last day of placing concrete in the member concerned. All formwork shall be removed without such shock or vibration as would damage the reinforced concrete. Before the soffits and struts are removed the concrete surface shall be exposed, where necessary order to ascertain in that the concrete has sufficiently hardened. The specified period may be extended if desired by the Engineer-in-Charge on account of delayed hardening caused by low atmospheric temperature.

#### **7.0 Reinforcement in cement concrete**

The steel for reinforcing bars shall be as indicated in drawings and conforming to specifications.

All reinforcement at the time of concreting, shall be free from loose rust or scales, oil, grease or other harmful matter, and other castings that will destroy or reduce the bond.

The number, size, form and position of all the reinforcement shall, unless otherwise directed or authorised by the Engineer-in-Charge be strictly in accordance with the drawings. Wherever inserts interfere with the placing of reinforcement, proper adjustment shall be made as directed by Engineer-in-Charge, before concrete is placed.

All reinforcement work shall conform to IS: 456:2000.

The steel reinforcement shall be connected to form a rigid cage. To prevent displacement before or during concreting the bars shall be secured to one another with 16 SWG black annealed binding wire. Bars intended to be in contact at passing points shall be securely wired together similarly at all such points. Wooden planks provided for labour to move shall be supported independent from the reinforcement cage, and the cage shall never be remitted to sag or get displaced during concreting.

The vertical distances required between successive layers of bars in beams or similar members shall be maintained by the provisions of steel spacer bars inserted at such intervals that the main bars do not perceptibly sag between adjacent spacer bars.

Concrete spacer blocks shall be used to ensure cover of concrete over the bars. The concrete over the reinforcement bars shall be as shown in drawings and shall be the clean cover.

The contractor must obtain the approval of the Engineer-in-Charge to the reinforcement placed before any concrete is deposited.

Binding wires and wastages are not to be included in measurements.



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**8.0 Brick Masonry works**

**8.1 Cement Mortar**

Cement mortar shall meet the requirements of IS:2250 and shall be prepared by mixing cement and sand by volume in a mechanical mixer. Proportion of cement and sand shall be 1:6 (1 part of cement and 6 parts of sand), or as directed by the Engineer-in- Charge/shown on the drawing, for brick masonry of one brick thickness or more, while 1:4 cement mortar (1 part of cement and 4 parts of sand) shall be used for brick masonry of half brick thickness. The sand being used for mortar shall be sieved. The mortar shall be used as soon as possible after mixing and before it has begun to set and in any case within initial setting time of cement after water is added to the dry mixture. Mortar unused for more than initial setting time of cement, shall be rejected and removed from the site of work.

**8.2 Proportioning**

The unit of measurement for cement shall be a bag of cement weighing 50 kgs and this shall be taken as 0.035 cubic meter. Sand shall be measured in boxes of suitable size on the basis of its dry volume. In case of damp sand, its quantity shall be increased suitably to allow for bulking.

**8.3 Mixing**

The mixing of mortar shall be done in a mechanical mixer operated manually or by power. The Engineer-in-Charge may, however, permit hand-mixing as a special case, taking into account the magnitude, nature and location of work. The Contractor shall take the prior permission of Engineer-in-Charge, in writing, for using hand-mixing before the commencement of work.

**8.4 Mixing in Mechanical Mixer**

Cement and sand in specified proportions, by volume, shall be thoroughly mixed dry in a mixer. Water shall then be added gradually and wet mixing continued for at least one minute. Care shall be taken not to add more water than that which shall bring the mortar to the consistency of stiff paste. Wet mix from the mixer shall be unloaded on water-tight masonry platform, made adjacent to the mixer. Platform shall be at least 150 mm above the leveled ground to avoid contact of surrounding earth with the mix. Size of the platform shall be such that it shall extend at least 300mm around the loaded wet mix area. Wet mix, so Portland cement conforming to IS:269 after addition of water. Mixer shall be cleaned with water each time before suspending the work.

**8.5 Hand Mixing**

The measured quantity of sand shall be leveled on a clean water tight masonry platform and cement bags emptied on top. The cement and sand shall be thoroughly mixed dry by being turned over and over, backward and forward, several times till the mixture is of uniform colour. The quantity of dry mix which can be consumed within initial setting time of cement shall then be mixed with just sufficient quantity of water to bring the mortar to the consistency of stiff paste.





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## **8.6 Construction Procedure**

### **Soaking of Bricks**

Bricks shall be soaked in water before use for a period that is sufficient for the water to just penetrate the whole depth of bricks as well as to remove dirt, dust and sand. Proper soaking of bricks shall prevent the suction of water from the wet mortar as otherwise mortar will dry out soon and crumble before attaining any strength. The bricks shall not be too wet at the time of use as they are likely to slip on mortar bed and there will be difficulty in achieving the plumpness of wall as well as proper adhesion of bricks to mortar. The period of soaking shall be determined at site by a field test by immersing the bricks in water for different periods and then breaking the bricks to find the extent of water penetration. The least period that corresponds to complete soaking, will be the one, to be allowed for in the construction work.

The soaked bricks shall be removed from the tank, sufficient early, so that at the time of laying, they are skin dry. The soaked bricks shall be stacked over a clean place, wooden planks or masonry platforms to avoid earth, dirt being smeared on them.

## **8.7 Laying**

### **Brick Work (one or more brick thickness)**

Brick work (one or more brick thickness) shall be laid in English Bond unless otherwise specified. Half or cut bricks shall not be used except when needed to complete the bond. In no case the defective bricks shall be used.

A layer of average thickness of 10mm of cement mortar shall be spread on full width over a suitable length of lower course or the concrete surface. In order to check and achieve uniformity in masonry, the thickness of bed joints shall be such that four courses and three joints taken consecutively shall measure equal to four times the actual thickness of the brick plus 30mm. Each brick with frog upward, shall be properly bedded and set in position by gently tapping with handle of trowel or wooden mallet. Its inside faces shall be buttered with mortar before the next brick is laid and pressed against it. After completion of the course, all vertical joints shall be filled from top with mortar.

All brick courses shall be taken up truly plumb; if battered, the batter is to be truly maintained. All courses shall be laid truly horizontal and vertical joints shall be truly vertical. The level and verticality of work in walls shall be checked up at every one meter interval.

The masonry walls of structures shall be carried up progressively, leaving no part one metre lower than the other. If this cannot be adhered to, the brick work shall be raked back according to bond (and not left toothed) at an angle not more than 45 degrees but raking back shall not start within 60 centimeters of a corner. In all cases returns, buttresses, counter forts, pillars etc. shall be built up carefully course by course, and properly bonded with the main walls. The brickwork shall not be raised more than fourteen (14) courses per day.



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At the junction of any two walls, the bricks shall at each alternate course, be carried into each of the respective walls so as to thoroughly unite the work.

The courses at the top of plinth and sills, at the top of the wall just below the soffit of the roof slab or roof beam and at the top of the parapet, shall be laid with bricks on edge. Brick on edge course shall be so arranged as to tightly fit under the soffit of the roof beam or roof slab, restricting the mortar layer thickness upto 12mm, however, any gap between the finished brick work and soffit of roof slab/beam shall be suitably sealed with the mortar.

#### **9.0 Brick Work (Half brick thickness)**

For brick walls of half brick thickness, all courses shall be laid with stretchers. Wall shall be reinforced with 2 nos. 6mm diameter mild steel reinforcement bars, placed at every fourth course. The reinforcement bars, shall be straightened and thoroughly cleaned. Half the mortar thickness for the bedding joint shall be laid first and mild steel reinforcement, one on each face of the wall, shall be embedded, keeping a side cover of 12mm mortar. Subsequently the other half of the mortar thickness shall be laid over the reinforcement covering it fully.

The reinforcement bars shall be carried at least 150mm into the adjoining walls or RCC columns. In case the adjoining wall being of half brick thickness, the length of bars shall be achieved by bending the bars in plan. During casting of reinforced concrete columns, 6mm dia. M.S. reinforcing bar shall be placed at every fourth course of brick masonry. At the junction of two walls, the brick shall, at each alternate course, be carried into each of the respective walls so as to thoroughly unite the work. The brick masonry work shall not be raised more than 14 courses per day.

Brick course under the soffit of beam or slab, shall be laid by restricting the mortar thickness of 12mm. However, any gap between the finished brickwork and soffit to slab/beam, shall be suitably sealed with the mortar.

#### **10.0 RCC Flooring in Forecourt:**

##### **10.1 Material:**

10.1.1 RCC of mix 1:1:2 of nominal mix strength not less than 25 N/mm<sup>2</sup> conforming to IS-456 code shall be used.

10.1.2 PCC of mix 1:3:6 of nominal mix strength not less than 10N/mm<sup>2</sup> conforming to IS-456 code shall be used.

10.1.3 Stone soling shall be carried out using 63 to 90 mm stone ballast.

##### **10.2 Procedure:**

On the well compacted surface of soil stone soling of 63-90 mm stones shall be carried out in layer of 150 mm thickness by filling up gaps with sand, grit etc., watering and then compacting with proper technique as per direction of EIC





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On the well compacted stone soling 100 mm thk. layer PCC of 1:3:6 mix shall be poured and proper compaction shall be carried out. Then after carrying out of PCC layer HYSD reinforcement mesh of 10 mm dia @ 200 mm c/c shall be prepared and lowered as per direction of EIC.

- 10.3** The scope of work includes all manpower, equipment, material, cutting , shuttering, expansion joint, PCC, reinforcement, stone soling, Concrete etc.

**11.0 Paver Block flooring:**

**11.1** Material:

Paver block of 80 mm thickness I shape, rough finish, M-40 strength with epoxy coating of approved make shall be used. Sand of approved size and grading shall be used. Cement of approved grade shall be used.

**11.2** Procedure:

Site cleaning, excavation in the area shall be carried out prior to laying the paver block flooring. 50 mm thick sand bed shall be prepared by spreading and leveling the sand of approved specs. Interlocking blocks of approved specs shall be properly fixed in position by skilled mason.

- 11.3** The scope of work includes all manpower, equipment, material, etc. required for satisfactory completion of work.

**12.0 Wearing Course over RCC forecourt:**

**12.1** Material:

- 12.1.1** Cement concrete of mix 1:1:2 (1 cement: 1 fine aggregate: 2 (6 mm course aggregate)) screed shall be used.

- 12.1.2** Wire mesh of 4 mm thick and 75 mm square shall be used.

- 12.1.3** Appropriate water proofing compound shall be used as per direction of EIC

**12.2** Procedure;

The properly leveled surface of RCC in forecourt shall be cleaned in all respect including watering properly.

Then specified wire mesh shall be properly fixed to the RCC forecourt layer using nails etc. and proper gap maintained from under surface.

As per direction of EIC the concrete screed shall be poured and compacted by cutting equal panels.

The shuttering, staging, leveling shall be proper as per direction of EIC.

Immediately after leveling of the concrete screed the appropriate water proofing compound shall be applied in the thickness as per the direction of EIC and again leveled properly.



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**12.3** The work includes all manpower, equipment, material, cutting , shuttering, wire mesh, Concrete, water proofing compound etc.

**13.0 Polysulphide filling in joints:**

**13.1** Material;

13.1.1 Capcell Board of Supreme make in sizes of 12x38mm shall be used.

13.1.2 Polysulphide sealant of approved make shall be used.

**13.2** Procedure:

Polysulphide filling shall be carried out in all the expansion joints of forecourt. The expansion joints shall be machine cut, properly leveled and cleaned. Then capcell board of supreme make shall be laid in the expansion joint gap with proper filling of sand. After fixing of capcell board of supreme make, polysulphide sealant shall be applied over the capcell board of 12x12 mm area. The surface shall be properly leveled, cleaned and dried as per direction of EIC

**13.3** The work includes all manpower, equipment, material, cutting , shuttering, capcell board, sealant etc.

**14.0 Providing and laying capcell board:**

**14.1** Material;

14.1.1 Capcell Board of Supreme make in size of 25 mm thickness and 100 mm depth shall be used.

14.1.2 Polysulphide sealant of approved make shall be used.

**14.2** Procedure:

Polysulphide filling shall be carried out in all the expansion joints of forecourt. The expansion joints shall be machine cut, properly leveled and cleaned. Then capcell board of supreme make shall be laid in the expansion joint gap with proper filling of sand. After fixing of capcell board of supreme make, polysulphide sealant shall be applied over the capcell board. The surface shall be properly leveled, cleaned and dried as per direction of EIC.

**14.3** The work includes all manpower, equipment, material, cutting , shuttering, capcell board, sealant etc.

**15.0 Chamber Construction:**

15.1 All chambers & other such works as specified shall be constructed in brick masonry in cement mortar 1:5 (1 cement: 5 coarse sand) or as specified in the Schedule of Quantities.



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- 15.2 All chambers etc. shall be supported on base of cement concrete of such thickness and mix as given in the Schedule of Quantities or shown on the drawings. Sizes of the chambers shall be as per CPWD specifications.
- 15.3 All chambers shall be provided with cement concrete benching in 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nom. Size). The benching shall have a slope of 10 cms towards the channel. The depth of the channel shall be full diameter of the pipe. Benching shall be finished with a floating coat of neat cement.
- 15.4 All chambers shall be plastered with 12/15 mm thick cement mortar 1:3 (1 cement: 3 coarse sand) and finished with a floating coat of neat cement inside. Manhole shall be plastered outside as above but with rough plaster.
- 15.5 All chambers with depths greater than 1 m. shall be provided with 20 mm square or 25 mm round rods catch rings set in cement concrete blocks 25x10x10 cms in 1:2:4 mix 30 cms vertically and staggered. Foot rests shall be coated with coal tar before embedding.
- 15.6 All chambers shall be provided with cast iron covers and frames embedded in reinforced cement concrete slab. Weight of cover, frame and thickness of slab shall be as specified in the Schedule of Quantities or given above.

**16.0 Plastering:**

**16.1 Materials**

The specifications for cement, sand and water as given in specification including relevant clauses for quality and testing of materials shall also apply for cement plaster materials and works.

Cement mortar shall be of grade and thickness specified in drawing or as directed by the Engineer-in-Charge, if not specified. The surface on which plastering is to be done shall be thoroughly cleaned from dust, dirt, oil, etc. It should be washed properly and watered for 4 hours before plastering. The joints of brick work shall be raked out to a depth of atleast 12mm when plastering has to be done. On cement concrete surface shall be scarified by lines with trowel then it is still green or hacked if concrete is hard as directed by Engineer-in-Charge.

Plaster shall not in any case, be thinner than specified. It shall have uniform specified thickness. Any extra thickness of plaster done by contractor will not be paid for. When smooth finishing is required the cement plaster shall be floated over with neat cement within 15 minutes of the application of the final coat.

During the process of plastering all corners shall be rounded to a radius of 25mm unless otherwise specified. The plaster shall be protected from sun and rain by such means as the Engineer-in-Charge may approve. The plaster shall be cured for 14 days.



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Construction joint shall be kept in plastering work at places approved by Engineer-in-Charge .

#### **17.0 Aluminium Glazed Doors/Windows/Ventilators**

Aluminum glazed doors/windows/ventilators shall be of specified sectional size, dimension and profile as per drawing.

All Aluminum sections shall be extruded sections of INDAL aluminum alloy as per IS:733 and IS:1285. Aluminum sections shall be anodised as per IS:7088 to min. 25 microns.

Glass used for glazing shall be Float glass made of Modi/AWI ( thickness of glass is specified in the drawings).

##### **17.1 Workmanships**

Frames shall be square and flat, the corner of the frame being fabricated to true right angle. Details of construction of frames, shutters etc. shall be as per drawings.

The door shutters shall be fitted with pivots as specified. The handle for doors shall be of Aluminum and as per design. The door shutters shall be provided with locking device, floor spring. O/H door closer and any other hardwires, specified in item.

In case of composite Door/Window/Ventilator units, the units shall be coupled as per drawings. Weather bar shall be provided whenever a coupling member is fitted over an external opening shutter.

Glazing shall be fixed to the masonry by means of extruded aluminum beading. Glass panes shall be provided with rubber lining before fixing.

The aluminum frames shall be fixed to the masonry over tough ground which are fixed by means of aluminum lugs fixed to the frame (by counter sunk galvanised machine screws) and grouted with M-15 (1:2:4) grade concrete in the hold in the masonry as per drawings. In case of concrete wall, the frames shall be fixed by 96 mm long, 12 mm dia metallic dash fasteners. Any steel material coming in contact with aluminium shall be galvanised.

The windows/ventilators/doors shall be checked to ensure smooth operation, perfect level and plumb.

#### **18.0 Anti Termite Treatment**

Designed Buildings shall be adequately protected against attack by termites by suitable chemical treatment measures. The work shall be carried out by a specialist pest control agency approved by the Architect/Engineer-in-charge. The pest control agency shall be a member of the Indian Pest Control Association. The work shall carry a guarantee of the satisfactory performance of the treatment for a minimum period of ten (10) years.



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The treatment shall be carried out generally in accordance with the stipulations laid down by IS:6313 (Part II)-1971 (Code of Practice for Anti Termite Measures in Buildings – Part II – Pre-constructional Chemical Treatment Measures) subject to the minimum requirements given in this specification.

Treatment shall commence after excavation for foundation is ready, leveling/compacting of filled soil, and before any damp proof membrane is laid under floors. The earth filling immediately under the stone soiling (under floors), bottom and side fills of all foundations buildings shall be chemically treated against termites.

The chemicals to be used for the treatment shall be formulation of approved soil toxicants like Chloropyrifos emulsifiable concentrates 1 % confirming IS:8944 shall be used. The chemical solution shall be prepared by mixing chemical with the appropriate quantity of water to obtain a chemical emulsion of the correct concentration as stipulated. The prepared emulsion shall be applied as described below.

Column Pits, Wall trenches etc.:

The bottom surface and sides of the excavations (up to a height of 30 cm from the bottom) made for column foundations, wall foundations, etc., (excepting RCC foundations) shall be treated with the chemical emulsion at the rate of 5 liters per sq.m. of surface area.

Treatment of Back fill:

After the column foundations, wall foundation, etc. have come up, the back fill in immediate contact with the foundation structure shall be treated at the rate of 15 liters per sq.m. of the surface of the substructure for each side. If water is used for ramming the earth fill, the chemical treatment shall be done after ramming operation is completed by rodding earth at 15 cm centers close to the wall face and spraying the chemical with the above doze. The earth is to be returned in layers and the treatment shall also be carried out in similar stages. The chemical emulsion shall be directed towards the masonry wall surfaces so that the earth in contact with these surfaces is well treated with the chemical.

RCC Walls and Columns:

The treatment shall start at the depth of 50cm below natural ground level. From this depth the back fill around the RCC columns, walls, etc., shall be treated at the rate of 15 liters per sq.m. of the surface.

Top Surface of Plinth Filling:

The top surface of the plinth fill (just below the stone soiling) shall be treated with chemical emulsion at the rate of 5 liters per sq.m. of the surface before the stone soiling is laid. If the filled earth has been well consolidated and does not permit the emulsion to seep through, holes up to 50 to 75mm deep at 150mm centers



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both ways be made with crowbars to facilitate saturation of the soil with the chemical emulsion.

**Junction of Wall and Floor:**

A channel of size 3cm x 3 cm shall be made at all the junctions and walls and columns with the floor (before laying the soil) and rod holes made in the channels up to the ground level at 15 cm centers. The solution is poured into the channel at the rate of 15 liters per sq.m. of the vertical surface and allowed to soak through the holes so that the soil in contact with the column/wall is fully soaked with the chemical. The soil shall be tamped back into the channel and consolidated to original condition.

**External Perimeter of Building:**

After the building is complete, holes shall be made along the external perimeter of the building at intervals of 15cm and depths of 30cm and the emulsion shall be allowed to soak through these holes fully at the rate of 5 liters per running meter of the perimeter wall.

**Treatment Critical Areas:**

Soil around utility pipe openings, floor drains, expansion joints, electrical conduit entry points shall be thoroughly flooded with chemical emulsion at an appropriate rate of 25 to 30 liters. If, during process of carrying out the work for services any chemical barrier is distributed/broken additional treatment of such areas shall be carried out.

**Treatment Under Aprons:**

The soil below concrete or stone aprons to be provided around the perimeter walls of all buildings shall also be treated with the chemical solution at the rate of 5 liters per sq.m.

**18.1 Treatment over DPC:**

Top concrete damp proof in external and internal walls shall be given a liberal coat of chemical solution when the concrete is still green.

**19.0 Vitreous/Ceramic floor tiles**

**19.1 Tiles**

The tiles shall be of the best quality and of approved make manufacture. These shall be of specified size, type and colour and laid to pattern as shown in the drawings or as approved by the Engineer. Sizes should not vary not exceeding  $\pm 0.5\text{mm}$ . Tolerance in thickness  $\pm 0.4\text{mm}$ . Normal thickness 8 to 10 mm.

**19.2 Sub-Base**

The base concrete on which the tiles are to be laid shall be cleaned, wetted and mopped. If required 1:3:6 cement concrete screed shall be laid to make up the total thickness of floor finish as specified. The surface shall be laid to falls and



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slopes as required and scratched for key.

**19.3 Laying of Floor Tiles**

After the base is cured and dried, 10mm thick 1:3 mortar (1 cement : 3 coarse sand) shall be laid on the surface and spread evenly with a trowel. A neat cement slurry of honey like consistency shall be spread over @3.3 kgs cement per sq. meter as would accommodate about 20 tiles, the back of the tile previously cleaned and soaked in water and placed over the mortar and brought to proper level by striking gently with a wooden mallet.

The surface of the flooring during laying shall be frequently checked with a straight edge about 2 meter long so as to obtain a true surface with the required slope.

**19.4 Pointing**

The tiles shall be laid in the manner as specified above in required pattern with a thin joint as possible. The joints shall be thoroughly cleaned off the grey cement slurry with wire/coir brush or trowel to a depth of 2mm to 3mm and all dust and loose mortar to be removed and pasted with white cement slurry admixed with pigment of matching colour as the tiles. The pointing can alternatively, be carried out with an approved non-shrink grout of matching colour as recommended by the manufacturer.

**19.5 Cutting of Tiles**

Care shall be taken to see the full tiles are used as far as possible. Where not possible, the edge tiles shall be neatly cut with a tile cutter and the edges rubbed smooth. The cut edge of the tiles shall not be installed in exposed locations.

**19.6 Curing**

The tiling shall be cured for 7 days with water and then thoroughly cleaned and dried. Finished floor shall not sound hollow when tapped with a wooden mallet.

**20.0 Ceramic Wall tile in Dado:**

**20.1 Tiles**

The tiles shall be of approved make/manufacturer. They shall be flat, and true to shape and free from cracks, crazing, spots, chipped edge and corners. The surface shall be of uniform shade except for patterned tile.

The tiles shall be of nominal sizes of 200 x 300 mm or as shown. The thickness of the tiles shall be 7 to 7.5mm unless otherwise mentioned or shown.

**20.2 Colour and Pattern**

The tiles shall be white, black matte, colored or patterned as specified.

**20.3 Preparation of Surfaces**

The joints shall be raked out to a depth of at least 12 mm in masonry walls, while the masonry is being laid. In case of concrete walls, the surfaces shall be





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backed and roughened with wire brushes. The surface shall be cleaned thoroughly, washed with water and kept wet before skirting/dado is commenced.

**20.4 Mortar**

10mm thick plaster of cement, mortar 1:3 (1 cement : 3 coarse sand) shall be applied and allowed slightly to harden. The plaster shall be roughened with wire brushes or by scratching diagonal at close intervals.

**20.5 Laying of Tiles**

The tiles shall be soaked in water, adequately washed clean, and a coat of neat cement slurry applied liberally at the back of tiles and set in the bedding mortar. The tiles shall be tamped and corrected to proper plane and lines. The tiles shall be set in the required pattern and butt jointed. The joints shall be as fine as possible and uniform. Top of dado shall be truly horizontal and joints truly vertical except where otherwise indicated. Where full size tiles cannot be fixed these shall be cut to the required size and their edges rubbed smooth. Care shall be taken to ensure that as far as possible cut tile are in non-exposed locations. Works shall be carried out in all areas only after the Engineer has approved a sample panel.

**20.6 Pointing**

After laying is complete, the joints shall be cleaned off the grey cement grout with wire brush and all dust and loose mortar removed. The joints shall then be flush pointed with white cement slurry added with approved pigments to match the colour of tiles.

**20.7 Curing and Finishing**

The surface shall be cleaned and kept wet by sprinkling water for seven days. The finished surface shall be clean, free of patches and glossy and shall not sound hollow. Finished dry surfaces shall be washed with mild organic acid, if so required. The finished surface shall meet the approval of the Engineer.

**21.0 METAL DOORS, WINDOWS, VENTILATORS & COLLAPSIBLE GATES**

**21.1 General**

Doors, windows and ventilators etc., shall be truly square and flat, i.e. free from twist and warp. The general fabrication shall conform to IS : 1038 and IS : 1361 as appropriate.

21.1.1 Frames shall be constructed of sections which have been cut to length and mitred. They shall be mortised, reinforced, drilled and tapped for hinges and lock and bolt strikes. Where necessary, frames shall be reinforced for door closers. Flash butt welded construction with mitred corners shall be used. Rubber door silencers shall be furnished for the striking jamb. Loose "T" masonry anchors shall be provided. Frames shall finish flush with floor and adjustable floor anchors shall be supplied. Frames shall be brought to site with floor ties/weather bars installed in place. All frames shall be square and flat. Door thresholds shall





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be provided as shown on drawing. Doors without threshold shall have bottom tie of approved type.

21.1.2 The Contractor shall obtain doors, windows, ventilators etc., from an approved manufacturer. The Contractor shall first submit for the approval of the Engineer, the name and address of the manufacturer whose metal casements and doors and windows he intends to use, together with typical drawings and specifications, describing the details of construction for each type of door/window/ventilator etc.

21.1.3 All steel doors, windows and ventilators shall be either galvanized or painted. All steel surfaces shall first be thoroughly cleaned free of rust, scale or dirt and mill scale by pickling or similar process and they shall be painted with one coat of an approved primer conforming to IS : 11883 before despatch. Alternatively they may be galvanized by the "Hot Dip" zinc spray or electro- galvanizing process as described in IS : 1361.

#### **21.2 Fixing**

Doors, windows and ventilators shall not be built in at the time the walls are constructed but shall be subsequently fixed into prepared openings, as laid down in IS : 1081. Holes to accommodate the fixing lugs are to be left or cut, and the casements fixed after all the rough masonry and plaster work have been finalised. The lugs of the casement shall be jammed in cement concrete (15C Mark) after holding the casement in proper position, line and level.

The width of the clear unfinished opening in the wall should be 25 mm more than the overall width of the door frame to allow for 12.5 mm plaster on each jamb. The height of the unfinished opening shall depend upon whether a threshold is required or not. While fixing the door, care shall be taken to see that at least 6 mm space is left between the door and the finished floor.

#### **21.3 Fittings**

Hardware shall be fixed as late as possible, preferably just before the final coat of paint is applied. It shall be fitted in a workmanlike manner, so that it may not work loose and in such a way that screws and pins are not marked and mutilated by hammers and screw drivers. It shall be tested for correct operation. Where specified, doors shall be fitted with a three-way bolting device which can be operated from outside as well as inside, and a locking system, which can similarly be operated from either side. Solid steel bolt handles shall be provided, one on the outside and one on the inside of each shutter. In case of doors provided with a service door, the lock shall be fitted on the service door. All materials shall be the best procurable and shall conform to the relevant IS specifications.

#### **21.4 Normal Steel Plate Doors**

Steel doors may be of the hinged type or sliding/folding type, single shutter or double shutter, and of single- walled or double walled construction, as specified on the drawings or Schedule of Items. All doors shall be provided with a sturdy frame and hold fasts for fixing into the wall. Unless otherwise specified, the frame



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shall be prepared from mild steel angles of size not less than 65 x 65 x 6 mm electrically welded at the corners and the shutter shall be made from flat steel sheet of 18 gauge thickness with a frame of mild steel angles not less than 50 x 50 x 6 mm all round, suitably braced. The whole shutter shall be of welded construction and shall be hung at the sides by means of three or four hinges as specified.

**21.4.1 Double Plate flush door shutters**

Door shutters shall be 45 mm thick, completely flush design and shall comprise of two outer sheets or 18G steel sheets, rigidly connected and reinforced inside with continuous vertical 20G stiffeners, spot welded in position at not more than 150 mm on centres. Both edges of doors shall be joined and reinforced full height by steel channels placed immediately inside and welded to the door faces. Top and bottom of doors shall be reinforced horizontally by steel channels running full width of door. Doors shall not have more than 2.5 mm clearance at jambs and head, shall have proper level on lock stiles and rails and shall be reinforced at corners to prevent sagging or twisting. Spires or double doors shall have meeting style edges beveled or rebated. Where shown on drawing, or in the Schedule of Items, the doors shall be sound-deadened by filling the inside voids with mineral wool or other suitable approved materials. Doors shall be mortised, reinforced, drilled and tapped in shop for hinges, locks and bolts. They shall also be reinforced for closers, push-plates and other surface hardware where necessary. Any drilling and tapering required for surface hardware shall be done at site. Where shown in drawing, provisions, shall be made for fixing glazing, vision panels, louvers etc. Glazing mouldings shall be of 18 g steel or extruded aluminium sections with profiles shown in drawing and suitable for fixing 6 mm glass. Louver blades shall be V or Z shaped sections.

**21.4.2 Single sheet door shutters**

Single sheet doors shall be made from best quality 18g mild steel sheets, and shall present a flush surface on the outside. The inside shall be stiffened with a semitubular edge and central stiffening rail which shall convey the lock and other fixture. The frames shall be made from best quality steel sections. Wherever required or shown on drawings, provision for fixing glass panes, louvers etc., shall be made.

The manufacturing shall done as specified in "Double Plate Flush Door Shutters".

**21.5 Sliding Doors**

Shall be either double plate or single plate construction as shown in drawings and Schedule of Items, made out of 18 gauge steel sheets with adequate stiffeners. The Contractor shall specify the weight of the door in his shop drawing and submit the manufacturer's catalogue of the sliding gear he proposes to use. Where shown in drawings or in the Schedule of Items, the Contractor shall make provision for openings in the door for mono-rail beams. Doors when closed shall effectively exclude rain water from seeping in. When called for in schedule,



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sliding doors shall withstand specified wind loads without buckling or jamming.  
The door shall slide freely under all ambient conditions.

**21.6 Pressed Steel Doors**

All pressed steel doors shall be obtained from an approved manufacturer. The frame and shutters shall be fabricated from cold rolled or pressed steel sections. Unless otherwise specified, the thickness of all sheets used for frames shall be not less than 5 mm. The shutters shall be made of sheet steel of 2 mm thickness for single shutter doors and double shutter doors with or without service door. The plates shall be adequately stiffened with suitably placed stiffeners.

The double-walled door shutter shall consist of two plates each 2.5 mm thick, separated by a gap of 33 mm in between making an overall thickness of 38 mm or as shown in drawing. The plates shall be adequately stiffened by means of suitably spaced horizontal steel stiffeners.

**21.7 Steel Windows, Sashes, Ventilators, etc.**

These shall conform to IS : 1038 and IS : 1361 as appropriate and as shown in drawings. The details as called for in the above codes shall be applicable for coupling mullions, transoms, weather bars, pivot arrangements for ventilators, etc.

21.7.1 Where composite unit openings are shown in drawings, the individual window units shall be joined together with requisite transoms and mullions. Where aluminium glazing beads are specified, they shall be extruded aluminium channel 9.5 mm x 1.6 mm (Indal Section No. 2209) unless otherwise shown in drawings. Aluminium beads shall be given one coat of zinc chromate primer before fixing to windows.

All welds at the corner of casement shall be done by flash butt welding process and dressed flush on all exposed and contact surfaces.

**21.8 Collapsible Gate (Steel)**

Mild steel collapsible gates shall be obtained from an approved manufacturer. These shall be of mid bar type made out of double channels each 20 x 10 x 2 mm with 20 x 5 mm diagonals and shall be top hung with roller bearings, and fitted with locking arrangement.

Collapsible gates under 3.0 meter height shall generally have 3 sets of lattices and those over 3.0 meter height, 4 sets of lattices. Guide tracks shall be fitted at the top and bottom, of T-iron 40 x 40 x 6 mm with 40 mm diameter bearings in every fourth double channel.

**22.0 GLAZING**

**22.1 General:**



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Glazing shall be done with plain, frosted or ground glass or wired cast glass as shown on drawings, described in the Schedule of Items or approved by the Engineer. The method of glazing adopted shall be such that movement of the structure, to which the securing is done, does not transmit strain to windows, doors or ventilators as the case may be. The work shall generally conform to IS : 1081, Code of Practice for Fixing and Glazing of Metal Doors, Windows & Ventilators. The material for putting shall consist of whiting and linseed oil, raw-mixed in such proportion as to form a paste conforming to IS : 419.

#### **22.2 Doors, Windows, Ventilators, etc.**

Windows and ventilators shall be designed for putty glazing fixed from outside and glazed doors for fixing from inside. In addition, spring type glazing clips shall be provided at intervals of 30 cm, or as shown otherwise on drawings or described in the Schedule of Items. These shall be inserted into holes drilled in the shutters or frames as the case may be.

All glazing shall be puttied to the shutters or frames with good quality putty in addition to glazing clips. Glass panes shall not be placed directly against the metal/timber. A thin layer of putty shall be evenly spread over the glazing rebate and the glass pressed firmly against it. It shall be secured in position by means of teak wood beds for wooden shutters. Glass panes shall be sent without spraining and shall be bedded in putty and back puttied, except where moulding or gasket are specified. Putty, mastic cement etc., shall be smoothly finished to even lines. Figured glass shall be set with smooth side out. After completion of glazing work, all dirt stains, excess putty etc., shall be removed and the glass panes shall be left in perfectly acceptable condition. All broken cracked or damaged glass shall be replaced by new ones at the Contractor's cost.

#### **22.3 Fixed Glazing**

This shall consist of steel glazing bars as shown on drawings or described in the Schedule of Item and be subject to approval of Engineer. The glazing parts shall be securely fixed in their frame and shall be weather-proof. All glazing shall be flashed to the surrounding so as to be weather-proof. Glass shall be fixed to the a strangles with glazing clips and putty.

#### **23.0 Rolling Shutters**

Rolling shutters shall conform to IS: 6248 – 1979. These shall include necessary locking arrangement and handles etc. These shall be suitable for fixing in the position as specified. The shutter shall generally be provided with reduction gear operated by mechanical device with handle.

##### **23.1 Shutter**

The shutter shall be built up of interlocking lath section formed from cold rolled steel strips. The thickness of the sheets from which the lath sections have been rolled shall be not less than 1.20 mm for shutters above 3.5 m width. Shutters above 9 meters in width should be divided in 2 parts with provision of one middle fixed or movable guide channel or supported from the back side to resist wind



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pressure. The lath section shall be rolled so as to have interlocking curls at both edges and a deep corrugation at the centre with a bridge depth of not less than 12mm to provide sufficient curtain of stiffness for resisting manual pressures and normal wind pressure. Each lath section shall be continuous single piece without any welded joint. When interlocked, the lath sections shall have a distance of 75 mm rolling centres. Each alternate lath section shall be fitted with malleable cast iron or mild steel clips securely rivetted at either ends, thus locking the lath section at both ends and preventing lateral movement of the individual lath sections. The clips shall be so designed as to fit the contour of the lath sections.

### **23.2 Spring**

The spring shall be of coiled type. The spring shall be manufactured from high tensile spring steel wire or strips of adequate strength conforming to IS: 4451-part I 1981.

### **23.3 Roller and Brackets**

The suspension shaft of the roller shall be made of steel pipe conforming to heavy duty as per IS: 1161-1979. For shutter upto 6 metre width and height not exceeding 5 metre, steel pipes of 50mm nominal bore shall be used. The shaft shall be supported on mild steel brackets of size 500 x 500 x 10 mm for shutter of clear height above 3.5 m and upto 6.5 m. The suspension shaft clamped to the brackets shall be fitted with rotatable cast iron pulleys to which the shutter is attached. The pulleys and pipe shaft shall be connected by means of pretensioned helical springs to counter balance the weight of the shutter and to keep the shutter in equilibrium in any partly open position.

When the width of the opening is greater than 3.5 meter. the cast iron pulleys shall be interconnected with a cage formed out of mild steel flats of at least 32 x 6 mm and mild steel dummy rings made of similar flats to distribute the torque uniformly. Self aligning two row ball bearing with special cast iron casings shall be provided at the extreme pulley and caging rings shall have a minimum spacing of 15 mm and at least 4 number of flats running throughout length of roller shall be provided.

In cast of shutters of large opening with mechanical device for opening the shutter the roller shall be fitted with a purion wheel at one end which in contract with a worm fitted to the bracket plate, caging and pully with two ball bearing shall be provided.

### **23.4 Guide Channel**

The width of guide channel shall be 25 mm the minimum depth of guide channels shall be 75mm.

The gap between the two legs of the guide channels shall be sufficient to allow the free movement of the shutter and at the same time close enough to prevent rattling of the shutter due to wind.



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Each guide channel shall be provided with a minimum of three fixing cleats or supports for attachments to the walls or column by means of bolts or screws. The spacing of cleats shall not exceed 0.75 m. Alternatively, the guide channels may also be provided with suitable dowels, hooks or pins for embedding in the walls.

The guide channels shall be attached to the jambs, plumb and true either in the overlapping fashion or embedded in grooves, depending on the method of fixing.

### **23.5 Cover**

Top cover shall be of mild steel sheets not less than 0.90mm thick and stiffened with angle or flat stiffeners at top and bottom edges to retain shape.

Lock plates, one center lock with sliding bolts, handles and anchoring rods shall be as per IS 6248 – 1979.

### **23.6 Fixing**

The arrangement for fixing in different situations in the opening shall be as per IS 6248 – 1979.

Brackets shall be fixed on the lintel or under the lintel as specified with rawl plugs, and screws bolts etc. the shaft along with the spring shall then be fixed on the brackets.

The lath portion (Shutter) shall be laid on ground and the side guide channels shall be bound with ropes etc. The shutter shall then be placed in position and top fixed with pipe shaft with bolts and nuts. The side guide channels and cover frames shall then be fixed to the walls through the plate welded to the guides. These plates and bracket shall be fixed by means of steel screws bolts, and rawl plugs concealed in plaster to make their location invisible. Fixing shall be done accurately in a workmen like manner that the operation of the shutter is easy and smooth.

### **23.7 Painting**

All the steel works shall be coated with Red Oxide Zinc Chromate primer conforming IS:2074 and painting works as mentioned in synthetic enamel paint.

## **24.0 STRUCTURAL STEEL WORKS:**

### **24.1 Steel Works**

All finished steel unless otherwise specified shall be well and clearly rolled to dimensions and weight as specified by ISI subject to permissible tolerances as per IS 1852-1973.

Material shall be free from cracks, surface flaws, laminations, rough and imperfect edges and other harmful defects like excessive rust, scaling and pitting etc. Structural steel work shall conform to requirements depending upon the





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designation of steel that is being selected to be used for particular structural function as specified in drawings.

All structural steel girders, channels, plates and other rolled sections shall conform to IS : 2062, grade-A. Pipes shall conform to IS : 1161 - YST 240 MPa.

- 24.2 Electrodes** required for metal arc welding shall be covered electrodes conforming to IS 814 – 1970.

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- 24.3 Fabrication:** Steel sections as required shall be straightened and cut to square and exact lengths. Cut ends exposed to view shall be finished smooth. No two pieces shall be otherwise welded or jointed to make up the required length of the number.

If straightening, flattening or bending is necessary, shall be done in a process that will not damage the material or impair its strength. Shearing, flame cutting or chipping shall be done carefully and accurately. Finished member shall be free from undue twists, bends, wrapping, distortion or other irregularities. Holes, where required, shall be drilled to required size and not made nor enlarged by burning. Holes shall have their axis perpendicular to surface bored through. Any fabricated assembly shall be without the member being strained or forced into position and components shall meet at perfect angles. Where practicable, welds should preferably be made in flat position. Welds shall be free from cracks, discontinuity in welding, or other defects categorised as such in relevant standards. Welds will be inspected and cost of the same shall be deemed to be included in the quoted rates. A defective weld, harmful to structural strength, shall be cut out and rewelded. All welds shall be cleaned of slag and other deposits after completion.

All structural steel works for canopy and other structures shall have butt welds between adjacent surfaces ground smooth. Items concealed from view need not require grinding of welds. Architectural metal work shall be well formed to shape and size with sharp lines, angles and true curves. Drilling and punches shall produce clean true line and surface. All site connections shall be preferably by permanent bolts. Welding at site shall be done with the prior permission of engineer-in-charge. Exposed weld shall be ground smooth, exposed surfaces shall have smooth finish. Joints shall be milled to close fit and corner joints shall be well formed and in true alignment. Work shall be accurately fastened in place.

Painting shall be as described under the head "Painting".

- 24.4 Roof Covering/ Sheeting:** Canopy roof sheeting shall be of 0.6mm Zincalume/ galvalume colour coated sheets and shall have trapezoidal profile with 28-32 mm deep crest and 186-250 c/c profile width with minimum two ribs at centre for stiffening. The sheet shall be of minimum fy = 345 MPa and shall be coated with



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hot dip metallic Zinc aluminum alloy @ 150 gsm coating mass total on both sides.

**24.5 False Ceiling:** False ceiling panels on the under-side of the canopy shall be of 0.6mm thk. cold rolled colour coated steel of profile as per drawings of approved colour and make. False ceiling panels shall be fixed with stainless steel screws in such a way that they are not visible from below after completion of work.

**24.6 Painting on Metal Work :** Painting shall be as done to meet the following specification for canopy:

**A. ON COILS**

**SUBSTRATE:**

- i) Cold Rolled Steel Coil
- ii) Galvanised Coil IS 227

<b>COATING</b>	<b>NORMAL</b>	<b>MAXIMUM</b>
Zinc Aluminium	150 gms/ sqm	8 microns
Epoxy Primer	5-7 microns	10 microns
Alkyd Backer	5-7 micron	10 micron
Polyster top-Coat	12-16 micron	15-22 micron
Normal Total Coatings	22-30 micron	40 micron

**TYPICAL PROPERTIES**

	<b>PROPERTY</b>	<b>APPLICABLE SPECIFICATION</b>	<b>DATA</b>
1	Normal organic coating thickness	ECCA-T-1(BS-3900/C-5)	23 micron
2	Specular gloss (60 Deg.)	ECCA-T-2(ASTMD- 523)	30-80%
3	Pencil Hardness	ECCA-T-4 (ASTMD-3363)	2H
4	Scratch Resistance	BS-3900/E2(IS-101)	1500g
5	Flexibility :		
5.1	Reverse Impact	ECCA-T-6 (BS-3900)	5mn/mm 40"/lb
5.2	Bend Test	ECCA-T-7 (BS-3900/E1)	2-T
5.3	Frichsen	IS-10175 (52)	>5mm

**B. ON ALL OTHER STEEL MEMBERS**





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- i) Surface preparation as per grade St -2 according to Swedish Standard SIS055900.
- ii) Two coats of zinc phosphate in phenolic alkyd medium (DFT 35μ/coat).
- iii) Two coats of synthetic enamel (DFT 25 μ /coat) conforming to IS: 2932-1974.

#### **24.7 Surface Preparation & Primer**

One coat of primer shall be applied on shop. The shop coated surface shall be rubbed down thoroughly with abrasive paper to remove dust, rust, other foreign matters and degreased cleaned with warm fresh water and air dried.

Primer coat of zinc phosphate primer shall be applied by brushing/spraying over the shop coat in a manner so as to ensure a continuous and uniform film throughout.

#### **24.8 Final Paint**

After the primer is hard dry the surface shall be dusted of and one coat of synthetic enamel paint of approved color and shade (conforming to IS:2932) shall be applied by brushing/spraying to achieve the required DFT. Second coat will be applied after drying of previous one to give a uniform surface. Paints can be diluted by means of thinner as approved by paint manufacturer only.

#### **25.0 White Washing with Whiting**

**Preparation of mix :** Whiting (ground white chalk) shall be dissolved in sufficient quantity of warm water and thoroughly stirred to form a thin slurry which shall then be screened through a clean coarse cloth. Two kg of gum (DDL) and 0.4 kg of copper sulphate dissolved separately in hot water shall be added for every cum of the slurry which shall then be diluted with water to the consistency of milk so as to make a wash ready for use.

##### **25.1 Preparation of surface**

Before new work is white washed, the surface shall be thoroughly brushed free from mortar droppings and foreign matter.

##### **25.2 Application:**

The white wash shall be applied with moonj brushes to the specified number of coats. The operation for each coat shall consist of a stroke of the brush given from the top downwards, another from the bottom upwards over the first stroke, and similarly one stroke horizontally from the right and another from the left before it dries.

Each coat shall be allowed to dry before the next one is applied. Further each coat shall be inspected and approved by the Engineerin- charge before the subsequent coat is applied. No portion of the surface shall be left out initially to be patched up later on.

For new work, three or more coats shall be applied till the surface presents a smooth and uniform finish through which the plaster does not show. The finished



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dry surface shall not show any signs of cracking and peeling nor shall it come off readily on the hand when rubbed.

**26.0 Oil Bound Distemper**

**26.1 Preparation of Surface**

Preparation of surface shall in general any unevenness shall be made good by applying putty made of plaster of paris mixed with water including filling up the undulation and then sand papering the same after it is dry. Before starting painting with oil bound distemper, the prepared surface shall be treated with two coats of primer consisting of cement primer, whiting and the surface shall be smoothened by applying thick paste made of synthetic enamel paint, varnish (Jallo) and chalk powder with knife edged patti.

**26.2 Primer Coat**

The primer coat shall be alkali resistant primer or distemper primer and shall be of the same manufacture as oil bound distemper.

If the wall surface plaster has not dried completely, alkali resistant primer, otherwise distemper primer shall be applied. The mixture of alkali resistant primer shall be prepared as per approved manufacturer's instructions.

**26.3 Preparation of oil bound distemper**

The distemper shall conform to IS:428 and shall be diluted with water.

**26.4 Application of Distemper**

After the primer coat has dried for at least for 48 hours, the surface shall be lightly sand papered and dusted off avoiding rubbing off the primer coat. Minimum 3 coats of distemper shall be applied with brushes in horizontal strokes followed by immediate vertical strokes which together shall continue 1 coat. The subsequent coats shall be applied after at least 24 hours between consecutive coats to permit proper drying of the proceeding coats. The finished surface shall be even and uniform without patches, brush marks, drops etc.

**27.0 Acrylic Emulsion Painting**

**27.1 Preparation of surface**

Same as mentioned in Oil Bound Distemper.

**27.2 Preparation of Mix**

Plastic emulsion paint shall conform to IS:5411 (Part 1) and shall be of approved shade. Preparation of mix shall be as per manufacture's instructions.

**27.3 Application of Paint**

The Paint mix shall be continuously stirred while applying for maintaining uniform consistency number of coats shall be 3 or more coats. The painting shall be laid evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area with paint, brushing the surface hard at first, then brushing alternately in opposite direction 2/3 times and then finally



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brushing lightly in a direction at right angles to the same. In this process no brush marks, no hair marks, no clogging of paint puddles shall be permitted. The full process of crossing and laying off will continue 1 coat. The paint shall be applied by means of brush and roller.

Plastic emulsion paint shall start only after the proceeding coat has become sufficiently hard to resist the brush marking. Subsequent coats of plastic emulsion shall also be started after the preceding coat is dried by evaporation of water content.

Plastic emulsion paint shall start only after the proceeding coat has become sufficiently hard to resist the brush marking. Subsequent coats of plastic emulsion shall also be started after the preceding coat is dried by evaporation of water content.

The surface of finishing shall present a flat, velvety smooth finish, even and uniform shade without patches, marks, paint drops etc.

**28.0 Synthetic Enamel Paint:**

The shop coated surface shall be rubbed down thoroughly with abrasive paper to remove dust, rust, other foreign matters and degreased cleaned with warm fresh water and air dried.

Primer coat of red-oxide zinc chromate primer conforming to IS:2074 shall be applied by brushing/spraying over the shop coat in a manner so as to ensure a continuous and uniform film throughout.

**28.1 Final Paint**

After the primer is hard dry the surface shall be dusted off and one coat of synthetic enamel paint of approved color and shade (conforming to IS:2932) shall be applied by brushing/spraying. The coats are applied after drying one after another to give a uniform surface. Paints can be diluted / thinning by means of thinner only as per the requirements of the finished paint surface.

**29.0 Water Proofing:**

**29.1 Surface Preparation**

Applying and grouting a slurry coat of neat cement using 2.75 kg/sqm. of cement admixed with proprietary water proofing compound conforming to IS. 3645 over the RCC slab including cleaning the surface before treatment.

**29.2 Laying**

All exposed flat roofs shall be water proofed with two components elastic polymerised acrylic water proofing system using "Uco Elastic Plaster" manufactured by STP including finishing the surface with 40 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone) admixed with water proofing compound confirming to IS:2645 to required slope and treating similarly the adjoining walls upto 300mm including rounding of junctions of wall and slabs.



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After two days proper curing applying a second coat of cement slurry admixed with proprietary water proofing compound conforming to IS:2645.

Finishing the surface with 20 mm thick joint less cement mortar of mix 1:4 (1 cement : 4 coarse sand) admixed with proprietary water proofing compound conforming to IS 2645 and finally finishing the surface with trowel with neat cement slurry and making of 300X300 mm square.

The whole terrace so finished shall be flooded water for a minimum period of two weeks for curing and for final test. All above operation to be done in order and as directed and specified by the Engineer-in-Charge.

Required No. of Khurrah of size 450X450X12mm to be provided as per drawings.

### **30.0 Providing and fixing fencing structure:**

#### **30.1 Material:**

30.1.1 The steel pipes of specified sizes as mentioned in the drawings confirming to IS:1161 shall be used.

30.1.2 The steel plates of specified sizes as mentioned in the drawings confirming to IS:2062 shall be used.

30.1.3 The GI weld mesh made from 3 mm GI wire @ 75 mm c/c bothways shall be used.

30.1.4 Painting on the fabricated fencing structure shall be carried out as per specification.

30.1.5 PCC(1:2:4) shall be used for fixing of post.

#### **30.2 Procedure:**

The fencing structure of appropriate height as given in the SOR, drawing including welding, bolting etc. complete in all respect shall be painted with the approved paint as per technical specification shall be supplied to site.

Then pockets of appropriate sizes shall be made in the existing surface as per direction of EIC.

The complete in all respect fencing structure shall be aligned properly by fixing posts properly in the made pockets by pouring PCC(1:2:4) in the pockets.

### **31.0 Providing and fixing fencing gates:**

#### **31.1 Material:**



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- 31.1.1 The steel pipes of specified sizes as mentioned in the drawings confirming to IS:1161 shall be used.
- 31.1.2 The steel plates and locking material of specified sizes as mentioned in the drawings confirming to IS:2062 shall be used.
- 31.1.3 The GI weld mesh made from 3 mm GI wire @ 75 mm c/c bothways shall be used.
- 31.1.4 Painting on the fabricated fencing structure shall be carried out as per specification.
- 31.1.5 PCC(1:2:4) shall be used for fixing of post.

**31.2 Procedure:**

The fencing gate of appropriate height as given in the SOR, drawing including welding, bolting etc. complete in all respect shall be painted with the approved paint as per technical specification shall be supplied to site.

Then pockets of appropriate sizes shall be made in the existing surface as per direction of EIC.

The complete in all respect fencing gate shall be aligned properly by fixing posts properly in the made pockets by pouring PCC(1:2:4) in the pockets.

**32.0 Design, Supply, Installation, testing & commissioning of MONOLITH:**

The following is the material specifications and our SOR for carrying out this work for this work.

**32.01 Description of Monolith:**

Type: Backlit Monolith, approx. size 2mX7.5 m (from top of granite cladding footing)

Specification:

**ACM :**

Thickness – 3 mm

Make – reputed indian/foreign make

Colour and make: as approved by MNGL

**Structure:** MS frame work of hollow steel sections as per design requirements duly painted.

**Logo Box:**

Material – PetG

Thickness – 3mm



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Make - Spectra/Bayer  
Colour – White

**Letters:**

Material – Polycarbonate  
Thickness – 5mm  
Make – GE/Lexan  
Colour – Clear

**Electricals:**

Make – Philips/Crompton/Wipro  
Electronic chokes & T5 tubes

**Vinyl:** Make – 3M

Colour Codes of various colours to be used in Monolith:

1. For Orange colour: (Gradient fill): (C:M:Y:K:: 0:44:71:0) & (R:G:B:: 247:152:99)
2. For Green Colour: (C:M:Y:K::22:2:65:0) & (R:G:B::205:219:130)
3. For Blue line colour : (C:M:Y:K::75:58:28:1) & (R:G:B:: 93:114:147)
4. For yellow colour : (C:M:Y:K::0:10:100:0) / Pantone 109C

All finished steel unless otherwise specified shall be well and clearly rolled to dimensions and weight as specified by ISI subject to permissible tolerances as per IS 1852-1973.

Material shall be free from cracks, surface flaws, laminations, rough and imperfect edges and other harmful defects like excessive rust, scaling and pitting etc. Structural steel work shall conform to requirements depending upon the designation of steel that is being selected to be used for particular structural function as specified in drawings.

All structural steel girders, channels, plates and other rolled sections shall conform to IS : 2062, grade-A. Pipes shall conform to IS : 1161 - YST 240 MPa.

32.02 **Electrodes** required for metal arc welding shall be covered electrodes conforming to IS 814 – 1970.

32.03 **Fabrication:** Steel sections as required shall be straightened and cut to square and exact lengths. Cut ends exposed to view shall be finished smooth. No two pieces shall be otherwise welded or jointed to make up the required length of the number.

If straightening, flattening or bending is necessary, shall be done in a process that will not damage the material or impair its strength. Shearing, flame cutting or chipping shall be done carefully and accurately. Finished member shall be free from undue twists, bends, wrapping, distortion or other irregularities. Holes,



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where required, shall be drilled to required size and not made nor enlarged by burning. Holes shall have their axis perpendicular to surface bored through. Any fabricated assembly shall be without the member being strained or forced into position and components shall meet at perfect angles. Where practicable, welds should preferably be made in flat position. Welds shall be free from cracks, discontinuity in welding, or other defects categorised as such in relevant standards. Welds will be inspected and cost of the same shall be deemed to be included in the quoted rates. A defective weld, harmful to structural strength, shall be cut out and rewelded. All welds shall be cleaned of slag and other deposits after completion.

All structural steel works for structures shall have butt welds between adjacent surfaces ground smooth. Items concealed from view need not require grinding of welds. Architectural metal work shall be well formed to shape and size with sharp lines, angles and true curves. Drilling and punches shall produce clean true line and surface. All site connections shall be preferably by permanent bolts. Welding at site shall be done with the prior permission of engineer-in-charge. Exposed weld shall be ground smooth, exposed surfaces shall have smooth finish. Joints shall be milled to close fit and corner joints shall be well formed and in true alignment. Work shall be accurately fastened in place.

Painting shall be as described under the head "Painting".

**32.04 Roof Covering/ Sheetting:** Roof sheeting shall be of 0.6mm Zincalume/ galvalume colour coated sheets and shall have trapezoidal profile with 28-32 mm deep crest and 186-250 c/c profile width with minimum two ribs at centre for stiffening. The sheet shall be of minimum fy = 345 MPa and shall be coated with hot dip metallic Zinc aluminum alloy @ 150 gsm coating mass total on both sides.

**32.05 Painting on Metal Work :** Painting shall be as done to meet the following specification for:

**A. ON COILS**

**SUBSTRATE:**

- i) Cold Rolled Steel Coil
- ii) Galvanised Coil IS 227

**COATING**

Zinc Aluminium  
Epoxy Primer  
Alkyd Backer  
Polyster top-Coat  
Normal Total Coatings

**NORMAL**

150 gms/ sqm  
5-7 microns  
5-7 micron  
12-16 micron  
22-30 micron

**MAXIMUM**

8 microns  
10 microns  
10 micron  
15-22 micron  
40 micron

**TYPICAL PROPERTIES**





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	PROPERTY	APPLICABLE SPECIFICATION	DATA
1	Normal organic coating thickness	ECCA-T-1(BS-3900/C-5)	23 micron
2	Specular gloss (60 Deg.)	ECCA-T-2(ASTMD- 523)	30-80%
3	Pencil Hardness	ECCA-T-4 (ASTMD-3363)	2H
4	Scratch Resistance	BS-3900/E2(IS-101)	1500g
5	Flexibility :		
5.1	Reverse Impact	ECCA-T-6 (BS-3900)	5mn/mm 40"/lb
5.2	Bend Test	ECCA-T-7 (BS-3900/E1)	2-T
5.3	Frichsen	IS-10175 (52)	>5mm

**B. ON ALL OTHER STEEL MEMBERS**

- i) Surface preparation as per grade St -2 according to Swedish Standard SIS055900.
- ii) Two coats of zinc phosphate in phenolic alkyd medium (DFT 35μ/coat).
- iii) Two coats of synthetic enamel (DFT 25 μ /coat) conforming to IS: 2932-1974.

**32.06 Surface Preparation & Primer**

One coat of primer shall be applied on shop. The shop coated surface shall be rubbed down thoroughly with abrasive paper to remove dust, rust, other foreign matters and degreased cleaned with warm fresh water and air dried.

Primer coat of zinc phosphate primer shall be applied by brushing/spraying over the shop coat in a manner so as to ensure a continuous and uniform film throughout.

**32.07 Final Paint**

After the primer is hard dry the surface shall be dusted of and one coat of synthetic enamel paint of approved color and shade (conforming to IS:2932) shall be applied by brushing/spraying to achieve the required DFT. Second coat will be applied after drying of previous one to give a uniform surface. Paints can be diluted by means of thinner as approved by paint manufacturer only.

**32.08 Procedure:**

- 1. Design of proposed Monolith structure shall be prepared as per the drawings.
- 2. Detailed drawings including shop drawings shall be prepared for construction of Monolith & got approved from MNGL.





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3. Fabrication of steel, polycarbonate sheet & other materials shall be done as per approved drawings.
4. The monolith structure shall be supplied & transported to the designated site.
5. The Monolith shall be erected at site with necessary arrangement.
6. All the electrical installations & cabling shall be done.
7. Proper testing of the total Monolith unit shall be done.
8. Monolith shall be commissioned after successful testing .

All the above work shall be strictly carried out in accordance with the drawings, tender document, SOR & shall be submitted to EIC for approval.

### **33.0 Providing & Constructing Rain Water Harvesting System:**

#### **33.1 Material:**

- 33.1.1 The PVC/Steel pipes of specified sizes as mentioned in the drawings confirming relevant IS code shall be used.
- 33.1.2 The steel plates and locking material of specified sizes as mentioned in the drawings confirming to IS:2062 shall be used.
- 33.1.3 The bricks confirming to relevant IS codes shall be used.
- 33.1.4 Plastering & painting shall be done as per relevant IS code standard..
- 33.1.5 Sand & gravel of the relevant standard shall be used.

#### **33.2 Procedure:**

1. Final approved for construction drawing shall be obtained from MNGL before start of activities for Rain Water Harvesting system.
2. Excavation shall be done for pit construction.
3. Brickwork/RCC work shall be done as per approved drawing.
4. Plastering, painting shall be done as per standard drawing.
5. Appropriate size of manhole cover shall be procured & installed at site.

All the above work shall be strictly carried out in accordance with the drawings, tender document, SOR & shall be submitted to EIC for approval.

### **34.0 Supply, installation & fixing speed breaker:**



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Supply, fixing in place rubber of approved specification over the constructed RCC speed breaker as per the technical specification and direction of Engineer In charge. The earlier laid RCC speed breaker shall be finished in properly before fixing rubber over it.

Rubber:

The natural rubber having following properties shall be used:

- i) Hardness Shore A shall be 77
- ii) Specific Gravity shall be 1.42
- iii) Angular tear shall be 13 kg/cm
- iv) Tensile strength shall be 50 kg/cm<sup>2</sup>
- v) Elongation max 130%
- vi) Rubber shall be black in colour.

The rubber of 50 mm thickness of approved specifications shall be brought as per requirement at site and shall be fixed in place by proper anchoring as per direction of EIC.

### **35.0 External water piping System (borewell connection):**

Supply, laying and commissioning MS water supply piping (Heavy duty) as per technical specification and direction of Engineer In Charge.

#### **35.01 Selection of Drilling Contractor:**

Drilling contractor should have work experience and should know the local geology. Officer/supervisor along with contractor should survey the existing wells in the area as it will provide important information about:

- Typical yields and water quality
- Which aquifer to tap into
- Trends in well design and construction
- Prior drilling success rates.

#### **35.02 Choosing a Well Site:**

Choice of well site will affect the safety and performance of well. Most contaminants enter the well either through the top or around the outside of the casing. Sewage or other contaminants may percolate down through the upper layers of the ground surface to the aquifer. It should be ensured that:

- The well is accessible for cleaning, testing, monitoring, maintenance and repair.
- The ground surrounding the well is sloped away from the well to prevent any surface run off from collecting or ponding.
- The well is up-slope and as far as possible from potential contamination sources such as septic systems.

#### **35.03 Trial boring:**



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Before sinking of pipes, samples of strata are examined for yield and samples of water taken for analysis. From the results obtained, the area of strainer necessary for the quantity of water required and the strata in which the strainers should be located are decided upon.

**35.04 Samples of water for analysis:**

For a large water supply, water should be drawn from as great a depth as possible to eliminate the danger of bacteriological contamination which can be expected in water drawn from the upper strata.

Water drawn from deep ground is likely to be bacteriologically pure. As the water obtained from deep wells may contain certain dissolved impurities, the chemical analysis of water to determine its suitability for drinking is always necessary and samples should be sent for the test.

**35.05 Minimum Distance Requirements:**

Provincial regulations may outline minimum distance requirements. In absence of those, the following may be considered and bore-well should be away by:

- 10 m from a watertight septic tank
- 15 m from a sub-surface effluent disposal field or an outdoor pit privy
- 50 m from sewage effluent discharge to the ground surface
- 30 m from pesticide or fertilizer storage
- 50 m from above-ground fuel storage tanks
- 100 m from a manure storage facility or manure collection area or livestock yard
- 100 m from dead animal burial or composting site
- 50 m from the outer boundary of a graveyard
- 450 m from any area where waste is or may be disposed of at a landfill



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**LIST OF APPROVED MAKES FOR CIVIL WORK**

Cement	Portland cement	L&T Raymonds ACC DLF
Steel	Tor Steel	SAIL TISCO RATHI
	Structural Steel	SAIL TISCO
Sheeting		Interarch Metacolor Supertech ( India ) Pvt. Ltd.
Bolts		Unbrako TVS GKW
Electrodes		ESAB Advani D&H
GI / MS Pipes	IS : 1239 IS : 3589	Tata, Jindal, Prakash, Surya TISCO Tubes
Paint		Asian Paints ICI Shalimar Berger
External Finish		Sandtex of ACC Spectrum Apex Unitile
Construction Chemicals		CICO FOSROC ROFFE STP MC Pidilite
Aluminium Extruded sections		Hindalco Domal Indal
Aluminum Hardware		Earlbehari ECIE
Glass		Modi Float



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Asahi Atul

Floor Spring

Door King  
Prabhat

Ceramic Tiles

Kajaria  
Orient Bell Somani

Vitreous Tiles

Diamond  
Granamite Spartek Somani (graviti)

Grout

ACC  
Roffe Fosroc Unitile

Laminate Board

Novapan  
Bhutan Kitply

False Ceiling

1 Tiger Steel Engineering India Ltd.  
606, Devarrata Building, Sec. 17,  
Vashi, New Mumbai – 400 705

2. Metalex Engineering & Construction Pvt. Ltd.  
E-165, Greater Kailash Part-I, New Delhi

3. Interarch

4. Lloyd Insulation Pvt. Ltd.

5. Supertech ( India ) Pvt. Ltd.



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**SECTION – II  
PLUMBING, SANITARY AND WATER SUPPLY WORKS**

**CONTENTS**

- 1.0 PLUMBING, SANITARY & WATER SUPPLY WORKS
- 2.0 SANITARY FIXTURES
- 3.0 SOIL, WASTE, VENT & RAINWATER PIPES
- 4.0 WATER SUPPLY SYSTEM
- 5.0 DRAINAGE
- 6.0 WATER SUPPLY PUMPS & ANCILLARIES



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## **1.0 PLUMBING SANITARY & WATER SUPPLY WORKS**

### **1.1. Scope of work**

1.1.1 The form of Contract shall be according to the "Conditions of Contract". The following clauses shall be considered as an extension and not in limitation of the obligation of the Contractor.

1.1.2 Work under this Contract shall consist of furnishing all labor, materials, equipment and appliances necessary and required. The Contractor is required to completely furnish all the plumbing and other specialized services as described hereinafter and as specified in the schedule of quantities and/or shown on the plumbing drawings.

1.1.3 Without restricting to the generality of the foregoing, the Plumbing installations shall include the following:-

- i) Sanitary Fixtures
- ii) Soil, Waste, Vent, Pipes & Fittings
- iii) Rainwater pipes
- iv) Water Supply System
- v) Sewerage & Storm Water Drainage including septic tanks & soakways and petrol-oil interceptor trap
- vi) Water Supply Distribution Pumps and related electrical works
- vii) Sinking of borewell including submersible pump and related electrical works

1.1.4 Services rendered under this section shall be done without any extra charge.

### **1.2 Specifications**

1.2.1 Work under this Contract shall be carried out strictly in accordance with specifications attached with the tender.

1.2.2 Items not covered under these specifications due to any ambiguity or misprints or additional works, the work shall be carried out as per latest specifications of the Central Public Works Department with upto date amendments as applicable in the Contract.

1.2.3 Works not covered under para 1.2.1 and 1.2.2 shall be carried out as per relevant Indian Standards specifications and Code of Practice as applicable.

### **1.3 Execution of work**

1.3.1 The Contractor should visit and examine the site of work and satisfy himself as to the nature of the existing roads and other means of communication and other details pertaining to the work and local conditions and facilities for obtaining his own information on all matters affecting the execution of work. No extra charge made in consequence of any misunderstanding or incorrect information on any of these points or on grounds of insufficient description will be allowed.



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1.3.2 The work shall be carried out in conformity with the plumbing drawings and within the requirements of architectural, HVAC, electrical, structural and other specialized services drawings.

1.3.3 The Contractor shall cooperate with all trades and agencies working on the site.

1.3.4 On award of the work, Contractor shall submit a schedule of construction in the form of a pert chart or bar chart for approval of the Engineer-in-Charge. All dates and time schedule agreed upon should be strictly adhered to, within the stipulated time of completion/commissioning along with the specified phasing, if any.

#### **1.4 Drawings**

1.4.1 Tender drawings, diagrams and details shall not be used for setting out until all relevant dimensions of existing structures and other related works have been checked on site by the contractor. Plumbing drawings are diagrammatic but shall be followed as closely as actual construction permits. Any deviations made shall be in conformity with the architectural and other services drawings.

1.4.2 Architectural drawings shall take precedence over plumbing or other services drawings as to all dimensions.

1.4.3 Contractor shall verify all dimensions at site and bring to the notice of the Engineer-in-Charge all discrepancies or deviations noticed. Decision of the Engineer-in-Charge shall be final.

1.4.4 Large size details and manufacturers dimensions for materials to be incorporated shall take precedence over small-scale drawings.

1.4.5 Any drawings issued by the Architects/Consultant for the work are the property of the Architects/Consultant and shall not be lent, reproduced or used on any works other than intended without the written permission of the Engineer-in-charge

#### **1.5 Inspection and testing of materials.**

1.5.1 Contractor shall be required, if requested, to produce manufacturers test certificate for the particular batch of materials supplied to him. The tests carried out shall be as per the relevant Indian Standards.

1.5.2 For examination and testing of materials and works at the site Contractor shall provide all testing and gauging equipment necessary and required at site for such tests.

1.5.3 All such equipment shall be tested for calibration at any approved laboratory, if required by the Engineer-in-Charge.





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1.5.4 Samples of all materials shall be got approved before placing order and the approved samples shall be deposited with the Engineer-in-charge. Any materials declared defective by Engineer-in-Charge shall be removed from the site within 48 hours.

**1.6 Metric conversion**

1.6.1 All dimensions and sizes of materials and equipment given in the tender document are commercial metric sizes.

1.6.2 Any weights or sizes given in the tender having changed due to metric conversion, the nearest equivalent sizes accepted by Indian Standards shall be acceptable without any additional cost.

**1.7 Reference points**

1.7.1 Contractor shall provide permanent benchmarks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of the work.

1.7.2 All such reference points shall be in relation to the levels and locations, given in the architectural and plumbing drawings.

**1.8 Reference drawings**

1.8.1 The Contractor shall maintain one set of all drawings issued to him as reference drawings. These shall not be used on site. All important drawings shall be mounted on boards indexed and placed in racks no drawings shall be rolled.

1.8.2 All corrections, deviations and changes made on the site shall be shown on these reference drawings for final incorporations in the completion drawings. All changes to be made shall be initialed by the Engineer-in-Charge.

**1.9 Shop drawings**

1.9.1 The Contractor shall submit to the Engineer-in-Charge four copies of the shop drawings for approval by Engineer-in-charge.

1.9.2 Shop drawings shall be submitted under following conditions: -

- a) All design drawings for underground services, structural works, electrical works and illumination works.
- b) Equipment layout, piping and wiring diagram.
- c) Manufacturer or Contractor's fabrication drawings for any materials or equipment supplied by him. Showing any changes in layout in the plumbing drawings.
- d) False ceiling, sheeting details.
- e) RCC details and Bar bending Schedules.
- f) Showing any changes in layout in the plumbing drawings.
- g) As Built Details Drawings.



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- 1.9.3 The Contractor shall submit four copies of catalogues, manufacturer's drawings, equipment characteristic data or performance charts as required by the Engineer-in-Charge.

**1.10 Completion drawings**

- 1.10.1 On completion of work, Contractor shall submit one complete set of original tracings and two prints of "As Built" drawings to the Engineer-in-Charge. These drawings shall have the following information.

- a) Run of all piping, diameters on all floors, vertical stacks and location of external services.
- b) Ground and invert levels of all drainage pipes together with location of all manholes and connections upto outfall.
- c) Run of all water supply lines with diameters, locations of control valves access panels.
- d) Location of all electrical equipment with their layout and piping connections.

No completion certificate shall be issued unless the above drawings are submitted.

- 1.10.2 Contractor shall provide four sets of catalogues, service manuals, manufacturer's drawings, performance data and list of spare parts together with the name and address of the manufacturer for all electrical and mechanical equipment provided by him.

- 1.10.3 All "Warranty Cards" given by the manufacturers shall be handed over to the Engineer-in-Charge.

**1.11 Contractor's rates**

- 1.11.1 Rates quoted in this tender shall be inclusive of cost of materials, labor, supervision, erection, tools, plant, scaffolding, service connections, transport to site, taxes, octroi and levies, breakage, wastage and all such expenses as may be necessary and required to completely do all the items of work and put them in a working condition.

- 1.11.2 Rates quoted are for all heights and depths and in all positions as may be required for this work.

- 1.11.3 All rates quoted must be for complete items inclusive of all such accessories, fixtures and fixing arrangements, nuts, bolts, hangers as are a standard part of the particular item except where specially mentioned otherwise.

- 1.11.4 All rates quoted are inclusive of cutting holes and chases in walls and floors and making good the same with cement mortar/concrete/water proofing of appropriate mix and strength as directed by Engineer-in-Charge. Contractor shall provide holes, sleeves, and recesses in the concrete and masonry work as per requirement of work.



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**1.12 Testing**

1.12.1 Piping, drainage, electrical and illumination works shall be tested as specified under the relevant clauses of the specifications.

1.12.2 Tests shall be performed in presence of the Engineer-in-Charge.

1.12.3 All materials and equipment found defective shall be replaced and whole work tested to meet the requirements of the specifications.

1.12.4 Contractor shall perform all such tests as may be necessary and required by the local authorities to meet municipal or other byelaws in force.

1.12.5 Contractor shall provide all labor, equipment and materials for the performance of the tests.

**1.13 Site clearance and cleanup**

1.13.1 The Contractor shall, from time to time clear away all debris and excess materials accumulated at the site.

1.13.2 After the fixtures, equipment and appliances have been installed and commissioned, Contractor shall clean-up the same and remove all plaster, paints, stains, stickers and other foreign matter or discoloration leaving the same in a ready to use condition.

1.13.3 On completion of all works, Contractor shall demolish all stores, remove all surplus materials and leave the site in a broom clean condition, failing which the same shall be done at Contractor's risk and cost.

**1.14 License permits and municipal approvals**

1.14.1 Contractor must hold a valid plumbing or any other license as required by the Municipal corporation or Municipality or any other competent authority under whose jurisdiction the work falls.

1.14.2 Contractor must keep constant liaison with the municipal/statutory authority and obtain approval of all Plumbing works carried out by him.

1.14.3 Contractor shall obtain, from the municipal and other authority completion certificate with respect to his work, as required for occupation of the building. Contractor shall obtain permanent water supply and drainage connections from authorities concerned. Engineer-in-Charge shall reimburse the fees paid to the authorities towards the connection charges on production of receipts for money paid.

**1.15 Recovery of cost for materials issued to Contractors free of cost**

1.15.1 If any materials issued to the Contractor, free of cost, are damaged or pilfered, the cost of the same shall be recovered from the Contractor on the basis of



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actual cost to owner which shall include all freight and transportation, Goods & Service Tax, octroi, import duty etc, plus 10%. The decision on the actual cost given by the Engineer-in-Charge shall be final and binding on the Contractor.

**1.16 Materials supplied by Purchaser**

1.16.1 The Contractor shall verify that all materials supplied by the Purchaser conform to the specifications of the relevant item in the tender. Any discrepancy found shall be brought to the notice of the Engineer-in-Charge.

**1.17 Materials**

1.17.1 Unless otherwise specified and expressly approved in writing by the Engineer-in-Charge, only materials of makes and specification as mentioned in the list of approved makes attached with the specifications shall be used.

1.17.2 If required, the Contractor shall submit samples of materials proposed to be used in the works. Approved samples shall be kept in the office of the Engineer-in-Charge and returned to the Contractor at the appropriate time.

**2.0 SANITARY FIXTURES**

**2.1 Scope of work**

2.1.1 Work under this section shall consist of furnishing all materials & labor necessary and required to completely install all sanitary fixtures, chromium plated fittings and accessories as required by the drawings specified here-in-after and given in the Schedule of Quantities.

2.1.2 Without restricting to the generality of the foregoing the sanitary fixtures shall include the following: -

- a) Sanitary fixtures
- b) Chromium plated fittings
- c) Porcelain or stainless steel sinks
- d) Accessories e.g. toilet paper holders, liquid soap dispenser, coat hooks etc.

2.1.3 Whether specifically mentioned or not all fixtures and appliances shall be provided with all fixing devices, nuts, bolts, screws, hangers as required.

2.1.4 All exposed pipes within toilets and near fixtures shall be chromium plated brass or copper unless otherwise specified.

**2.2 General requirements**

2.2.1 Sanitary fixtures shall be of the best quality approved by the Engineer-in-Charge. Wherever particular makes are mentioned, the choice of selection shall remain with the Engineer-in-Charge.

2.2.2 All fixtures and fittings shall be provided with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the Schedule of Quantities, specifications, drawings. Accessories shall include



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proper fixing arrangement, brackets, and nuts, bolts, screws and required connection pieces.

- 2.2.3 Fixing screws shall be half round head chromium plated brass screws with C.P. washers where necessary.
- 2.2.4 Porcelain sanitaryware shall be glazed vitreous china of first quality free from warps, cracks and glazing defects. All wares shall be white unless otherwise given in the Schedule of Quantities. Color of sanitaryware, when specified shall be selected by the Engineer-in-Charge. Fixtures shall conform to I.S.2556 (Part-I) 'General Requirements'.
- 2.2.5 Chromium plated fittings shall be cast brass chromium plated of the best quality approved by the Architects. The chromium plating shall conform to BE 4827 and shall be of grade 2 (thickness 10 micron).
- 2.2.6 All fittings and fixtures shall be fixed in a neat workmanlike manner true to level and heights shown on the drawings and in accordance with the manufacturer recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished floor, tiling or terrace shall be made good at Contractor's cost.

**2.3 Water Closet**

**2.3.1 European W.C**

- 2.3.1.1 European W.C. shall be low volume flushing (4-6 liters) wash down wall mounted set flushed by means of coupled porcelain flushing cistern with complete internal fittings of non-corrosive materials. The EWC shall be supported through C.I. floor mounted chair. Flush pipe/bend shall be connected to the W.C. by means of a suitable rubber adapter.
- 2.3.1.2 Each W.C. Set shall be provided with a solid plastic seat of color given in the schedule of quantities, rubber buffers and chromium plated hinges.
- 2.3.1.3 Plastic seat shall be so fixed that it remains absolutely stationary in vertical position without falling down on the W.C.

**2.4 Urinals**

- 2.4.1 Urinals shall be flat back large (half stalls) white glazed vitreous china fixed on concealed wall hangers and bracket. The size of the urinal shall be as given in schedule of quantities.
- 2.4.2 Half stall urinals shall be provided with 15 mm dia. C.P. spreader, 32 mm dia C.P. domical waste and C.P. cast brass bottle trap with pipe and wall flange, and shall be fixed to wall by C.I. brackets and C.I. wall clips as recommended by manufacturers complete as directed by Engineer-in-Charge.



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- 2.4.3 Half stall urinals shall be fixed with C.P. brass screws and shall be provided with 32-mm dia domical waste leading to urinal's trap.
- 2.4.4 Flush pipes shall be G.I. pipes concealed in wall chase but with chromium plated bends at inlet and outlet or as given in Schedule of Quantities.
- 2.4.5 Urinals shall be flushed with No-touch automatic infrared flush valve set operated by a solenoid valve.
- 2.4.6 Waste pipes for urinals shall be any one of the following:
- a) G.I. pipes
  - b) Rigid P.V.C.

Waste pipes may be exposed on wall or concealed in chase as directed by the Engineer-in-Charge. Specifications for waste pipes shall be same as given in Section III.

**2.5 Lavatory basin**

- 2.5.1 Lavatory basins shall be white glazed vitreous china of size, shape and type specified in the Schedule of Quantities.
- 2.5.2 Each basin shall be provided with R.S. or C.I. brackets and clips and the basin securely fixed to wall. Placing of basins over the brackets without secure fixing shall not be accepted.
- 2.5.3 Each basin shall be provided with 32 mm dia C.P. waste as specified in the Schedule of Quantities, 32 mm dia C.P. brass bottle trap with C.P. pipe to wall and flange.
- 2.5.4 Each basin shall be provided with mixing fitting or as specified in the Schedule of Quantities.
- 2.5.5 Basins shall be fixed at proper heights as shown on drawings. If height is not specified, the rim level shall be 79 CMS or as directed by Engineer-in-Charge.

**2.6 Sinks**

- 2.6.1 Sinks shall be white glazed fireclay or vitreous china or stainless steel or any other material as specified in the Schedule of Quantities.
- 2.6.2 Each sink shall be provided with R.S. or C.I. brackets and clips and securely fixed. Counter top sinks shall be fixed with suitable angle iron brackets or clips as recommended by the manufacturer. Each sink shall be provided with 40-mm dia C.P. waste with chain and plug as given in the Schedule of Quantities. Fixing shall be done as directed by Engineer-in-Charge.
- 2.6.3 Supply fittings for sinks shall be mixing fittings or C.P. taps as specified in the Schedule of Quantities.



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**2.7 Accessories**

- 2.7.1 Contractor shall install all chromium plated and porcelain accessories as shown on the drawings or directed by Engineer-in- Charge and given in the Schedule of Quantities.
- 2.7.2 All C.P. Accessories shall be fixed with C.P. brass half round head screws and cup washers in wall with rawl plugs or nylon sleeves and shall include cutting and making good as required or directed by Engineer-in-Charge.
- 2.7.3 Porcelain accessories shall be fixed in walls and set in cement mortar 1:2 (1 cement: 2 coarse sand) and fixed in relation to the tiling work.

**2.8 Urinal partitions**

- 2.8.1 Urinal partitions shall be white glazed vitreous china or 25-mm thick marble of size specified in the Schedule of Quantities.
- 2.8.2 Porcelain partitions shall be fixed at proper heights with C.P. brass bolts, anchor fasteners and M.S. Clips as recommended by the manufacturer and directed by Engineer-in-Charge.

**2.9 Measurement**

- 2.9.1 Sanitary fixtures shall be measured by numbers.
- 2.9.2 Rate for providing and fixing of sanitary fixtures, accessories, urinal partitions shall include all items, and operations stated in the respective specifications and Schedule of Quantities and nothing extra is payable.
- 2.9.3 Rates for all items under specifications pares above shall be inclusive of cutting holes and chases and making good the same, C.P. brass screws, nuts, bolts and any fixing arrangements required and recommended by manufacturers, testing and commissioning.

**3.0 SOIL, WASTE, VENT & RAINWATER PIPES**

**3.1 Scope of work**

- 3.1.1 Work under this section shall consist of furnishing all labor, materials, equipment's and appliances necessary and required to completely install all soil, waste, vent and rainwater pipes and fittings as required by the drawings, and given in the Schedule of Quantities.
- 3.1.2 Without restricting to the generality of the foregoing, the soil, waste, vent pipes system shall include the following:-
- Vertical and horizontal soil, waste and vent pipes, and fittings, joints, clamps and connections to fixtures.
  - Connection of all pipes to sewer lines as shown on the drawings at ground floor levels.
  - Floor and urinal traps, cleanout plugs, inlet fittings and rainwater heads.
  - Testing of all pipelines.





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### **3.2 General requirements**

- 3.2.1 All materials shall be new of the best quality conforming to specifications and subject to the approval of Engineer-in-Charge.
- 3.2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.
- 3.2.3 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
- 3.2.4 Pipes shall be securely fixed to walls and ceilings by suitable clamps at intervals specified.
- 3.2.5 Access doors for fittings and cleanouts shall be so located that they are easily accessible for repair and maintenance.

### **3.3 Cast iron pipes & fittings**

#### **3.3.1 Pipes**

- 3.3.1.1 Soil, waste, vent, anti-siphonage and rainwater pipes shall be cast iron pipes. All pipes shall be straight and smooth and inside free from irregular bore, blow holes, cracks and other manufacturing defects. Pipes shall be centrifugal spun iron soil pipes conforming to I.S. 3989-1970 or sand cast to I.S. 1729- 1967.

- 3.3.1.2 Standard weight, dimensions and pig lead required for joints shall be as follows:-

For pipes conforming to I.S. 3989-1970 (centrifugal spun soil pipes)

Nominal Diameter		Thickness	Overall Weight 6'length 1.83mm	Internal diameter of socket	Depth of lead
in	Mm	mm	Kg	mm	mm
2	50	3.5	8.5	73	25
3	75	3.5	12.7	99	25
4	100	4.0	19.2	126	25
6	150	5.0	35.5	178	38





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For pipes conforming to I.S. 1729-1967 (sand cast iron soil pipes and fittings)

Nominal Diameter		Thickness	Overall Weight 6'length 1.83mm	Internal diameter of socket	Depth of lead
in	mm	mm	Kg	mm	mm
2	50	5	11.41	76	25
3	75	5	16.52	101	25
4	100	5	21.67	129	25
6	150	5.0	31.91	181	38

**3.3.1.3 Tolerance**

Acceptable tolerance for pipes to I.S. 3989 and I.S. 1729 shall be as follows:-

- a) Wall thickness -15%
- b) Length + 20 mm
- c) Weight -10%

**3.4 uPVC pipes & fittings**

3.4.1 uPVC pipes for drainage system shall be unplasticized (rigid) PVC pipes conforming to I.S.: 4985 of appropriate class as specified in schedule of quantities.

3.4.2 Fitting for the pipes shall be injection molded with approved type of sockets and 'O' rings joints.

3.4.3 Jointing shall be done as per the manufacturers recommendation. The pipes and fittings must have matching dimensions for a perfect joint. Loose or excessively tight joints in the system shall not be accepted. Fittings must have sufficient gap (approx. 10 mm) for permissible thermal expansion of pipes.

3.4.4 uPVC pipes shall be clamped to the wall with approved type uPVC saddle clamps.

3.4.5 Use proper uPVC pipe adapters for connections between cast iron pipes, traps and uPVC pipes.

**3.5 Fittings**

3.5.1 Fittings shall conform to the same Indian Standard as for pipes. Contractor shall use pipes and fittings of matching specifications.

3.5.2 Fittings shall be of the required degree of curvature with or without access door.

3.5.3 Access door shall be made up with 3-mm thick insertion rubber washer and white lead. The bolts shall be lubricated with grease or white lead for easy removal later. The fixing shall be air and watertight.



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**3.6 Fixing**

- 3.6.1 All vertical pipes shall be fixed by M.S. clamps truly vertical. Branch pipes shall be connected to the stack at the same angle as that of the fittings. No collars shall be used on vertical stacks. Each stack shall be terminated at top with a cowl (terminal guard).
- 3.6.2 Horizontal pipes running along ceiling shall be fixed on structural adjustable clamps of special design shown on the drawings or as directed. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on them.
- 3.6.3 Contractor shall provide all sleeves, openings, hangers, inserts during the construction. He shall provide all necessary information to the building Contractor for making such provisions in the structure as necessary. All damages shall be made good to restore the surfaces.

**3.7 Clamps**

- 3.7.1 Holder bat clamps shall be of standard design and fabricated from M.S. flats 40x3 mm thick and 12-mm dia M.S. Rod and 6 mm nuts and bolts. They shall be painted with two coats of black bitumen paint before fixing. Holder bat clamps shall be fixed in cement concrete 1:2:4 mix blocks 10x10x10 cms deep.
- 3.7.2 Where holder bat clamps are to be fixed in RCC column or slotted angles, walls or beam they shall be fixed with 40x3 mm flat iron "U" type clamps with anchor fasteners of approved design or 6 mm nuts and bolts.
- 3.7.3 Structural clamps shall be fabricated from M.S. structural members e.g. rods, angles, channels flats as per detailed drawing or as directed. Contractor shall provide all nuts, bolts, welding material and paint the clamps with one coat of red oxide and two or more coats of black enamel paint.
- 3.7.4 Slotted angle/channel supports on walls shall be provided wherever shown on drawings. Angles/channels shall be of sizes shown on drawings or specified in schedule of quantities. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with suitable anchor fasteners. The spacing of support bolts horizontally shall not exceed 1 m.
- 3.7.5 Wherever M.S. clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangement and making good with cement concrete 1:2:4 mix (1 cement :2 coarse sand :4 mm stone aggregate 20 mm nominal size) as directed by the Engineer-in- Charge.

**3.8 Traps**

- 3.8.1 Nahni trap or floor traps shall be cast iron, deep seal with an effective seal of 50 mm. The trap and waste pipes shall be set in cement concrete blocks firmly supported on the structural floor. The blocks shall be in 1:2:4 mix (1 cement :2



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coarse sand :4 stone aggregate 20 mm nominal size) and extended to 40 mm below finished floor level. Contractor shall provide all necessary shuttering and centering for the blocks. Size of the block shall be 30x30 cm of the required depth.

- 3.8.2 Urinal traps shall be cast iron P or S traps with or without vent and set in cement concrete block specified in para above without extra charge.

**3.8.3 Floor trap inlet**

Bath room traps and connections shall ensure free and silent flow of discharging water. Where specified, Contractor shall provide a special type cast iron inlet hopper without or with one, two or three inlet sockets to receive the waste pipe. Joint between waste and hopper inlet socket shall be lead caulked. Hopper shall be connected to a C.I. P or S trap with atleast 50 mm seal (hopper and traps shall be paid for separately.) Floor trap inlet hoppers and the traps shall be set in cement concrete blocks as specified in para above without extra charge.

**3.8.4 C.P. Grating**

Floor and urinal traps shall be provided with 100-150mm square or round C.P./Stainless steel grating, with rim of approved design and shape. Minimum thickness shall be 4 mm or as specified in the Schedule of Quantities.

**3.9 Jointing**

Soil, waste vent, antisiphonage and rainwater pipes shall be jointed with refined pig lead conforming to I.S.27-1977. Sufficient skein of jute rope shall be caulked to leave a minimum space for the pig lead as given in para 3.1.2 to be poured in. After the pouring the lead shall be caulked into the joint with caulking tool and hammer. all surplus lead shall be cut and joint left flush with the rim of the socket neatly.

**3.10 Cleanout plugs**

Contractor shall provide cast brass cleanout plugs as required. Cleanout plugs shall be threaded and provided with keyholes for opening. Cleanout plugs shall be fixed to the pipe by a G.I. socket and lead caulked joint.

**3.11 Waste pipe from appliances**

- 3.11.1 Waste pipe from appliances e.g. washbasins, sinks and urinals shall be of galvanized steel or P.V.C. as given in the Schedule of Quantities.

- 3.11.2 All pipes shall be fixed in gradient towards the outfalls of drains. Pipes inside a toilet room shall be in chase unless otherwise shown on drawings. Where required pipes may be run at ceiling level in suitable gradient and supported on structural clamps. Spacing for clamps for such pipes shall be as follows:-

	<b>Vertical</b>	<b>Horizontal</b>
G.I. pipes	300 cms	240cms
P.V.C. pipes	180 CMS	120cms



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### **3.11.3 Galvanized pipes**

Pipes shall be galvanized steel tubes conforming to I.S.1239- 1979 (medium class) and quality certificates shall be furnished. Pipes shall be provided with all required fittings e.g. tees, couplings, bends, elbows, unions, reducers, nipples, plugs. All G.I. waste pipes shall be terminated at the point of connection with the appliance with an outlet of suitable diameter. Pipes in chase shall be painted with two coats of black bitumen paint and exposed pipes with one coat of red oxide primer and two or more coats of synthetic enamel paint or as given in the Schedule of Quantities.

### **3.12 Cast iron pipes for drainage**

3.12.1 All drainage lines passing under building, floors, in exposed position above ground e.g. basement ceiling shall be cast iron pipes. Position of such pipes shall generally be shown on the drawings.

3.12.2 Cast iron pipes shall be centrifugal spun iron pipes conforming to I.S. 1536-1967. Quality certificates shall be furnished.

### **3.12.3 Fittings**

- a) Fittings used for C.I. drainage pipe shall conform to I.S.1538- 1967. Wherever possible junction from branch pipes shall be made by a Y tee.
- b) Cleanout plugs shall be provided on head of each drain and at location indicated on plans or directed by Engineer-in-Charge. Cleanout plugs shall be of size matching the full bore of the pipe. Plugs shall be made out with G.I. coupling caulked into the socket of the pipe or fittings. The end shall be provided with a brass screwed plug with suitable key for opening.

### **3.12.4 Laying**

- a) All cast iron pipes and fittings shall be jointed with best quality soft pig lead (conforming to I.S. 27-1977) which shall be free from impurities in wet trenches joints shall be made from lead wool. Nothing extra will be paid for lead wool joints. Depth of pig lead and weight for joints shall be as per I.S. code.
- b) The spigot of pipe or fittings shall be centered in the adjoining socket by caulking. Sufficient turns of tarred gasket will be given to leave unfilled the required depth of socket for depth of 45 mm when the gasket has been caulked tightly home. Joining ring shall be placed round the barrel and against the face fill the remainder of the socket. This shall then be of the socket. Molten pig lead shall then be poured to done in one pouring. The lead shall then be solidly caulked with suitable tools and hammers weighing not less than 2 kg.
- c) For lead wool joints the socket shall be caulked with tarred gasket, as explained above. The lead wool shall be inserted into the sockets and



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tightly caulked home skein by skein with suitable tools and hammers of not less than 2-kg weight until joint is filled.

### **3.12.5 Testing**

All cast iron pipes for drainage shall be tested to a hydraulic test of 3-meter head. A test register shall be maintained which shall be signed and dated by Contractor, Engineer-in-Charge and representative of Architect/Consultant.

### **3.13 Cement Concrete**

Cast iron soil and waste pipes under floor in sunken slabs and in wall chases (when cut specially for the pipe) shall be encased in cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 12 mm size) 75 mm in bed and all around. When pipes are running well above the structural slab, the encased pipes shall be supported with suitable cement concrete pillars of required height at intervals of 1.8 m. Rate for concrete round pipes shall be inclusive of pillars, supports, shuttering and centering.

### **3.14 Painting**

3.14.1 Soil, waste vent, anti-syphonage and rainwater pipes in exposed location in shafts and pipe spaces shall be painted with two or more coats of synthetic enamel paint to give an even shade.

3.14.2 Paint shall be of approved quality and shade. Where directed pipes shall be painted in accordance with approved pipe color code.

3.14.3 G.I. waste pipes in chase shall be painted with two coats of bitumen paint, covered with polythene tape and a final coat of bitumen paint. Exposed pipes shall be painted with two or more coats of synthetic enamel paint.

3.14.4 C.I. soil and waste pipes below ground and covered in cement concrete or lead pipes shall not be painted.

### **3.15 Testing**

3.15.1 Before use at site all C.I. soil pipes shall be tested by filling up with water for at least 10 minutes. After filling, pipes shall be struck with a hammer and inspected for blowholes and cracks. All defective pipes shall be rejected and removed from the site within 48 hours. Pipes with minor sweating may be accepted at the discretion of the Engineer-in-Charge.

3.15.2 Pipes shall be tested after installation, by filling up the stack with water. All opening and connections shall be suitably plugged. The total head in the stack shall be however not exceed 3 m.

3.15.3 Alternatively Contractor may test all soil and waste stacks by a smoke-testing machine. Smoke shall be pumped into the stack after plugging all inlets and connections. The top end shall, however, be left open. The stack shall then be



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observed for leakages and all defective pipes and fittings removed or repaired as directed by the Engineer-in-Charge.

3.15.4 A test register shall be maintained and all entries shall be signed and dated by Contractors and Engineer-in-Charge.

### **3.16 Measurements:**

#### **3.16.1 General**

3.16.1 Rates for all items quoted shall be inclusive of all work and items given in the above mentioned specifications and Schedule of Quantities and applicable for the work under floors, in shafts or at ceiling level at all heights and depths.

3.16.2 All rates are inclusive of cutting holes and chases in RCC and masonry work and making good the same.

3.16.3 All rates are inclusive of pre testing and on site testing of the installations, materials and commissioning.

3.16.4 Pipes (unit of measurement. Linear meter to the nearest centimeter).

3.16.5 All uPVC & C.I. soil, waste, vent, anti-syphonage and rain water pipes shall be measured net when fixed correct to a centimeter including all fittings along its length. No allowance shall be made for the portions of pipe lengths entering the sockets of the adjacent pipes or fittings. The above will apply to both case i.e. whether pipes are fixed on wall face or pillars or embedded in masonry or pipes running at ceiling level.

3.16.6 Pipes shall be measured per running meter correct to a centimeter for the finished work which shall include fittings e.g. bends, tees, elbows, reducers, crosses, sockets, nipples and nuts. The length shall be taken along centerline of the pipes and fittings. All pipes and fittings shall be classified according to their diameter, method of jointing and fixing substance, quality, and finish. The diameters shall be nominal diameter of internal bore. The pipes shall be described as including all cutting and waste. In case of fittings of unequal bore, the largest bore shall be measured.

3.16.7 Cement concrete around pipes shall be measured along the center of the pipe line measured per linear meter and include any masonry supports, shuttering and centering cutting complete as described in the relevant specifications.

3.16.8 Slotted angles/channels shall be measured per linear meter of finished length and shall include support bolts and nuts embedded in masonry walls with cement concrete blocks and nothing extra will be paid for making good the same.

#### **3.16.9 Fittings**



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Unit of measurement shall be the number of pieces. All urinal traps, trap gratings, hoppers, cleanout plugs shall be measured by number per piece and shall include all items described in the relevant specifications and Schedule of Quantities.

3.16.10 Painting: painting of pipes shall be measured per running meter and shall be inclusive of all fittings and clamps. no deduction for fittings shall be made.

3.16.11 Excavation for soil pipes: - no extra payment shall be admissible with respect to excavation, refilling and disposal of surplus earth for cast iron soil and waste pipes.

#### **4.0 WATER SUPPLY SYSTEM**

##### **4.1 Scope of work**

4.1.1 Work under this section consists of furnishing all labor, materials equipment and appliances necessary and required to completely install the water supply system as required by the drawings, specified hereinafter and given in the Schedule of Quantities.

4.1.2 Without restricting to the generality of the foregoing, the water supply system shall include the following:-

- a) Distribution system from main supply or overhead tank to all fixtures and appliances for cold water.
- b) Excavation and refilling of pipes trenches.
- c) Pipe protection and painting.
- d) Control valves, masonry chambers and other appurtenances.
- e) Connections to all plumbing fixtures, tanks, appliances and municipal mains.
- f) Inserts for R.C.C. tanks

4.1.3 The word internal water supply is used as indicative of all water supply work required and necessary for the building including such external work as may be necessary to make the system functional.

##### **4.2 General requirements**

4.2.1 All materials shall be new of the best quality conforming to specifications. All works executed shall be to the satisfaction of the Engineer-in-Charge.

4.2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.

4.2.3 Short or long bends shall be used on all main pipelines as far as possible. Use of elbows shall be restricted for short connections.

As far as possible all bends shall be formed by means of a hydraulic pipe bending machine for pipes upto 65 mm dia.





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- 4.2.4 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
- 4.2.5 Pipes shall be securely fixed to walls and ceilings by suitable clamps at intervals specified.
- 4.2.6 Valves and other appurtenances shall be so located as to provide easy accessibility for operations, maintenance and repairs.
- 4.3 G.I. pipes & fittings**
- 4.3.1 Where specified cold water lines shall be galvanized steel tubes conforming to I.S. 1239-1979 of class specified. When class is not specified they shall be medium class.
- 4.3.2 Fittings shall be of malleable iron galvanized of approved make. Each fitting shall have manufacturer's trademark stamped on it. Fittings for G.I. pipes shall include couplings, bends, tees, reducers, nipples, unions, and bushes. Fittings shall conform to I.S.1879-(part I to X) 1975.
- 4.3.3 Pipes and fittings shall be jointed with screwed joints. Care shall be taken to remove burr from the end of the pipe after cutting by a round file. Genuine red lead with grumet and a few strands of fine hemp shall be applied. All pipes shall be fixed in accordance with layout and alignment shown on the drawings. Care shall be taken to avoid air pockets. G.I. pipes inside toilets shall be fixed in wall chases well above the floor. No pipes shall be run inside a sunken floor as far as possible. Pipes may be run under the ceiling or floors and other areas as shown on drawings.
- 4.4 Clamps**
- G.I. Pipes in shafts and other locations shall be supported by M.S. clamps of design approved by Engineer-in-Charge. Iron hooks shall anchor pipes in wall chases. Pipes at ceiling level shall be supported on structural clamps fabricated from M.S. Structurally as described in section II-A. Pipes in typical shafts shall be supported on slotted angles/channels as specified elsewhere.
- 4.5 Unions**
- Contractor shall provide adequate number of unions on all pipes to enable easy dismantling later when required. unions shall be provided near each gunmetal valve, stop cock, or check valve and on straight runs as necessary at appropriate locations as required and/or directed by Engineer-in-Charge.
- 4.6 Flanges**
- Flanged connections shall be provided on pipes as required or where shown on the drawings, all equipment connections as necessary and required or as directed by Engineer-in-Charge. Connections shall be made by the correct number and size of the bolts and made with 3 mm thick insertion rubber washer. Where hot water or steam connections are made insertion gasket shall be of





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suitable high temperature grade and quality approved by Engineer-in-Charge. Bolt hole dia for flanges shall conform to match the specification for C.I. sluice valve to I.S. 780.

#### **4.7 Trenches**

All G.I. pipes below ground shall be laid in trenches with a minimum cover of 60 cms. The width and depth of the trenches shall be as follows: -

<b>Dia of pipe</b>	<b>width of trench</b>	<b>depth of trench</b>
15 mm to 50 mm	30 cms	75 cms
65 mm to 100 mm	45 cms	100 cms

#### **4.8 Sand filling**

Where specified in the Schedule of Quantities all G.I. pipes in trenches shall be protected with fine sand 15 cms all around before filling in the trenches.

#### **4.9 Painting**

All pipes above ground shall be painted with one coat of red lead and two coats of synthetic enamel paint of approved shade and quality. Pipes shall be painted to standard color code specified by Engineer-in-Charge.

#### **4.10 Pipe protection**

Where specified in the Schedule of Quantities all pipes in chase below floor or below ground shall be protected against corrosion by the application of two coats of bitumen paint covered with polythene tape and a final coat of bitumen paint.

#### **4.11 HDPE Pipes & fittings**

4.11.1 All pipes for D.M. and R.O. water supply shall be High Density Polyethylene (HDPE) to IS:4984 Class V (10 kg/sqcm) with matching fittings of the same grade. Pipe lines for cold water supply lines exceeding 25 O.D. shall also be HDPE or as specified in bill of quantities.

4.11.2 Jointing : All HDPE pipes and fittings shall be jointed by welding as per manufacturers' recommendations.

4.11.3 All piping works shall be tested after installation for a test pressure of one and half times the working pressure.

#### **4.12 Composite pipes & fittings**

4.12.1 Where specified, water supply pipes (both hot and cold) inside the building shall be Composite PE-AL-PE tubes conforming to ASTM F-1282-95.

4.12.2 Fittings for composite tubes shall be brass compression fittings. The pipes shall be free of visible cracks, holes, foreign inclusions, blisters and other known injurious defects. The pipe shall be as uniform as commercially practicable in color, opacity, and regularity of the distribution of the Polyethylene inside and outside.



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#### **4.13 Ball Valves**

4.13.1 Where specified and shown on the drawings, valves 50 mm dia and below shall be bronze ball valves quarter turn, lever operated with screwed female/flanged ends to BSP/BS:10 Table D. Valves shall be tested at manufacturer's works and the same stamped on it.

4.13.2 Ball valves shall be provided with Stainless steel ball and spindle (AISI410/AISI304). All valves shall be approved by the Engineer-in-Charge before they are allowed to be used on work.

#### **4.14 Butterfly Valves**

4.14.1 Valves 50 mm dia and above shall be cast iron butterfly valve to be used for isolation and/or flow regulation. The valves shall be bubble tight, resilient seated suitable for flow in either direction and seal in both direction.

4.14.2 Butterfly valve shall be of best quality conforming to IS: 13095. Butterfly valves for general purpose.

#### **4.15 Non Return Valve**

4.15.1 Where specified non return valve (swing check type) shall be provided through which flow can occur in one direction only. It shall be single door swing check type of best quality conforming to IS: 5312.

#### **4.16 Storage tanks (Overhead)**

4.16.1 Overhead Storage tanks for water supply shall be High Density Polythene (HDPE) cylindrical vertical tanks with closed top rated for outdoor installation (UV stabilized).

4.16.2 HDPE tanks for R.O. water storage shall be food grade type. Each tank shall be provided with lockable type manhole cover.

4.16.3 HDPE tanks on terrace location shall be insulated with resin bonded mineral wool/glasswool mattresses (with standard G.I. wire netting) of 50 mm thickness confirming to IS:8183.

4.16.4 The insulation shall be secured with Aluminum bands sealing at approx. 300 mm center atleast 25mm back from butted joints. At irregular shapes where banding may be impractical tie wire (12 SWG) may be used. The entire outer surface of insulation shall be coated with vapor sealing compound. The insulation shall be encased with Aluminum cladding of 26 SWG and held in position by bands and seals spaced at 450 mm c/c. Proper weather proofing mastic shall be used as recommended by the insulation manufacturer.

#### **4.17 Outlets and overflow:**



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All nozzles for puddle flanges in HDPE tanks for inlet, outlet, overflow and scour etc. shall be provided by Plumbing contractor.

#### **4.18 Storage tanks (Underground):**

- 4.18.1 Underground water storage tanks for water supply shall be in reinforced cement concrete to be constructed by Civil contractor.
- 4.18.2 Each tank shall be provided with lockable type manhole cover fabricated from M.S. sheet or standard cast iron tank covers. Manhole covers shall be 450-500 mm dia as approved by local municipal authority.
- 4.18.3 Outlets and overflow, all nozzles for puddle flanges in RCC tank for inlet, outlet, overflow and scour etc. shall be provided by civil contractor or as given in the Schedule of Quantities.

#### **4.19 Testing**

- 4.19.1 All pipes, fittings and valves, after fixing at site, shall be tested by hydrostatic pressure of 1.5 times the working pressure or 7kg/sqcm whichever is more. Pressure shall be maintained for a period of at least thirty minutes without any drop.

A test register shall be maintained and all entries shall be signed and dated by Contractor(s) and Engineer-in-Charge.

- 4.19.2 In addition to the sectional testing carried out during the construction, Contractor shall test the entire installation after connections to the overhead tanks or pumping system or mains. He shall rectify all leakages and shall replace all defective materials in the system. any damage done due to carelessness, open or burst pipes or failure of fittings, to the building, furniture and fixtures shall be made good by the Contractor during the defects liability period without any cost.
- 4.19.3 After commissioning of the water supply system, Contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently. Valves , which do not effectively operate, shall be replaced by new ones, at no extra cost and the same shall be tested as above.

#### **4.20 Measurement**

- 4.20.1 G.I. pipes above ground shall be measured per linear meter (to the nearest cm) and shall be inclusive of all fittings e.g. couplings, tees, bends, elbows, unions, and flanges. Deduction for valves shall be made. Rate quoted shall be inclusive of all fittings, clamps, cutting holes chases and making good the same and all items mentioned in the specifications and Schedule of Quantities.
- 4.20.2 G.I. pipes below ground shall be measured per linear meter (to the nearest cm) and shall be inclusive of fittings, e.g. couplings, tees, bends, elbows, unions, deduction for valves shall be made. Rates quoted shall be inclusive of all fittings,



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excavation, back filling and disposal of surplus earth, cutting holes and chases and making good and all other items mentioned in the specifications and Schedule of Quantities.

- 4.20.3 Gunmetal and cast iron valves and puddle flanges shall be measured in numbers.

Painting/pipe protection/insulation for pipes shall be measured per linear meter over finished surface and shall include all valves and fittings for which no deduction shall be made.

- 4.20.5 All HDPE pipes shall be measured per linear meter to the nearest centimeter and shall be inclusive of all fittings e.g. couplings, tees, bends, and elbows. Deduction for valves shall be made.

- 4.20.6 All HDPE tanks shall be measured in numbers and shall include all nozzles, fittings, insulation etc. as specified and given in schedule of quantities.

**5.0 DRAINAGE**

**5.1 Scope of work**

- 5.1.1 Work under this section shall consist of furnishing all labor, materials, equipment and appliances necessary and required to completely install all the drainage system as required by the drawings and specified hereinafter or given in the Schedule of Quantities.

- 5.1.2 Without restricting to the generality of the foregoing, the drainage system shall include:-

- a) Sewer lines including excavations, pipe lines, manholes, drop connections and connections to the municipal sewer or septic tanks as per site conditions.
- b) Storm water drainage, excavation, pipe lines, manholes, catch basins and connections to the existing municipal storm water drain. All roof water to be connected to ground water recharge pit.

**5.2 General requirements**

- 5.2.1 All materials shall be of the best quality conforming to specifications and subject to the approval of the Engineer-in- Charge.
- 5.2.2 Drainage lines and open drains shall be laid to the required gradients and profiles.
- 5.2.3 All drainage work shall be done in accordance with the local municipal bye-laws.
- 5.2.4 Contractor shall obtain necessary approval and permission for the drainage system from the municipal or any other competent authority.



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5.2.5 Location of all manholes, etc. shall be got confirmed by the Engineer-in-Charge before the actual execution of work at site. As far as possible, no drains or sewers shall be laid in the middle of road unless otherwise specifically shown on the drawings or directed by the Engineer-in-Charge.

**5.3. Excavation**

**5.3.1 Alignment and grade**

The sewer pipes shall be laid to alignment and gradient shown on the drawings but subject to such modifications as shall be ordered by the Engineer-in-Charge from time to time to meet the requirements of the works. No deviations from the lines, depths of cutting or gradients of sewers shown on the plans and sections shall be permitted except by the express direction in writing of the Engineer-in-Charge.

**5.3.2 Excavation in tunnels**

The excavation for sewer works shall be open cutting unless the permission of the Engineer-in-Charge for the ground to be tunneled is obtained in writing. Where sewers have to be constructed along narrow passages, the Engineer-in-Charge may order the excavation to be made partly in tunnel and in such cases the excavated soil shall be brought back later on for refilling the trenches or tunnel.

**5.3.3 Opening out trenches**

In excavating the trenches, etc. The solid road metalling, pavement, kerbing, etc. And turf is to be placed on one side and preserved for reinstatement when the trenches or other excavation shall be filled up. Before any road metal is replaced, it shall be carefully sifted. The surface of all trenches and holes shall be restored and maintained to the satisfaction of the Engineer-in-Charge and of the owners of the roads or other property traversed and the Contractor shall not cut out or break down any live fence of trees in the line of the proposed works but shall tunnel under them, unless the Engineer-in-Charge shall order to the contrary.

The Contractor shall grub up and clear the surface over the trenches and other excavations of all trees, stumps roots and all other encumbrances affecting execution of the work and shall remove them from the site to the approval of the Engineer-in-Charge.

**5.3.4 Obstruction of roads**

The Contractor shall not occupy or obstruct by his operation more than one half of the width of any road or street and sufficient space shall then be left for public and private transit, he shall remove the materials excavated and bring them back again when the trench is required to be refilled. The Contractor shall obtain the consent of the Engineer-in-Charge in writing before closing any road to vehicular traffic and the foot walks must be clear at all times.

**5.3.5 Removal of filth**



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All night soil, filth or any other offensive matter met with during the execution of the works, immediately after it is taken out of any trench, sewer or cess pool, shall not be deposited on to the surface of any street or where it is likely to be a nuisance or passed into any sewer or drain but shall be at once put into the carts and removed to a suitable place to be provided by the Contractor.

**5.3.6 Excavation to be taken to proper depths**

The trenches shall be excavated to such a depth that the sewer shall rest on concrete as described in the several clauses relating thereto and so that the inverts may be at the levels given in the sections. In bad ground, the Engineer-in-Charge may order the Contractor to excavate to a greater depth than that shown on the drawings and to fill up the excavation to the level of the sewers with concrete, broken stone, graven or other materials. For such extra excavation and concrete, broken stone, gravel or other materials, the Contractor shall be paid extra at rates laid down for such works in the schedule, if the extra work was ordered by the Engineer-in-Charge in writing, but if the Contractor should excavate the trench to a greater depth than is required without a specific order to that effect in writing of the Engineer-in-Charge the extra depth shall have to be filled up with concrete at the Contractor's own costs and charges to the requirements and satisfactions of the Engineer-in-Charge.

**5.3.7 Refilling**

After the sewer or other work has been laid and proved to be water tight, the trench or other excavations shall be refilled. Utmost care shall be taken in doing this, so that no damage shall be caused to the sewer and other permanent work. The filling in the haunches and upto 75 cms above the crown of the sewer shall consist of the finest selected materials placed carefully in 15 cms layers and flooded and consolidated. After this has been laid, the trench and other excavation shall be refilled carefully in 15 cms layers with materials taken from the excavation, each layer being watered to assist in the consolidation unless the Engineer-in-Charge shall otherwise direct.

**5.3.8 Contractor to restore settlement and damages**

The Contractor shall, at his own costs and Charges, make good promptly during the whole period the works are in hand, any settlement that may occur in the surfaces of roads, berms, footpaths, gardens, open spaces etc. Whether public or private caused by his trenches or by his other excavations and he shall be liable for any accidents caused thereby. He shall also, at his own expense and Charges, repair and make good any damage done to buildings and other property. If in the opinion of the Engineer-in-Charge he fails to make good such works with all practicable dispatch, the Engineer-in-Charge shall be at liberty to get the work done by other means and the expenses thereof shall be paid by the Contractor or deducted from any money that may be or become due to him or recovered from him in any other manner according to the law of the land.

**5.3.9 Disposal of surplus soil**



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The Contractor shall at his own costs and charges provide places for disposal of all surplus materials not required to be used on the works. As each trench is refilled the surplus soil shall be immediately removed, the surface properly restored and roadways and sides left clear.

**5.3.10 Timbering of sewer and trenches**

- a) The Contractor shall at all times support efficiently and effectively the sides of the sewer trenches and other excavations by suitable timbering, piling and sheeting and they shall be closed, timbered in loose or sandy strata and below the surface of the sub soil water level.
- b) All timbering, sheeting and piling with their walling and supports shall be of adequate dimensions and strength and fully braced and strutted so that no risk of collapse or subsidence of the walls of the trench shall take place.
- c) The Contractor shall be held responsible and will be accountable for the sufficiency of all timbering, bracing's, sheeting and piling used as also for, all damage to persons and property resulting from improper quality, strength, placing, maintaining or removing of the same.

**5.3.11 Shoring of buildings**

The Contractor shall shore up all buildings, walls and other structures, the stability of which is liable to be endangered by the execution of the work and shall be fully responsible for all damages to persons or property resulting from any accident.

**5.3.12 Removal of water from sewer, trench etc**

- a) The Contractor shall at all times during the progress of the work keep the trenches and excavations free from water which shall be disposed of by him in a manner as will neither cause injury to the public health nor to the public or private property nor to the work completed or in progress nor to the surface of any roads or streets, nor cause any interference with the use of the same by the public.
- b) If any excavation is carried out at any point or points to a greater width than the specified cross section of the sewer with its envelope, the full width of the trench shall be filled with concrete by the Contractor at his own expenses and charges to the requirements of the Engineer-in-Charge.

**5.3.13 Width of trench**

The Engineer-in-Charge shall have power by giving an order in writing to the Contractor to increase the maximum width in respect of which payment will be allowed for excavation in trenches for various classes of sewer, manholes, and other works in certain lengths to be specifically laid down by him, where on account of bad ground or other unusual conditions, he considers that such increased widths are necessary in view of the site conditions.

**5.3.14 Recommended width of trenches at the bottom shall be as follows:-**





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100 mm dia pipe	55 cms
150 mm dia pipe	55 cms
225-250 cms dia pipe	60 cms
300 mm dia pipe	75 cms

Maximum width of the bed concrete shall also be as above. No additional payment is admissible for widths greater than specified.

**5.4 Salt glazed stoneware pipes**

5.4.1 Stoneware pipes shall be of first class quality salt glazed and free from rough texture inside and outside and straight. All pipes shall have the manufacturers name marked on it and shall comply with I.S. 651-1971 approved makes Perfect or Burn.

**5.4.2 Laying and jointing of stoneware salt glazed pipes**

- a) Pipes are liable to be damaged in transit and without standing tests that may have been made before dispatch each pipe shall be examined carefully on arrival at site. Each pipe shall be rung with a wooden hammer or mallet and those that do not ring true and clear shall be rejected. Sound pipes shall be carefully stacked to prevent damage. All defective pipes should be segregated, marked in a conspicuous manner and their use in the works prevented.
- b) The pipes shall be laid with sockets leading uphill and should rest on solid and even foundations for the full length of the barrel. Socket holes shall be formed in the foundation sufficiently deep to allow the pipe jointer room to work right round the pipe and as short as practicable to admit the socket and allow the joint to be made.
- c) Where pipes are not bedded on concrete the trench bottom shall be left slightly high and carefully bottomed up as pipe laying proceeds so that the pipe barrels rest on firm ground. If excavation has been carried too low it shall be made up with cement concrete at the Contractor's cost and Charges.
- d) If the bottom of the trench consists of rock or very hard ground that cannot be easily excavated to a smooth surface, the pipes shall be laid on cement concrete bed to ensure even bearing.

**5.4.3 Jointing of pipes**

- a) Tarred gaskin shall first be wrapped round the spigot of each pipe and the spigot shall then be placed into the socket of the pipe previously laid, the pipe shall then be adjusted and fixed in its correct position and the gaskin caulked tightly home so as to fill not more than one quarter of the total length of the socket.





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- b) The remainder of the socket shall be filled with stiff mix of cement mortar (1 cement: 1 clear sharp washed sand). When the socket is filled, a fillet should be formed round the joint with a trowel forming an angle of 45 degrees with the barrel of the pipe. The mortar shall be mixed as needed for immediate use and no mortar shall be beaten up and used after it has begun to set.
- c) After the joint has been made any extraneous materials shall be removed from inside of the joint with a suitable scraper of "badger". The newly made joints shall be protected until set, from the sun, drying winds, rain or dust. Sacking or other materials, which can be kept damp, shall be used. The joints shall be exposed and space left all round the pipes for inspection by the Engineer-in-Charge. The inside of the sewer must be left absolutely clear in bore and free from cement mortar or other obstructions throughout its entire length, and shall efficiently drain and discharge.

## **5.5 Testing**

- a) All lengths of the sewer and drain shall be fully tested for water tightness by means of water pressure maintained for not less than 30 minutes. Testing shall be carried out from manhole to manhole. All pipes shall be subjected to a test pressure of at least 1.5 meter head of water. The test pressure shall, however, not exceed 6 meter head at any point. The pipes shall be plugged preferably with standard design plugs with rubber plugs on both ends. The upper end shall, however, be connected to a pipe for filling with water and getting the required head.
- b) Sewer lines shall be tested for straightness by:
  - i) inserting a smooth ball 12 mm less than the internal diameter of the pipe. In the absence of obstructions such as yarn or mortar projecting at the joints the ball should roll down the invert of the pipe and emerge at the lower end,
  - ii) means of a mirror at one and a lamp at the other end. If the pipe line is straight the full circle of light will be seen otherwise obstruction of deviation will be apparent.
- c) The Contractor shall give a smoke test to the drains and sewer at his own expense and charges, if directed by the Engineer-in-Charge.
- d) A test register shall be maintained which shall be signed and dated by Contractor, Engineer-in-Charge and representative of Architects/Consultants.

## **5.6 Gully traps**

- 5.6.1 Gully traps shall be of the same quality as described for stoneware pipes in clause 5.



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- 5.6.2 Gully traps shall be fixed in cement concrete 1:5:10 mix and a brick masonry chamber 30x30 cms inside in cement mortar 1:5 with 15x15 cms grating inside and 30x30 cms C.I. sealed cover and frame weighing not less than 7.3 kg to be constructed as per standard drawing. Where necessary, sealed cover shall be replaced with C.I. grating of the same size (1 cement: 5 coarse sand: 10 stone aggregate 40 mm nominal size)

**5.7 Reinforced cement concrete pipes**

- 5.7.1 All underground storm water drainage pipes and sewer lines where specified (other than those specified cast iron) shall be centrifugal spun RCC pipes of specified class. Pipes shall be true and straight with uniform bore, throughout. Cracked, warped pipes shall not be used on the work. The manufacturer shall test all pipes and the Contractor shall produce, when directed a certificate to that effect from the manufacturer.

**5.7.2 Laying**

R.C.C. spun pipes shall be laid on cement concrete bed or cradles as specified and shown on the detailed drawings. The cradles may be precast and sufficiently cured to prevent cracks and breakage in handling. The invert of the cradles shall be left 12 mm below the invert level of the pipe properly placed on the soil to prevent any disturbance. The pipe shall then be placed on the bed concrete or cradles and set for the line and gradient by means of sight rails and bonding rods etc. Cradles or concrete bed may be omitted, if directed by the Engineer-in-Charge.

**5.7.3 Jointing**

After setting out the pipes the collar shall be centered over the joint and filled in with tarred gaskin, so that sufficient space is left on either side of the collar to receive the mortar. The space shall then be filled with cement mortar 1:2 (1 cement: 2 fine sand) and caulked by means of proper tools. All joints shall be finished at an angle of 45 degrees to the longitudinal axis of the pipe on both sides of the collars neatly.

**5.7.4 Testing**

All pipes shall be tested to a hydraulic test of 1.5 m head for at least 30 minutes at the highest point in the section under test. Smoke test shall be carried out by the Contractor similar to those for stoneware pipes given above, if directed by the Engineer-in-Charge, at the expense and charges of the Contractor. A test register shall be maintained which shall be signed and dated by Contractor,/Engineer-in-Charge and representative of Architects/ Consultant.

**5.8 Cement concrete and masonry works (for manholes and chambers etc.)**

**5.8.1 Materials**

**a) Water**

Water used for all the constructional purposes shall be clear and free from oil, acid, alkali, organic and other harmful matters, which can



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deteriorate the strength and/or durability of the structure. In general, the water suitable for drinking purposes shall be considered good enough for constructional purpose.

- b) Aggregate for concrete  
The aggregate for concrete shall be in accordance with I.S.383 and I.S. 515.in general, these shall be free from all impurities that may cause corrosion of the reinforcement.

Before actual use these shall be washed in water, if required as per the direction of Engineer-in-Charge. The size of the coarse aggregate shall be done as per I.S.383.

- c) Sand  
Sand for various constructional purposes shall comply in all respects with I.S. 650 and I.S. 2116. It shall be clean, coarse hard and strong, sharp, durable, uncoated, free from any mixture of clay, dust, vegetable matters, mica, iron impurities soft or flaky and elongated particles, alkali, organic matters, salt, loam and other impurities which may be considered by the Engineer-in-Charge as harmful for the construction.
- d) Cement  
The cement used for all the constructional purposes shall be ordinary Portland cement or rapid hardening Portland cement conforming to I.S.269.
- e) Mild steel reinforcement  
The mild steel for the reinforcement bars shall be in the form of round bars conforming to all requirements of I.S. 432 grade I.
- f) Bricks  
Brick shall have uniform color, thoroughly burnt but not over burnt, shall have plain rectangular faces with parallel sides and sharp right angled edges. They should give ringing sound when struck. Brick shall not absorb more than 20% to 22% of water, when immersed in water for 24 hours. Bricks to be used shall be approved by the Engineer-in-Charge.
- g) Other materials  
Other materials not fully specified in these specifications and which may be required in the work shall conform to the latest I.S.. All such materials shall be approved by the Engineer-in-Charge before use.

#### 5.8.2 Cement concrete (plain or reinforced)

- a) Cement concrete pipes bedding, cradles, foundations and R.C.C. slabs for all works shall be mixed by a mechanical mixer where quantities of the concrete poured at one time permit. Hand mixing on properly constructed platforms may be allowed for small quantities by the Engineer-in-Charge.



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Rate for cement concrete shall be inclusive of all shuttering and centering at all depth and heights.

- b) Concrete work shall be of such thickness and mix as given in the Schedule of Quantities.
- c) All concrete work shall be cured for a period of atleast 7 days. Such work shall be kept moist by means of gunny bags at all times. All pipes trenches and foundations shall be kept dry during the curing period.

### **5.9 Masonry work**

Masonry work for manholes, chambers, septic tanks, and such other works as required shall be constructed from 1st class bricks or 2nd class as specified in the Schedule of quantities in cement mortar 1:5 mix (1 cement: 5 coarse sand). All joints shall be properly raked to receive plaster.

### **5.10 Cement concrete for pipe support**

- a) Wherever specified or shown on the drawings, all pipes shall be supported in bed all round or in haunches. The thickness and mix of the concrete shall be given in the Schedule of Quantities. Width of the bedding shall be as per para 4.14.
- b) Unless otherwise directed by the Engineer-in-Charge cement concrete for bed, all round or in haunches shall be laid as per CPWD specifications 1977.
- c) R.C.C. pipes or C.I. pipes may be supported on brick masonry or precast R.C.C. or in situ cradles. Cradles shall be as shown on the drawings.
- d) Pipes in loose soil or above ground shall be supported on brick or stone masonry pillars as shown on the drawings.

### **5.11 Manholes and chambers**

5.11.1 All manholes, chambers & other such works as specified shall be constructed in brick masonry in cement mortar 1:5 (1 cement: 5 coarse sand) or as specified in the Schedule of Quantities.

5.11.2 All manholes and chambers, etc. shall be supported on base of cement concrete of such thickness and mix as given in the Schedule of Quantities or shown on the drawings. Sizes of the manhole shall be as per CPWD specifications.

5.11.3 All manholes shall be provided with cement concrete benching in 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nom. Size). The benching shall have a slope of 10 cms towards the channel. The depth of the channel shall be full diameter of the pipe. Benching shall be finished with a floating coat of neat cement.



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5.11.4 All manholes shall be plastered with 12/15 mm thick cement mortar 1:3 (1 cement: 3 coarse sand) and finished with a floating coat of neat cement inside. Manhole shall be plastered outside as above but with rough plaster.

5.11.5 All manholes with depths greater than 1 m. shall be provided with 20 mm square or 25 mm round rods catch rings set in cement concrete blocks 25x10x10 cms in 1:2:4 mix 30 cms vertically and staggered. Foot rests shall be coated with coal tar before embedding.

5.11.6 All manholes shall be provided with cast iron covers and frames embedded in reinforced cement concrete slab. Weight of cover, frame and thickness of slab shall be as specified in the Schedule of Quantities or given above.

**5.12 Septic tank and soak pits**

5.12.1 Since the area is unsewered, it is proposed to discharge the sewage from the house in a septic tank and the effluent from the same shall be disposed off to sub-surface disposal system in form of soak pits.

5.12.2 Septic tank construction material shall be similar to manholes as described in para 7 above. The size of the septic tank shall be as given in the schedule of quantities.

5.12.3 Every septic tank shall be provided with C.I. cover of adequate strength. The cover and frame shall be 500 mm dia (Medium duty) minimum. Every septic tank shall also be provided with a ventilating pipe of minimum 50 mm diameter.

5.12.4 Before the tank is commissioned for use, it shall be tested for water tightness by filling it up with water and allowing it to stand for 24 hours. It shall then be topped up, if necessary, and allowed to stand for a further period of 24 hours, during which time the fall in the level of water shall not be more than 1.5 cm.

5.12.5 The septic tank shall be filled with water to its outlet level before the sewage is let into the tank. It shall, preferably, be seeded with small quantities of well digested sludge obtained from septic tanks or sludge digestion tanks. In the absence of digested sludge a small quantity of decaying organic matter may be introduced.

5.12.6 The effluent from septic tank shall be discharged into a soak pit. The soak pit shall have a honey comb dry brick shaft 45x45 cm and of depth as given in the specifications. Round the shaft and within the radius of 60 cm shall be placed well burnt brick bats. Brick ballast of size from 50 to 80 mm nominal size shall be packed round the brick bats upto the radius of 90 cm. The remaining portion shall be filled with brick ballast of 40 mm nominal size. The construction of shaft and filling of the bats and the ballast shall progress simultaneously. Over the filling shall be placed a single matting, which shall be covered with minimum layer of 7.5 cm earth. The shaft shall be covered with 7.5 cm thick stone or RCC slab. 10 cm wide and 10 cm deep brick edging with first class bricks shall be provided round the pit.



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**5.13 Measurement**

**5.13.1 Excavation**

5.13.2 Measurement for excavation of pipe trenches shall be made per linear meter under the respective category of soil classification encountered at site:

- A) Ordinary soil
- B) Hard soil (hard murum & soft rock)
- C) Hard rock requiring chiseling
- D) Hard rock requiring blasting.

5.13.3 Trenches shall be measured between outside walls of manholes at top and the depth shall be the average depth between the two ends to the nearest cm. The rate quoted shall be for a depth upto 1.5 m or as given in the Schedule of Quantities.

5.13.4 Payment for trenches more than 1.5 m in depth shall be made for extra depth as given in the schedule of quantities and above the rate for depth upto 1.5 m.

5.13.5 Timbering and Shoring as described above shall be measured per sq.mt. and paid for as per the type of timbering of shoring done at site and as per the relevant item in the Schedule of Quantities. Rate for timbering and shoring shall be for all depths and types of soil classifications including saturated soil.

**5.13.6 Saturated Soil**

No extra payment for pumping and bailing out water shall be made for excavation with an average depth of 1.5 m in saturated soil, surface water from rain falls or broken pipes lines or sewers and other similar sources. An extra rate as quoted in the schedule of quantities shall be paid for excavation in saturated soil for pipe trenches above average depth of 1.5 m. No payment is admissible for water collected from surface sources and broken pipe lines or sewers.

5.13.7 Refilling, Consolidation and Disposal of Surplus Earth Rate quoted for excavation of trenches shall be inclusive of refilling, consolidation and disposal of surplus earth within a lead of 200 m.

5.13.8 Stoneware Pipes/RCC/C.I. pipes shall be measured for the finished length of the pipeline per linear meter i.e.

- (a) Lengths between manholes shall be recorded from inside of one manhole to inside of other manhole.
- (b) Length between gully trap and manhole shall be recorded between socket of pipe near gully trap and inside of manhole. Rate shall include all items given in the schedule of quantities and specifications.

5.13.9 Gully Traps shall be measured in numbers and rate shall include all excavation, foundation, concrete, brick masonry, cement plaster inside and outside, C.I. grating and sealed cover and frame.



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**5.13.10 Cement Concrete for Pipes**

Cement concrete in bed and all round or in haunches shall be paid per running meter between the outside wall of manholes at bottom of the trench. No additional payment is admissible in respect of concreting done for widths greater than specified, for shuttering or centering and concreting in sub-soil water conditions.

**5.13.11 Manholes**

- a) All manholes shall be measured by numbers and shall include all items specified above and necessary excavation, refilling & disposal of surplus earth.
- b) Manholes with depths greater than specified under the main item shall be paid for under "extra depth" and shall include all items as given for manholes. measurement shall be done to the nearest cm. Depth of the manholes shall be measured from top of the manhole cover to bottom of channel.

5.13.12 Septic tanks and soak pits shall be enumerated and shall include the cost of materials and labor involved in all the operations described above.

**6.0 WATER SUPPLY PUMPS & ANCILLARIES**

**6.1 Scope of work**

Work under this section consists of furnishing all labor, materials, equipment and appliances necessary and required to supply install and commission the water supply pumps & accessories as described hereinafter and given in the Schedule of Quantities and/or shown on the drawings.

**6.2 General requirements**

6.2.1 All materials shall be new of the best quality conforming to specifications and subject to the approval of Engineer-in-Charge.

6.2.2 All equipment shall be of the best available make, manufactured by reputed firms.

6.2.3 All equipment shall be installed on suitable foundations, true to level and in a neat workman like manner.

6.2.4 Equipment shall be installed so as to provide sufficient clearance between the end walls and between equipment to equipment.

**6.3 Pumping sets**

6.3.1 Water supply pumps shall be suitable for fresh water. Pumps shall be single stage, mono-block horizontal centrifugal pumps with cast iron body and gunmetal/bronze impeller, stainless steel shaft mechanical seal and coupled to a





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TEFC electric motor. Each pump should operate upto a curve-10m below specified head. The pump shall be of submersible type.

6.3.2 Motor shall be totally enclosed fan cooled induction motor of required H.P. The motor shall be suitable for 400/440 volts, 3 phase, 50 cycles A.C power supply and shall conform to I.S. 325.

6.3.3 Pressure Gauge  
Each pumping set shall be provided with a 150 mm dia. Gunmetal "Bourden" type pressure gauge with gunmetal isolation cock and connecting piping.

6.3.4 Vibration Pads  
Provide vibration eliminating pads appropriate for each pump.

**6.4 Cables**

6.4.1 Contractor shall provide all power and control cables from the motor control center to various motors.

6.4.2 Cables shall conform to I.S. 1554 and carry ISI mark.

6.4.3 Wiring cables shall conform to IS 694.

6.4.4 All power and wiring cables shall be aluminum conductor PVC insulated armored and PVC sheathed of 1100 volts grade.

6.4.5 All control cables shall be copper conductor PVC insulated armored and PVC sheathed 1100 volt grade.

6.4.6 All cables shall have stranded conductors. The cables shall be in drums as far as possible and bear manufacturer's name.

6.4.7 All cable joints shall be made in an approved manner as per standard practice.

**6.5 Earthing**

All equipment installed by the contractor shall be suitably earthed by making proper connection by means of G.I. strip to the main earthing system laid by the electrical contractors.


**6.6 Measurement**

6.6.1 G.I. pipes shall be measured per linear meter of the finished length and shall include all fittings, jointing, clamps for fixing to walls or hangers and testing.

6.6.2 Suction and delivery headers shall be measured per linear meter of finished length and shall include all items as given in the Schedule of Quantities. Painting shall be included in the rate of headers.

6.6.3 Pumps shall be measured by numbers and shall include all items as given in the specifications and Schedule of Quantities.



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- 6.6.4 Motor control panels, earthing station, vibration eliminators, and suction strainer shall be measured by numbers and shall include all items as given in the Schedule of Quantities and specifications.



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### LIST OF APPROVED MAKES OF MATERIALS

S.No.	Materials	I.S. No.	Brand Name	Manufacturer
1.	Vitreous Sanitaryware China	2556 (Part 1 to 16)	Parry	E.I.D. Parry(India)Ltd. Madras
			Hindustan	Hindustan Sanitaryware & Industries, Bahadurgarh
			Cera	Madhusudan Ceramics Ahmedabad
2.	Stainless Steel Sinks		AMC	Ashok Mfg. Co. New Delhi
			Neelkanth	Neelkanth Mfg. Co. New Delhi
			Jayna	Jain Brothers, New Delhi
3.	C.P. Fittings		Parko	Prakash Brassware Ind., New Delhi
			GEM	GEM Sanitary Appliances Pvt. Ltd. Delhi.
4.	Autoflush valves & taps		ROBO	AOS Systems New Delhi
			TOSHI	Toshi Automatic Systems, Ghaziabad
5.	C.P. Accessories, waste fittings		ESS ESS	Ess Ess Bathroom Products Pvt. Ltd. Panchkula (Haryana)
			Lotus	D.P. Gupta & Co. New Delhi
			Orient	Venus Metal Ind., Delhi
6.	Soil, Waste & Rainwater Pipes & fittings			
	a) Sand Cast	1729	RIF	Raj Iron Foundry, Agra
			BIC	Bengal Iron Co., Kolkata
	b) PVC Pipe	4985	SUPREME	Supreme Industries, Bombay



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S.No.	Materials	I.S. No.	Brand Name	Manufacturer
			PRINCE	Selfshine Industries Bombay
7.	G.I. Pipes/M.S. Pipes	1239	TATA	TISCO- Tubes Div., Jamshedpur.
		3589	Jindal	
8.	G.I. Fittings (malleable cast iron)	1879	R	R.M. Engg. Works, Ahmedabad.
			KS	K.S. Engg. Works, Ghaziabad.
9.	Ball Valves (Bronze)		Zoloto	Zoloto Industries, Jalandhar
			Italvolvole	Gujarmal Ganpat Rai, New Delhi
10.	Composite pipes and fittings		KiTEC	KiTEC Ind., Baroda
11.	Gunmetal valves & Cocks works		Leader	Leader Engg. W Jalandhar.
			Zoloto	Zoloto Industries, Jalandhar
12.	C.I. S/S pipes	1536	Kesoram	Kesoram Spun Pipe & Foundries, Kolkata.
			Electrosteel	Electrosteel Casting Ltd. West Bengal
13.	C.I. double flanged sluice Valves, Non Return Valve	780	Kirloskar	Kirloskar Bros. Ltd. Pune
		5312	Leader	Leader Engg. Works Jalandhar
14.	Butterfly Valve		AUDCO	L&T, Bombay
15.	Suction Strainer		Leader	Leader Engg. Works Jalandhar
			Kirloskar	Kirloskar Bros. Pune
16.	Electrical cables		CCI, Fort and Gloster, Finolex	
17.	Pressure gauges		Fiebig H. Guru	
18.	Clear Water Pumps		Best & Crompton, Kirloskar, Mather & Platt	



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S.No.	Materials	I.S. No.	Brand Name	Manufacturer
19.	Motors		NGEF, Kirloskar, Siemens, Crompton Greaves	
20.	Vibration Eliminator		Resistoflex, Noida	
			D Wren, Calcutta	
21.	Electrical Switch Gear & Starters.		Siemens, L & T, Cutler Hammer, English Electric.	
22.	Single Phasing Preventor		L & T, English Electric, Siemens.	
23.	Liquid Level Controllers		Minilec Water Manager (Femack) Silver Spark	
24.	Stoneware Pipes & Gully Traps	651	Perfect	Perfect Potteries Jabalpur
			HCI	
25.	R.C.C. pipes	458		Lakshmi, New Delhi, Sood & Sood, New Delhi, Jain & Co.
26.	HDPE pipes and fittings		HASTI	NOCIL, Bangalore
			ORI-PLAST	Ori-plast Ltd., Balasore Aaw (Orissa)




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### **SECTION – III: ELECTRICAL & ILLUMINATION WORKS**

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## LIST OF SPECIFICATION

CONTRACTOR shall carry out the work strictly in accordance with the following specifications enclosed: -

1. SPECIFICATION FOR L.T. POWER DISTRIBUTION BOARD
2. SPECIFICATION FOR EARTHING
3. SPECIFICATION FOR CABLING
4. SPECIFICATION FOR D.G. SET
5. SPECIFICATION FOR LIGHTING FITTINGS FOR HAZARDOUS, INDOOR AND SAFE AREA
6. SPECIFICATION FOR SPLIT AIR CONDITIONING SYSTEM
7. SPECIFICATION FOR ELECTRICAL WORK- GENERAL
8. SPECIFICATION FOR U.P.S. SYSTEM AND BATTERY SET



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## **1.SPECIFICATION FOR L.T. POWER DISTRIBUTION BOARD**



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## **C O N T E N T S**

- 1.0 ELECTRICAL DESIGN
- 2.0 INSULATION LEVEL
- 3.0 FUNCTIONAL UNITS
- 4.0 CONSTRUCTION FEATURES
- 5.0 BUSBARS & CONNECTIONS
- 6.0 EXTERNAL TERMINATIONS
- 7.0 COMPONENTS





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**1.0 ELECTRICAL DESIGN**

Electric Power Supply

- Rated main circuit voltage  $415 \pm 10\%$ ,  $50\text{Hz} \pm 5\%$ , solidly grounded neutral.

**2.0 INSULATION LEVEL**

- Rated insulation voltage 660V
- One minute power frequency withstands voltage: 2.5 kV for power circuits and 2 kV for control circuits.
- Clearance in air of live parts: phase to phase: 25.4mm, phase to earth: 19.4mm.

**2.1 Short Circuit Strength**

Horizontal and vertical buses with one second rating not less than the symmetrical short circuit level specified.

**3.0 MADE-UP OF FOLLOWING FUNCTIONAL UNITS**

**3.1 Incomer**

- Load break switch
- Voltmeter (on line side) with 4 position selector switch
- Ammeter one for each phase
- Indicating lamps for each phase, busbar side.

**3.2 Outgoing Feeders**

- Switch fuse units of 32/63 Amps.
- Removable neutral link to be provided for neutral connection
- DOL starter feeders as specified.

**4.0 CONSTRUCTION FEASTURES**

**4.1 Mechanical Design**

- Non draw out type floor mounted.
- Sheet steel clad, floor mounted, freestanding design
- Minimum sheet steel thickness: Doors & covers - 1.6mm cold rolled and other members - 2.0mm
- Degree of protection IP 54
- Assembled on base channel of structural steel/ frame of minimum height 50mm and 2.5mm thickness painted black.
- Earthed metallic barriers between compartments and between vertical sections.
- Zinc bichromated and passivated hardware
- Transport unit not longer than 3.2 meters.
- Removable lifting arrangement for each transport unit
- Extendibility on both sides.
- Removable sheet steel covers at rear
- Cable entry from bottom, 2mm thick removable and un-drilled gland plates



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- All built up and wired modules or vacant cubicles/ chambers shall be of size so as to accommodate standard modules.

#### **4.2 Labels**

- PDB designation nameplate shall be at the centre of the board with letters not less than 2.5mm high. Panel identification/ designation number shall be on each panel at the top, both in front and rear.
- Warning labels "**CAUTION EXTERNAL VOLTAGE**" for terminal blocks where voltage appears from external source.
- Labels made of non-rusting metal or 3 ply lamicaid with engraved inscriptions of white letters (minimum 3mm high) on black-ground.
- Label designation and size of lettering subject to approval.

#### **4.3 Surface Treatment**

All metal parts of the panel to undergo surface treatment that includes cleaning, chemical degreasing, pickling in acid, cold rinsing, phosphating and passivating followed by spraying with two coat of epoxy based primer & two coats of epoxy based paint of approved colour & shade.

#### **5.0 BUSBAR & CONNECTIONS**

- Three phase, Neutral and earth buses unless otherwise specified.
- Power and earth buses of EC grade aluminium alloy equivalent to E91E WP as per IS-5082 or high conductivity electrolytic grade copper as per IS-613.
- Phase identification by color in each panel (red, yellow, blue for phase and black for neutral).

#### **6.0 EXTERNAL TERMINATIONS**

- Extension bus links properly spaced for terminating single cable of size 120 sq. mm and above as well as for terminating multiple cables.
- Crimping type tinned, heavy duty copper lugs for power and control cables.
- Power terminal blocks to be provided with covers.

#### **7.0 COMPONENTS**

##### **7.1 Air Break Switch Fuse Units**

- Air break, triple pole, switch, confirming to IS Specification
- HRC fuse links as per requirement
- Utilization category AC23.
- Auxiliary contacts - 1 No & 1 NC



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**7.2 Power Contactor**

- Air break, triple pole confirming to IS Specification.

**7.3 Thermal Overload Relays**

- Triple pole, ambient temperature compensated, inverse time lag conforming to IS-8544.
- Built in single phasing protection.
- Setting range step-less adjustable in range 70% to 110%.

**7.4 Auxiliary Contactors**

- 4 Contacts 2 No. + 2 NC
- Continuous rating - 10 Amp

**7.5 Indicating Instruments**

- Accuracy class - 1.5
- Ammeter with normal scale upto full load and suppressed scale for motor starting current.
- Size : 96 x 96mm for incomer  
72 x 72mm for motor feeder
- Voltmeter protected with HRC fuses

**7.6 Indicating Lamps**

- 7 watts screw type filament lamps with series connected resistors, preferably built-in the lamp assembly.
- Colour  
ON-Red; OFF - Green; CIRCUIT HEALTHY - White; FAULTY/ WARNING - Amber, RED - YELLOW - BLUE for Incomer.



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## 2.SPECIFICATION FOR EARTHING



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## **C O N T E N T S**

- 1.0 SCOPE
- 2.0 STANDARDS
- 3.0 EARTHING CONDUCTOR/ELECTRODE
- 4.0 EARTHING NET WORK
- 5.0 INSTALLATION OF EARTH ELECTRODE
- 6.0 CONNECTION
- 7.0 TESTING
- 8.0 TEST PROFORMA



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- 1.0 SCOPE :  
The intent of this specification is to define the requirements for the supply, installation, testing, and commissioning of the Earthing System.
- 2.0 STANDARDS :  
The work shall be carried out in the best workmanlike manner in conformity with this specification, the relevant specifications/codes of practice of Indian Standard Institution, approved drawings and instructions of the Engineer-in-Charge or his authorized representative issued from time to time. In case of any conflict between the standards, the instructions of Engineer-in-Charge shall be binding.
- 3.0 CONDUCTOR ELECTRODE:  
The main grid conductor shall be hot dip galvanized G.I. Flat or PVC insulated aluminum conductor/copper conductor. Sizes for main conductors shall be marked on the drawings. Thickness of hot dip galvanizing shall not be less than 75 microns.
- 4.0 EARTHING NETWORK:
- 4.1 The earthing installation shall be done in accordance with the earthing drawings, specifications and the standard drawings of reference attached with this document. The entire earthing system shall fully comply with the Indian Electricity Act and Rules framed thereunder. The contractor shall carry out any changes desired by the Electrical Inspector or the owner, in order to make the installation conform to the Indian Electricity Rules at no extra cost. The exact location on the equipment shall be determined in field, in consultation with the Engineer-in-Charge or his authorised representative. Any changes in the methods, routing, size of conductors etc. shall be subject to approval of the Owner/Engineer-in-Charge before execution. Excavation and refilling of earth, necessary for laying underground earth bus loops shall be the responsibility of the contractor.
- 4.2 The earth loop impedance to any point in the electrical system shall have a value which will ensure satisfactory operation of protective devices.
- 4.3 The main earth loop shall be laid at a depth of 500 mm below grade level. Wherever cable trenches are available, the earth lead shall be laid in the trenches and shall be firmly cleated to the walls of concrete lined trenches. The earthing strip shall be protected against mechanical damage.
- 4.4 In process unit areas, the earthing cable shall be run along cable trays wherever specified in the layout drawings. The earthing cable shall be suitably cleated and electrically bonded to the cable tray at regular intervals.
- 4.5 Joints and tappings in the main earth loop shall be made in such a way that reliable and good electrical connections are permanently ensured. All joints below grade shall be welded and suitably protected by giving two coats of bitumen and covering with hessian tape. All joints above ground shall be by



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- means of connectors/lugs as far as practicable. Tee connectors shall be used for tapping, earth leads from the main earth loop wherever it is installed above ground. Earthing plates shall be provided for earthing of two or more equipment at a place from earth grid. Where aluminium cable risers are to be connected to the underground GI earth bus, the aluminium cable riser shall be taken to the nearest earth pit and terminated through a bolted joint. If this is not practicable, then a G.I. risers shall be brought above grade and a bolted joint shall be made between this GI riser and the aluminium cable termination. This G.I. Riser shall be protected applying two coats of bituminous paint/bitumen on the exposed portion.
- 4.6 Conduits in which cables have been installed, shall be effectively bonded and earthed. Cable armours shall be earthed at both ends.
- 5.0 EARTH ELECTRODES:
- 5.1 Earth pipe electrodes shall be installed as shown in the earthing layout drawings and in accordance with the standard drawings of reference and IS:3043. Their location shall be marked to enable accurate location by permanent markers.
- 5.2 All earth electrodes shall preferably be driven to sufficient depth to reach permanently moist soil. Electrodes shall preferably be situated in a soil which has a fine texture and which is packed by watering and ramming as tightly as possible. Wherever practicable, the soil shall be dug up, all lumps broken and stones removed from the immediate vicinity of the electrodes.
- 5.3 All earth electrodes shall be tested for earth resistance by means of standard earth test meter. The tests shall take place in dry months, preferably after a protracted dry spell. If necessary, a number of electrodes shall be connected in parallel to reduce the earth resistance. The distance between two electrodes shall not be less than twice the length of electrode.
- 5.4 The electrodes shall have a clean surface, not covered by paint, enamel, grease or other materials of poor conductivity.
- 5.5 The exact location and number of earth electrodes required at each location shall be determined in the field in consultation with the owner/Engineer-in- Charge, depending on the soil strata and resistivity, to meet the ohmic values prescribed in clause 5.3. Earth Electrodes shall be located avoiding interference with road, building foundation, column etc. Individual earth electrode shall be provided for each lightning arrestor and lightning mast. The electrodes shall be so placed that all lightning protective earths may be brought to earth electrode by a short and straight a path as possible to minimise surge impedance.
- 5.6 The disconnect facility shall be provided for the individual earth pits to check their earth resistance periodically. All the earth electrodes shall be suitably numbered and this should be indicated in as built drawings.



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**6.0 CONNECTION:**

6.1 All electrical equipment is to be doubly earthed by connecting two points on equipment to a main earthing ring. The earthing ring will be connected via links to several earth electrodes. The earth grid formed shall be a closed loop as shown in the drawing with earth electrodes connected to the grid with double strip connection. The cable armour will be earthed through the cable glands.

6.2 In hazardous areas all major process equipments shall be connected to the earthing ring by means of anti- loosening connections and all pipe lines will be bonded and earthed on entering the battery limit of the process area.

6.3 The following shall be earthed.

1. Transformer neutrals, CT/PT neutrals.
2. Neutral Grounding Resistors.
3. Transformer Housing.
4. Lightning Arrestors.
5. All switchgear and their earth buses, bus duct.
6. Motor Frames.
7. Non-current carrying metallic parts of electrical equipment such as switchgear, switch racks, panel boards, motor control centres, lighting, power and instrument panels, push button stations, cable trays, pipes, conduits, terminal boxes, etc.
8. All fences, gates/enclosures, housing electrical equipment
9. All steel structures, rails etc. including bonding between sections.
10. Shield Wire
11. Structural steel and Columns.
12. Loading racks.
13. Lighting Mast, poles.
14. Lighting rods (Mast).
15. Tanks and vessels containing flammable materials.
16. Rotating parts of the agitators, pumps etc. through spring loaded brushes of suitable grade.
17. Earth continuity conductor shall be provided for flanges.

Conductor size for connection to various equipments shall be as indicated on Earthing Layout Drawings.

6.4 System shall be earthed by two distinct conductors directly connected to independent earth electrodes which in turn, shall be connected to the earth too.

The earth connection shall be properly made. A small flexible aluminium cable loops to bridge the top cover of the transformer and the tank shall be provided to avoid earth fault current passing through fastening bolts when there is a lightning surge, high voltage surge or failure of the bushings.

6.5 Each Lightning Arrestor shall be connected to a separate electrode located as close as possible to it and within the fenced area for each set of arrestors. The





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three nos. electrodes for each set of arrestors shall be spaced about 5 metres apart so that they are all within the enclosing fence. Each of these electrodes shall be connected to the main earth grid.

- 6.6 The shield wire shall be connected with the main grid solidly and not through supporting steel structures.
- 6.7 All paint, scale and enamel shall be removed from the contact surface before the earthing connections are made.
- 6.8 All earthing connections for equipment earthing shall be preferably from the earth plate mounted above ground. In case of G.I. Earth Loop all underground "T" connections shall be of the same size as main loop however in case of PVC insulated aluminium conductor loops underground joints shall be completely avoided. Connections to motors from earth plate or main loop conductor brought above ground shall not be less than following:
- i) No.8 SWG G.I. Wire upto 3.7 KW motors.
  - ii) 3/8" DIA G.I. FINE WIRE ROPE for all motors above 3.7 KW upto 30 KW with tinned copper lug at both ends or 35 mm<sup>2</sup> PVC insulated stranded aluminium conductor with crimped lug.
  - iii) 5/8" DIA G.I. FINE WIRE ROPE OR 70 mm<sup>2</sup> PVC insulated aluminium stranded conductor for motors above 30 KW upto 75 KW terminated as described above.
  - iv) For all motors above 75 KW conductor size shall be same as that of loop conductor with equivalent size flexible, if required.

Anchor bolts or fixing bolts shall not be used for earthing connection.

- 6.9 All hardware used for earthing installations shall be hot dip galvanized or zinc passivated. Spring washers shall be used for all earthing connections of equipment.
- 6.10 Lighting fixtures shall be earthed through the extra core provided in the lighting cable for this purpose.
- 7.0 TESTING:  
Earthing systems/connections shall be tested as follows:
- 7.1 Resistance of individual electrodes shall be measured after disconnecting it from the grid.
- 7.2 Earthing resistance of the grid shall be measured after connecting all the electrodes to the grid. The resistance between any point on the metallic earth grid and the general mass of earth shall not exceed 1 ohm.
- 7.3 The resistance to earth shall be measured at the following:
- a) At each electrical system earth or system neutral earth.



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- b) At each earth provided for structure lightning protections.
- c) At one point on each earthing system used to earth electrical equipment enclosures.
- d) At one point on each earthing system used to earth wiring system enclosures such as metal conduits and cable sheaths or armour.
- e) At one point on each fence enclosing electrical equipment.

Measurement shall be made before connection is made between the ground and the object to be grounded.

#### 8.0 TEST PROFORMA (INSTALLATION TESTING REPORT EARTHING INSTALLATIONS)

1. Earth system data
  - Type of electrode :
  - Total number of electrodes :
  - Main grid size :
  - Material :
2. General checks Put Tick  $\checkmark$  if O.K.; otherwise give details.

Construction of earth  
electrodes as per  
Standard.

Size of earth conductor  
for various equipment  
O.K. as per Standard.

Minimum distance kept  
between two electrodes.

Cleanliness and tightness  
of connectors.

Inspect bolted & clamped  
connectors.

3. TESTS
- 3.1 Measured earth resistance  
of each electrode in ohms

No. 1  
2  
3  
4  
5



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- 3.2 Measurement of earth grid resistance (with all electrodes connected to grid)
- a) At each electrical system : earth or system neutral earth.
  - b) At each point provided protection : for structure lightning
  - c) At one point on each to earth electrical equipment enclosure : earthing systems used
  - d) At one point on each to earth wiring systems such as metal conduits etc. : earthing systems used
  - e) At one point on each electrical equipment. : fence enclosing

4. Remarks:

PROJECT		UNIT	
TESTED BY	WITNESSED BY		DATE
CONTRACTOR	OWNER		

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### 3.SPECIFICATION FOR CABLING



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## **C O N T E N T S**

- 1.0 SCOPE
- 2.0 STANDARD
- 3.0 CABLE SPECIFICATIONS
- 4.0 MISCELLANEOUS MATERIALS SPECIFICATIONS
- 5.0 CABLE LAYING
- 6.0 TERMINATION
- 7.0 TESTING



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**1.0 SCOPE**

This is to define the requirements for supply, wherever applicable, the installation, testing and commissioning of the cabling system.

**2.0 STANDARDS**

The work shall be carried out in the best workman like manner in conformity with this specification, the relevant specifications, codes of practice of Indian Standards Institution, approved drawings and instructions of Engineer-in-Charge or his authorized representative issued from time to time. In case of any conflict between the standards, the instruction of Engineer-in-Charge shall be binding.

**3.0 CABLE SPECIFICATIONS**

**3.1 Power Cables**

Power cables for use on 415 V system shall be of 1100 Volts grade, aluminum stranded conductor, PVC insulated, extruded PVC inner sheathed, GI Wire /flat armored and overall FRLS PVC sheathed. Power cables for 3.3 KV 6.6 KV and 11 KV system shall be aluminum conductor, XLPL insulated, screened, PVC bedded galvanized steel flat armored and PVC sheathed cable. All L.T. Cables conform to standard specification and relevant sections of IS: 1554 Part-I and H.T. Cables shall conform to IS:7098 (Part II). Unarmored cables will be used wherever specified on the cable schedule.

**3.2 Control Cables:**

Control cables shall be 1100 Volt Grade, 2.5 mm<sup>2</sup> copper conductor PVC insulated, extruded PVC inner sheathed, GI Wire armored and overall FRLS PVC sheathed, as per IS: 1554 Pt. I. Unarmored cables shall be used wherever specified on the cable schedule.

**3.3 Communication cables:**

Communication cables shall comprise 1 pair unarmored, 2-pair, 5-pair and multipair armored cables of sizes as specified in the cable schedule. Minimum conductor size shall be 0.5 mm telephone system and 0.71 for plant communication system.

**4.0 MISCELLANEOUS MATERIALS SPECIFICATIONS**

**4.1 Connectors:**

Cable terminations shall be made with aluminum/tinned copper crimped type solder less lugs of M/s. Dowell's make or approved equivalent for all aluminum conductors and stud type terminals.

**4.2 Cable Identification**

Cable tags shall be of 2 mm thick, 20 mm wide aluminum strap of suitable length to contain cable number, equipment no., etc.

**4.3 Ferrules**



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Ferrules shall be of approved type size to suit core size mentioned and shall be employed to designate the various cores of control cable by the terminal numbers to which the cores are connected for case in identification and maintenance.

**4.4 Cable Glands:**

Cable glands to be supplied shall be nickel plated Brass double compression type of approved/ reputed make. Glands for classified hazardous areas shall be certified by CMRS .

**4.5 Cable Trays:**

This shall be either prefabricated hot dip galvanized sheet steel trays or site fabricated angle iron trays as specified elsewhere. Prefabricated hot dip galvanized sheet steel cable trays shall be used for maximum support span of 2000 mm unless design is approved for larger span. For requirements of larger than 750 mm width two trays shall be run side by side. Cable trays shall be suitable for a cable weight of 50 kg/meter running length of tray. Minimum thickness of sheet steel/galvanizing shall be 2mm/86 microns respectively.

Cable trays fabricated from standard rolled sections shall use 50x50x6 /ISMC 100 Sections for runners for supporting spans limited to 2000 mm/more than 2000 mm respectively. Cross support shall be 32 x 6 mm flat/ 25x25x6 angle for width upto 500 mm/ more than 500 mm respectively.

Vertical supports for both the above type of trays shall be fabricated out of ISMC 100 and horizontal supports with 75 x 50 x 6 angle iron/ ISMC 75 as approved by Engineer-in-Charge.

**5.0 CABLE LAYING**

**5.1** Cable network shall include power, control, lighting and communication cables, which shall be laid in trenches, cable trays or conduits as detailed in the relevant drawings and cable schedules. Erection of cable trays as required shall be checked after erection and marked in as built drawings. Cable routing given on the layout drawings shall be checked in the field to avoid interference with structures, heat sources, drains, piping, air-conditioning duct etc. and minor adjustments shall be done to suit the field conditions wherever deemed necessary without any extra cost.

**5.2** High voltage, medium voltage and other control cables shall be separated from each other by adequate spacing or running through independent pipes, trenches or cables trays, as applicable.

All communication cables (telephones, P.A.S.) RTD Cables shall run on instrument trays/ducts/trenches. Wherever these are not available, cables shall be taken in a separate trench with a minimum clearance of 300 mm away from electrical trench as per the direction of Engineer-in-Charge and



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Communication cables shall cross power cables at right angles.

All cable routes shall be carefully measured and cables cut to the required lengths, leaving sufficient lengths for the final connection of the cable to the terminal of the equipment. The various cable lengths cut from the cable reels shall be carefully selected to prevent undue wastage of cables. The quantity indicated in the cable schedule is only approximate. The contractor shall ascertain the exact requirement of cable for a particular feeder by measuring at site and avoiding interference with structure, foundation, pipelines or any other works. Before the start of cable laying, cable drum schedule; shall be prepared by electrician contractor and get that approved by Engineer-in-Charge to minimize/avoid straight through joints required. Contractor shall work out the actual number of straight through joints required.

- 5.4 Cables as far as possible shall be laid in complete, uncut lengths from one termination to the other.
- 5.5 Cables shall be neatly arranged in the trenches/trays in such a manner so that criss-crossing is avoided and final take off to the motor/switchgear is facilitated. Arrangement of cables within the trenches/trays shall be the responsibility of the Contractor. Cable routing between lined cable trench and equipment/motors shall be taken through GI pipe sleeves of adequate size. Pipe sleeves shall be laid at an angle of maximum 45° to the trench wall. In case of larger dia cables, i.e., 50 mm and above, adequately sized pipe with larger bend radius shall be provided for ease of drawing of cable or for replacement. In places where it is not possible, a smaller trench may be provided if approved by Engineer-in-Charge.
- 5.6 All cables will be identified close to their termination point by cable numbers as per cable schedule. Cable numbers will be punched on aluminium straps (2 mm thick) securely fastened to the cable and wrapped around it. Alternatively cable tags shall be circular in construction to which cable numbers can be conveniently punched.

Each underground cable shall be provided with identity tags of lead securely fastened every 30 m of its underground length with at least one tag at each end before the cable enters the ground. In unpaved areas, cable trenches shall be identified by means of markers as per standard drawing. These posts shall be placed at location of changes in the direction of cables and at intervals of not more than 30 M and at cable joint locations.

- 5.7 All temporary ends of cables must be protected against dirt and moisture to prevent damage to the insulation. For this purpose, ends of all PVC insulated cables shall be taped with an approved PVC or rubber insulating tape. Use of friction type or other fabric type tape is not permitted. Lead sheath cables shall be plumbed with lead alloy.





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- 5.8 RCC cable trenches shall be with removable covers. Cables shall be laid in 3 or 4 tiers in these trenches as indicated on the sectional drawings. Concrete cable trenches shall be filled with sand where specified to avoid accumulation of hazardous gases, RCC covers of trenches in process area shall be effectively sealed to avoid ingress of chemicals etc. Removal of concrete covers for purpose of cable laying and reinstating them in their proper positions after the cables are laid shall be done by the electrical Contractor at no extra cost.

Cables shall be handled carefully during installation to prevent mechanical injury to the cables. Ends of cables leaving trenches shall be coiled and provided with a protective pipe or cover, until such times the final termination to the equipment is connected.

- 5.9 Directly buried cables shall be laid underground in excavated cable trenches where specified in layout drawings. Trenches shall be of sufficient depth and width for accommodation of all cables correctly spaced and arranged with a view of heat dissipation and economy of design.

Minimum depth of buried cable trench shall be 750 mm for low voltage and 1000 mm for H.V. Cables, the depth and the width of the trench shall vary depending upon the number of layers of cables.

Cables shall be laid in trenches at depth as shown in the drawing. Before cables are placed, the trenches bottom shall be filled with a layer of sand. This sand shall be leveled and cables laid over it. These cables shall be covered with 150 mm of sand on top of the largest diameter cable and sand shall be lightly pressed. A protective covering of 75 mm thick second class red bricks shall then be laid flat. The remainder of the trench shall then be back-filled with soil, rammed and leveled.

- 5.10 As each row of cables is laid in place and before covering with sand every cable shall be given an insulation test in the presence of Engineer-in-Charge / Owner. Any cable which proves defective shall be replaced before the next group of cables are laid.

All wall openings / pipe sleeves shall be effectively sealed after installation of cables to avoid seepage of water inside building/ lined trench.

Where cables rise from trenches to motor, control station, lighting panels etc., they shall be taken in G.I. Pipes for mechanical protection upto a minimum of 300 mm above finished ground level.

Cable ends shall be carefully pulled through the conduits, to prevent damage to the cable. Where required, approved cable lubricant shall be used for this purpose. Where cable enters conduit the cable should be bent in large radius. Radius shall not be less than the recommended bending radius of the cables specified by the manufacturer.



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Following grade of the pipe fill shall be used for sizing the pipe size:

- |    |                  |   |          |
|----|------------------|---|----------|
| a) | 1 cable in pipe  | - | 53% full |
| b) | 2 cables in pipe | - | 31% full |
| c) | 3 or more cables | - | 43% full |
| d) | Multiple cables  | - | 40% full |

After the cables are installed and all testing is complete, conduit ends above grade shall be plugged with a suitable weatherproof plastic compound/ 'PUTTI' for sealing purpose. Alternatively G.I. Lidsor PVC bushes shall be employed for sealing purposes. The cost for the same shall be deemed to have been included in the installation of G.I. Pipe and no separate payment shall be allowed.

- 5.11 Where cables pass through foundation walls or other underground structures, the necessary ducts or openings will be provided in advance for the same. However, should it become necessary to cut holes in existing foundations or structures, the electrical contractor shall determine their location and obtain approval of the Engineer-in-Charge before cutting is done.
- 5.12 At road crossing and other places where cables enter pipe sleeves adequate bed of sand shall be given so that the cables do not slack and get damaged by pipe ends.
- 5.13 Drum number of each cable from which it is taken shall be recorded against the cable number in the cable schedule.
- 5.14 Cables installed above grade shall be run in trays, exposed on walls, ceilings or structures and shall be run parallel or at right angles to beams, walls or columns. Cables shall be so routed that they will not be subjected to heat from adjacent hot piping or vessels.
- 5.15 Individual cables or small groups which run along structures/walls etc., will be clamped by means of 10 SWG GI saddles on 25x6 mm saddle bars. The cost of saddle and saddle bars shall be deemed to have been included in the installation of cables and no separate payment shall be made on this account. Alternatively small group of cables can be taken through 100 mm slotted channel/ISMC 100.

They shall be rightly supported on structural steel and masonry, individual or in groups as required, if drilling of steel must be resorted to, approval must be secured and steel must be drilled where the minimum weakening of the structure will result.

Cables shall be supported so as to prevent unsightly sagging. In general distance between supports shall be approximately 300 mm for cables upto 25 mm diameter and maximum 450 mm for cables larger than 25 mm dia.



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- 5.16 All G.I. Pipes shall be laid as per layout drawings and site requirements. Before fabrication of various profiles of pipe by hydraulically operated bending machine (which is to be arranged by the contractor), all the burrs from the pipes shall be removed. GI Pipes with bends shall be buried in soil/concrete in such way that the bends shall be totally concealed. For G.I. Pipes buried in soil, bitumen coating shall be applied on the buried lengths. Installation of G.I. Pipes shall be undertaken well before paving is completed and necessary co-ordination with paving agency shall be the responsibility of Electrical Contractor. The open ends of pipes shall be suitably plugged with G.I. Plugs after they are laid in final position. G.I. Plugs shall be supplied by the Contractor at no extra cost.
- 5.17 Cable laid on supporting angle in cable trenches, structures, columns and vertical run of cable trays shall be suitably clamped by means of G.I. Saddles/Clamps, whereas cable in horizontal run of cable trays shall be tied by means of nylon cords.
- 5.18 Supporting steel shall be painted before laying of cables. The painting shall be done with one coat of red lead paint and two coats of approved bituminous aluminium paint unless otherwise specified.
- 6.0 TERMINATION
- 6.1 All PVC cables upto 1.1 KV grade shall be terminated at the equipments by means of double compression type cable glands. They shall have a screwed nipple with conduit electrical threads and check nut.
- All Cable entries shall be through bottom only and top entry terminations are made only after getting approval of Engineer-in-Charge.
- 6.2 Power cables wherever colour coding is not available shall be identified with red, yellow and blue PVC tapes. Where copper to aluminum connections are made, necessary bimetallic washers shall be used. For trip circuit identification additional red ferrules shall be used only in the particular cores of control cables at the termination points in the Switchgear/Control panels and Control Switches.
- 6.3 In case of control cables all cables shall be identified at both ends by their terminal numbers by means of PVC ferrules or Self-sticking cable markers. Wire numbers shall be as per schematic/ wiring /inter-connection diagram. Bidders shall have the samples of PVC ferrules/cable markers approved before starting the work. All unused spare cores of control cables shall be neatly bunched and ferruled with cable tag at both ends.
- 6.4 Where threaded cable gland is screwed into threaded opening of different size, suitable galvanized threaded reducing bushing shall be used of



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approved type, at no extra cost. All switchgear and control panels shall have undrilled gland plate.

Contractor shall drill holes for fixing glands wherever necessary at no extra cost. Gland plate shall be of non-magnetic material/aluminium sheet in case of single core cables.

- 6.5 The cable shall be taken through glands inside the panels or any other electrical equipment such as motors. The individual cores shall then be dressed and taken along the cable ways (if provided) or shall be fixed to the panels with polyethylene straps. Only control cables of single strand and lighting cables may be directly terminated on to the terminals.

In case of termination of cables at the bottom of a panel over a cable trench having no access from the bottom close fit hole should be drilled in the bottom plate for all the cables in one line, then bottom plate should be split in two parts along the centre line of holes. After installation of bottom plate and cables it should be sealed with cold setting compound. Cables shall be clamped over the open armoring to connect it to earth bus.

- 6.6 Cable leads shall be terminated at the equipment terminals, by means of crimped type solder less connectors as manufactured by M/s. Dowell Electro works or approved equivalent.

Crimping shall be done by hand crimping hydraulically operated tool and conducting jelly shall be applied on the conductor. Insulation of the leads should be removed immediately before the crimping. Conductor surface shall be cleaned and shall not be left open.


- 6.7 Cable accessories for H.V. Systems

- 6.7.1 The 11, 6.6 and 3.3 KV cables terminations joints shall be done by skilled and experienced jointers duly approved by the Engineer-in-Charge. Termination including supplying of jointing kit shall be threaded in Contractor scope unless specified otherwise.

- 6.7.2 The termination and straight thro' joint kit. For use on high voltage system shall be suitable for the type of cables red by the contractor or the type of cables issued by owner for installation. The materials required for termination and straight through joints shall be supplied in kit form. The kit shall include all insulating and sealing materials apart from conductor fitting and consumables items. An installation instruction shall be included in each sheet.

- 6.7.3 The termination kits shall be suitable for termination of the cables to an indoor switchgear or to a weatherproof cable box of an outdoor mounted transformer motor. The terminating kits shall preferably be of the following types :

- a) TAPLEX' of M-seal make using non-linear resistance material

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fortress grading.

- b) 'PUSH-ON' type of CCI make using factory - molded silicone rubber insulators.
- c) 'TROPOLINK' type of CCI makes.

For outdoor installations, weather shields/sealing ends and any other accessories required.

6.7.4 The straight thro jointing kits shall be suitable for underground-buried installation with uncontrolled backfill and possibility of flooding by water. The jointing kit shall be one of the following types.

- a) 'TAPLEX' of M-seal make
- b) 'TROPOLINK' type of CCI make
- c) Heat-shrinkable sleeve type of M/s. Raychem.

6.7.5 Makes of kits other than those specified in 6.7.3 and 6.7.4 may be considered, provided the Contractor furnishes type test certificates, alongwith the offer.

6.7.6 Type tests are to be carried out at manufacturer's works to prove the general qualities and design of a given type of termination/jointing system. The type tests shall include the following tests conforming to the latest IEC 502.2, 466 and VDE 0278 specifications. The Contractor along with the offer for the jointing system considered shall submit the type test certificates.

- a) A.C. Voltage withstand dry test for 1 minute
- b) Partial discharge test - Discharge magnitude shall be less than 20 p.c.
- c) Impulse voltage withstand test with 10 impulses of each polarity.
- d) A.C. high voltage test following load cycling test with conductor temperature at 95oC.
- e) Thermal short circuit test of 250oC for 1 second.
- f) DC Voltage withstand test for 30 minutes.
- g) Humidity test.
- h) Dynamic short circuit test.
- i) Salt log test
- j) Impact test


7.0 TESTING:

7.1 Before energizing, the insulation resistance of every circuit shall be measured from phase to phase and from phase to ground.

7.2 Where splices or termination are required in circuits rated above 600 volts, measure insulation resistance of each length of cable before splicing and or/ terminating. Repeat measurement after splices and/or terminations are completed.

7.3 Measure the insulation resistance of directly buried cable circuits before cable trenches are back-filled. Repeat measurement after back- filling.

For cables upto 1.1 KV grade 1000 KV Meager and for H.V. Cables 2.5

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KV/5 KV Meager shall be used.

- 7.4 D.C. High Voltage Test shall be conducted after installation on the following and test results are recorded.

- a) All 1000volts grade cables in which straight through joints have been made.
- b) All cables above 1100 V grade.

For record purposes test data shall include the measure values of leakage current versus time.

The D.C. High Voltage test shall be performed as detailed below in the presence of the Engineer-in- Charge or his authorized representative only.

Cables shall be installed in final position with all the straight through joints complete. Terminations shall be kept unfinished so that motors, switchgears, transformers etc. are not subjected to test voltage.

The test voltage shall be as under:-

- |      |                         |            |
|------|-------------------------|------------|
| i)   | For cables 3.3 KV grade | 5.4 KV DC  |
| ii)  | For cables 6.6 KV grade | 10.8 KV DC |
| iii) | For cables 11 KV grade  | 18 KV DC   |

- 7.5 All cables shall be tested as per standard test Performa available with site engineer.
- 7.6 Cable schedule and layout drawings must be marked for AS BUILT conditions during the installation work and shall be approved by Site Engineer.




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## 4. SPECIFICATION FOR DG SET

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## **ANNEXURE -I**

### **1. LIST OF SPARES — MANDATORY**

The spare parts as listed below shall be quoted for the D.G. set along with the offer with item wise unit prices:

1. Rings of various types and sizes.
2. Bearings of various types and sizes.
3. Caskets of various sizes and types.
4. Lube oil filters.
5. Fuses of all ratings.

### **2. LIST OF SPARES — FOR 2 YEARS OPERATION**

#### **A. MOULDED CASE CIRCUIT BREAKER (OF EACH RATING)**

- i) Complete Breaker Assembly

#### **B. SWITCHES (OF EACH RATING)**

- i) Assembled switch in open execution
- ii) FUSES Single pole moving blade assembly
- iii) Single pole base assembly

#### **C. FUSES (OF EACH RATING)**

- i) Fuse links
- ii) Fuse fittings

#### **D. CONTROL SWITCHES**

- i) Trip – Neutral – Close Switch
- ii) Local Remote Selector Switch
- iii) Heater Switch
- iv) Thermostat
- v) Ammeter Selector Switch
- vi) Voltmeter Selector Switch
- vii) Push Button
- viii) Push Button element
- ix) Push Button Actuator of each type

#### **E. CONTACTOR (OF EACH RATING)**

- i) Contactor with Auxiliary Contacts
- ii) Operating Coil
- iii) Auxiliary Contact Block



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**F. INDICATING LAMPS**

- i) Indicating lamps globes of each colour
- ii) Indicating lamp fittings
- iii) Indicating lamp bulbs

**G. METERS**

- i) Ammeter
- ii) Voltmeter

**H. PROTECTIVE RELAYS**

- i) Relays
- ii) Thermal overload relay of each type

NOTE: All spare parts shall be identical to the parts used in the distribution boards.



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## **ANNEXURE — II**

### **DOCUMENTATION FOR**

### **D.G. SET**

Sl. No.	Description	With Bid No. of copies	After Order	
			For Review	Final
			No. of Copies	No. of copies
1.	Specification Sheet	1	6	8
2.	Technical Particulars	1	6	8
3.	General arrangement and foundation drg. For all the equipment	-	6	8
4.	Civil scope drawings	-	6	8
5.	Earthing Layout	-	6	8
6.	Terminal arrangement drg. And interconnection	-	6	8
7.	Sectional view of D.G. set	-	-	8
8.	Illustrative and descriptive literature.	-	-	8
9.	Catalogue for bought out accessories	-	-	8
10.	Installation, operation & maintenance manual	-	-	8
11.	Type test certificates for engine, alternator and circuit breaker	-	-	8
12.	Guarantee certificate	-	-	8
13.	Spare parts list with identification	-	-	8
14.	GA, schematic and wiring diagram of synchronization & control panel.	-	6	8



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## **5. SPECIFICATION FOR LIGHTING FITTINGS FOR HAZARDOUS LOCATIONS**



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## **C O N T E N T S**

- 1.0 SCOPE
- 2.0 STANDARDS
- 3.0 SYSTEM
- 4.0 CERTIFICATION
- 5.0 CONSTRUCTION
- 6.0 TERMINALS AND WIRING
- 7.0 CONTROL GEAR & LAMP HOLDERS
- 8.0 GUARANTEE AND INSPECTION
- 9.0 INFORMATION REQUIRED WITH QUOTATIONS



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**1.0 SCOPE**

This specification defines the design, construction, testing and supply of lighting fixtures suitable for installation in classified hazardous locations in Refineries/Petrochemical plants. Unless specified in material requisition all fixtures shall be suitable for Gas Groups IIA & IIB as per IS 2148.

**2.0 STANDARDS**

Complete lighting fixtures and other accessories shall conform to the following Indian Standards or other relevant internationally accepted standards.

IS-2148	Specification for Flameproof Enclosures.
IS-5572	Classification of hazardous area for electrical installation.
IS-8239	Classification of maximum surface temperature of electrical equipment for use in explosive atmosphere.
IS-6381	Construction and testing of electrical apparatus with type of protection 'e'
IS-8289	Electrical equipment with type of protection 'n'.
IS-2206	Flameproof electrical lighting fittings Pt.I & II(well glass and bulk head type, fittings using glass tubes)
IS-8224	Electric lighting fitting for division 2 areas.
IS-1913	Electric lighting fittings, general and safety requirements .

**3.0 SYSTEM**

Unless until specified in material requisition all lighting fixtures shall be suitable for 220 - 250 volts single phase and neutral, 50 Hz. power supply.

**4.0 CERTIFICATION**

All fixtures and accessories shall be tested and certified by independent authorities for use in specified gas group location. Certification number/data and gas group/temperature classification must be indicated on the manufacturer's nameplate on each fixture.

**5.0 CONSTRUCTION**

All fixtures shall be suitable for use in outdoor open location and shall have degree of protection for weatherproofing equal to IP-55.

The body of the lighting fixture shall be of cast aluminium alloy LM-6 and should be free from frictional sparking hazard. Complete fixture body and accessories shall be suitable to withstand corrosive atmosphere. Outer



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metallic surface shall be treated/prepared and provided with two coats of epoxy paint. All screws, nuts, studs, clamps, supporting brackets, etc. shall be electro galvanized or zinc passivated.

All fixtures shall be provided with sheet steel vitreous enameled or approved type of reflector. Glass used for fixtures shall be clean and toughened type suitable for use under conditions involving exceptional risk of mechanical damage and shall be type 'A' as per IS 2206 or the requirements stipulated by international standards. All well glass fixtures shall be provided with steel wire protecting cage having mesh dimension not exceeding 50 mm.

The fixing parts of the enclosure, which is to be opened for replacement of bulb, shall be so fastened that they can only be unfastened with special tools. All fixtures shall carry a special warning inscription in English to "Isolate supply elsewhere before opening". Three sets of special tools required for maintenance of fixtures shall be supplied free of cost along with the fixtures.

The temperature rise of external surface shall not exceed the temperature specified in the standards for the gas group to which fitting shall be suitable.

All fixtures and associated control gear boxes shall be provided with two 3/4" E.T. threaded entries with one approved type threaded plug to seal one of the entry. Two entries shall be used for looping of circuit wherever required.

All junction boxes for looping for SPN Lighting circuits using cables upto 4 mm<sup>2</sup> shall be minimum 100 mm dia in size. Junction boxes for looping of large three phase cable and multiple single phase circuits shall be of minimum 300x250x100 mm. in dimension complete with flameproof cable glands as specified in material requisition.

The top of all well glass lighting fixtures shall be identically drilled/threaded to facilitate the installation on pole/column or ceiling as per the enclosed sketch using stud/bracket supplied by others.

## **6.0 TERMINALS & WIRING**

Each terminal for external cable connections shall be suitable for termination of minimum of two number 4 mm<sup>2</sup> aluminium conductors for circuit looping facility. All terminals shall be of non-sparking and anti-loosening design such that they do not produce any arc or spark in normal operation.

Connection to current carrying parts shall be such that the contact is not appreciably impaired by temperature or by vibrations, which occur, in normal service or by shrinkage of insulating materials.



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If flexible wires are used for internal wiring they should be soldered at the ends, preferable with lugs.

Whereas a screw type holder is used, the centre contact shall be connected to a terminal which shall be clearly identified for connection to the live conductor.

One earthing terminal shall be provided inside the connection chamber suitable for termination of minimum 4 mm<sup>2</sup> aluminium conductor.

**7.0 CONTROL GEAR AND LAMP HOLDER**

Lighting fixtures suitable for discharge lamps shall be complete with power factor correction capacitor, choke and starter, etc. mounted within the fixtures as integral part completely wired upto terminals. Separate control for gearbox shall be acceptable only for flood lighting fixtures and these shall be of approved flameproof construction.

All incandescent lamp fixtures shall have screwed type E.S. cap lamp holder.

All lighting fixtures which are not certified as flameproof construction but approved for use in Div. II area shall have approved ENCLOSED BREAK lamp holder and complete enclosure certified as having restricted breathing type construction.

**Mounting**

All well glass fixtures shall be suitable for bracket, ceiling or pole mounting as per the enclosed sketch.

All flood lighting fixtures shall be supplied with adjustable mounting arrangement both in horizontal and vertical plane.

**8.0 GUARANTEE & INSPECTION**

All fittings shall be guaranteed for defective material/ design/ workmanship, for a period of 12 months from the date of commissioning or twenty four months from the date of despatch whichever is earlier.


Mechanical strength of well glass shall satisfy the requirements stated in Clause 7.2.1 of IS 6381 and during inspection facilities shall be provided for impact testing of a random sample.

The purchaser's representative shall inspect all fittings and accessories before despatch and minimum two weeks notice shall be given to facilitate inspection. Purchaser's representative will also be allowed to visit works during execution of order for expediting/monitoring activities.

**9.0 INFORMATION REQUIRED WITH QUOTATIONS**

1. Three copies of catalogues/drawings giving details of make/catalogue No./Overall Dimensions/Weight/ Material of construction and mounting details etc.



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2. Name/address of testing/certifying authority and certificate No./date for each item.
3. Clause wise deviations to the requirements of specification/material requisition, if any. It will be assumed that offer meets all the requirements except deviations furnished with the quotation.
4. Unpriced true copy of price quotation giving detailed description of each item.
5. Price variation due to part ordering or change in quantities as the quantities specified in material requisition are tentative.
6. Drawing of the complete assembly for each item offered which shall be valid for the actual material supplied if ordered.

INCOMPLETE QUOTATION WITHOUT ABOVE INFORMATION SHALL NOT BE CONSIDERED.



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## **6.SPECIFICATION FOR SPLIT AIR CONDITIONER SYSTEM**



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**1.0 SCOPE OF WORK**

Scope of Work includes supply; installation and commissioning of latest model split Air conditioner with remote and 4KVA automatic voltage stabilizer.

**2.0 Number of AC Units: -**

<b>Sl. No.</b>	<b>Location</b>	<b>No. of 1.5 T Split AC Unit</b>
1.	SALES Room	1 Nos.

**3.0 Power Supply Voltage**

Voltage - 230 V +/- 10% ,Single  
Phase Frequency - 50 Hz +/- 5%

4.0 Contractor shall supply all material including 4 KVA Stabilizer, 20A Industrial type Plug Socket with 20A SP MCB, brackets, tools and tackles and any other items required for installation, testing and commissioning of the Air conditioning system.

Please furnish the Technical Data Sheet for Split Air Conditioner:

<b>Sl.No.</b>	<b>Description</b>	<b>Unit</b>	<b>Power Supply</b>
1.	Manufacturer		
2.	T.R. Rating		
3.	Model No.		
4.	Nominal	KCAL/HR	
5.	Cooling Capacity	BTU/HR	
6.	Heating capacity	Not Applicable	
7.	Power supply		
	Voltage	V	230V
	Frequency	Hz	50Hz
	Phase		1 Phase
	Power Consumption	WATTS	
	Running Current	A	
8.	Performance		
	Nominal Air Circulation Indoor	CFM	
	Nominal Air circulation Outdoor	CFM	
	Moisture Removal		
	Noise Level	dB	



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9.	Refrigerant type Features Air direction Auto air swing Temp. Control Fan type Fan discharge Fan quality Fan motor type Fan motor –no. of speed Fan motor –quantity Compressor type Compressor model Compressor –quantity Air discharge Forced operation Soft dry operation De-humidification Plasma air purifier Anti bacterial filter Electro static filter Remote control Indoor unit-width Height Depth Weight Colour Outdoor unit-width Height Depth Weight Colour		
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## **7.0 SPECIFICATION FOR ELECTRICAL WORK-**

### **GENERAL**

#### **CONTENTS**

- 1.0 GENERAL
- 2.0 EQUIPMENT SPECIFICATION
- 3.0 ERECTION SPECIFICATIONS
- 4.0 LIST OF APPROVED VENDOR (Annexure -I)
- 5.0 LIST OF SPECIFICATIONS
  - 5.1) SPECIFICATION FOR CABLING
  - 5.2.) SPECIFICATION FOR EARTHING AND LIGHTNING PROTECTION
  - 5.3.) SPECIFICATION FOR LIGHTING FITTINGS FOR HAZARDOUS, INDOOR AND SAFE AREA.
  - 5.4.) SPECIFICATION FOR L.T. POWER DISTRIBUTION BOARD
  - 5.5.) SPECIFICATION FOR SPLIT AIR CONDITIONING SYSTEM
  - 5.6.) SPECIFICATION FOR UPS SYSTEM
  - 5.7.) SPECIFICATION FOR DG SET
- 6.0 QAP FOR ELECTRICAL EQUIPMENTS
- 7.0 ELECTRICALCHECK LIST



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## **ELECTRICAL WORK**

### **1.0 GENERAL**


#### **1.1 General**

These Technical Specifications are intended to amplify the General and Special Conditions of Contract and shall be read in conjunction with them. For any discrepancy between the General Conditions/Special Conditions and these Specifications the most stringent shall apply.

#### **1.2 Scope of work**

The general character and the scope of work to be carried out under this contract are illustrated in Drawings, Specifications and Schedule of Quantities. The Contractor shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with the direction of and to the satisfaction of the Owner's site representative. The contractor shall furnish all labor, materials and equipment (except those to be supplied by the owner) as listed under Schedule of Quantities and as specified including transportation and incidentals necessary for supply, installation, testing and commissioning of the complete electrical system as described in the Specifications and as shown on the drawings. This also includes any materials, equipment, appliances and incidental work not specifically mentioned herein or noted on the Drawings/Documents as being furnished or installed, but which are necessary and customary to be performed for completion of the specified work under this Contract. The Electrical system shall comprise of following:

- a. Design, supply, installation, testing & commissioning of LT Panels, Main distribution/Sub distribution panels, Lighting Distribution Boards, Capacitor Banks and any other electrical equipments as specified in SOR or required to complete the scope of work.
- b. Design, Supply, Installation, Testing & Commissioning of building lighting system which shall include lighting distribution boards, lighting fixtures, fans, exhaust fans, power sockets, telephone sockets, MDF box (for telephone), switchboards, circuit wiring and point wiring and grounding etc. All conduit work including junction boxes, outlet boxes and wiring for lighting/fan and power.
- c. Supply, laying testing and commissioning of Cables , wires and associated cable trays, cable supports and cabling accessories and required structural steel/assemblies.
- d Supply and installation of Earthing and Lightning protection system including all earthing materials , earthing conductors, earth pits as specified/required..
- e. Supply, Erection, Testing and Commissioning of external pole

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lights, armoured cable etc. as required and complete in all respects as specified.

- f. Supply, Erection, Testing and Commissioning of canopy underlights complete in all respects including armoured copper conductor cable and the type of lighting fixture as specified.
- g. Supply, installation, testing and commissioning of UPS System complete in all respect including battery as specified.
- h. Construction of cable trenches and laying of embedded/ exposed G.I. pipes, electrical conduits for laying of cables/wires.
- i. Supply and installation of any equipment/material as required for completeness of the electrical installations.
- j. Supply and installation of all electrical equipment/material required for erection and commissioning of MNGL's technological equipment such as compressors, cascades, dispensers etc.
- k. Supply, Erection, Testing and Commissioning of DG set complete in all respects as specified.

### **1.3 Bye Laws Regulation**

The work shall be carried out to the satisfaction of the Owner's site representative and in accordance with the Specifications, Regulations of the Electric Supply Authority, Indian Electricity Rules and Regulations, latest Indian Standards and as per the requirements of the Chief Fire Officer and other applicable statutory authorities such as Chief Controller of Explosives, Nagpur. The application on behalf of the owner for submission to Electrical Inspector / state or central Electricity Authority along with copies of required certificates complete in all respects shall be prepared by the contractor and submitted to the Engineer-in-charge for onward transmission well ahead of time so that the actual commissioning of equipment are not delayed for want of inspection by the Electrical Inspector / CEA.

### **STATUTORY APPROVALS**

All works relating to statutory approvals of the installation from competent authority like Electrical Inspectorate, CEA, DGMS etc. including carrying out of all required modifications in design / manufacture / installation to meet the requirement of Indian Electricity Rules and other statutory regulations in force , carrying out necessary paper work and liason with the authorities to obtain all necessary clearances for charging of installation as per relevant national standards. However the official fees towards the approvals shall be borne by the client.

### **1.4 ELECTRICAL CONTRACTOR'S LICENSE – GRADE A:**

**The Contractor shall confirm in his bid that the electrical work shall**



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**be done by an electrical contractor having Grade A license (photocopy to be enclosed) and authorization to carryout electrical installation work of all voltages in the state of MAHARASTRA.**

The electrical contractor shall assign at least one full-time engineer who would be exclusively responsible for ensuring strict quality control, adherence to specifications and ensuring top class workmanship for the electrical installation as per specification and statutory requirement.

### **1.5 Drawings**

The Electrical Drawings listed under Appendix, which are issued with tenders, are diagrammatic only and indicate arrangement of various systems and the extent of work covered in the contract. These drawings indicate the points of supply and of termination of services and broadly suggest the routes to be followed. Under no circumstances shall dimensions be scaled from these Drawings. The architectural/interiors drawings and details shall be examined for exact location of equipment, electrical points & fixtures.

The contractor shall follow the tender drawings in preparation of his shop drawings for MNG approval and for subsequent installation work.

Maximum headroom and space conditions shall be maintained at all points. Where headroom appears inadequate, the contractor shall notify the Architect/Consultant/Owner's site representative before proceeding with the installation. In case installation is carried out without notifying, the work shall be rejected and contractor shall rectify the same at his own cost.

The contractor shall examine all architectural, structural, plumbing, and other services drawings before starting the work and shall report to the Owner's site representative any discrepancies and obtain clarifications. Any changes found essential to coordinate installation of his work with other services and trades shall be made with prior approval of the MNG's site representative without additional cost to MNG.

### **1.6 Specifications:**

These Specifications shall be considered as part of this contract. The Drawings indicate the extent and general arrangement of power distribution, location of lighting the fixtures, controlling switches, wiring system, cabling and Earthing. These drawings are essentially diagrammatic. The Drawings indicate the point of termination of conduit runs and broadly suggest the routes to be followed. The work shall be installed as indicated on the Drawings. However, any change found essential to coordinate the installation of this work with other trades shall be made without any additional cost to the Owner. The data given herein and on the Drawings is as exact as could be secured, but its complete accuracy is not guaranteed. The drawings are for the guidance of the contractor, exact locations, distances and levels shall be governed by the





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site conditions and the Architectural & Interior layouts.

**1.7 Shop Drawings:**

The Contractor shall prepare and submit for approval the detailed drawings of building conduit layouts and G.I. pipe layouts and distribution panels, switch boards, cabinets, special pull boxes, cable trays and any other equipment to be fabricated or purchased by the contractor. The Overall General Arrangement (OGA) drawings of all the panels/boards etc. shall be furnished for approval. The weight of each panel/equipment shall be indicated in respective OGA drawings to facilitate proper civil foundation/ support design.

- 1.7.1 These shop drawings shall contain all information required to complete the Project as per contract specifications and as required by the Architect/Consultant/Owner's site representative. These Drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of equipment/materials/works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings.

Each item of equipment/material proposed should be a standard catalogue product of an established manufacturer strictly from the manufacturers listed in ANNEXURE-I.

When the Architect/Consultant makes any amendments in the above drawings, the contractor shall supply two fresh sets of drawings with the amendments duly incorporated along with check print, for approval. The contractor shall submit further twelve sets of shop drawings to MNGL's site representative. No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the particular material/ equipment/ installation.

- 1.7.2 Shop drawings shall be submitted for approval sufficiently in advance of planned delivery and installation of any material to allow Architect/Consultant ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved programme.
- 1.7.3 Manufacturer drawings, catalogues, pamphlets and other documents submitted for approval shall be in four sets. Each item in each set shall be properly labeled, indicating the specific services for which material or equipment is to be used, giving reference to the governing section and clause number and clearly identifying in ink the items and the operating characteristics. Data of general nature shall not be accepted.



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- 1.7.4 Samples of all materials like conduits, accessories, switches controls, control wires etc shall be submitted to the Owner's site representative prior to procurement. These will be submitted in two sets for approval and retention by Owner's site representative and shall be kept in their site office for reference and verification till the completion of the Project.
- 1.7.5 Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or requirement to furnish material and perform work as required by the contract.
- 1.7.6 Where the contractor proposes to use an item of equipment, other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundation, wiring or any other part of the mechanical, electrical or architectural layouts; all such re-design, and all new drawings and detailing required therefore, shall be prepared by the contractor at his own expense and got approved by the Architect/Consultant/ Owner's site representative.
- 1.7.7 Where the work of the contractor has to be installed in close proximity to, or will interfere with work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Owner's site representative, the contractor shall prepare composite working drawings and sections at a suitable scale, not less than 1:50, clearly showing how his work is to be installed in relation to the work of other trades. If the Contractor installs his work before coordinating with other trades, or so as to cause any interference with work of other trades, he shall make all the necessary changes without extra cost to the Owner.
- 1.7.8 Within four weeks of approval of all the relevant shop drawings, the contractor shall submit four copies of a comprehensive variation in quantity statement, and itemized price list of recommended (by manufacturers) imported and local spare parts and tools, covering all equipment and materials in this contract. The Project Manager shall make recommendation to Owner for acceptance of anticipated variation in contract amounts and also advise Owner to initiate action for procurement of spare parts and tools at the completion of project.
- 1.7.9 Submission/Completion Drawings:**  
Upon the completion of the work and before issuance of certificate of completion the contractor shall submit to the Owner's site representative six sets of layout drawings in progressive manner for individual systems drawn at approved scale indicating the complete wiring system as installed. Soft copies of all the drawings shall be furnished in the CD or DVD. No drawing shall be made in size less than A3. These drawings/documents shall include:



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- a. Electrical room layout & all panel layouts, as installed .
- b. Cable Trays/Conduit layout with number and size of cables installed.
- c. Run and size of conduits, inspection, junction and pull boxes.
- d. Number and size of conductors in each conduit with phase identification.
- e. Location and rating of sockets and switches controlling the lighting and power outlets.
- f. Location and details of distribution boards/panels, mains, switches along with phase balancing details.
- g. A complete scheme and wiring diagram as installed and single line diagrams covering the complete electrical system. Panel OGA drawings shall furnish list of all equipment/material used along with their make and rating.
- h. Location of all Earthing stations, routes and size of all Earthing conductors/manhole.
- i. Layout and particulars of all LT cables.
- j. Instruction, maintenance and operation manuals including maintenance schedule for all equipment. Testing & commissioning reports of all electrical equipment.
- k. Site test reports and factory acceptance report for each and every equipment/system supplied by the Contractor.

**1.7.10 Manufacturers Instructions**

Where manufacturer have furnished specific instructions relating to the materials used in this project and covering points not specifically mentioned in these documents, manufacturer's instructions shall be followed.

**1.7.11 Materials and Equipment**

All materials and equipment shall conform to the relevant Indian Standards and shall be of the approved make and design. Makes shall be strictly in conformity with list of approved manufacturers as per Appendix.

The Contractor shall be responsible for the safe custody of all materials and shall insure them against theft or damage in handling or storage etc. A list of items of materials and equipment, together with a sample of each shall be submitted to the Owner's site representative within 15 days of the award of the contract. Any item which is proposed as a substitute, the contractor shall state the credit, if any, due to the Owner. In the event the substitution is approved, all changes and substitutions shall be requested in writing and approvals obtained in writing from the Owner's site representative.

**1.7.12 Performance Guarantee**

The contractor shall carry out the work in accordance with the Drawings, Specifications, Schedule of Quantities and other documents forming part of the Contract.

The contractor shall be fully responsible for the performance of the



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selected equipment (installed by him) at the specified parameters and for the efficiency of the installation to deliver the required end result.

The contractor shall guarantee that the electrical system as installed shall perform to complete satisfaction of the Owner.

The Contractor shall hold himself fully responsible for reinstallation or replacement, free of cost to Owner the following:

- a. Any defective work or material supplied by the Contractor.
- b. Any material or equipment damaged or destroyed as a result of defective workmanship by the Contractor.

#### **1.7.13 Completion**

On completion of the electrical installation a certificate shall be furnished by the Contractor countersigned by the licensed supervisor, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local authorities concerned.

#### **1.7.14 Demonstration to owner**

At completion, devices subject to manual operation shall be operated at least five times in presence of Owner's site representative to demonstrate satisfactory operation.

#### **1.7.15 Tools and tackles**

The Contractor shall provide and install all necessary hoists, ladders, scaffolding, tools, tackles, all transport for labour and materials and plant necessary for the proper execution and completion of the work to the satisfaction of the Owner's site representative.

#### **1.7.16 On site training**

Upon completion of all work and all tests, the Contractor shall furnish necessary operators, labour and helpers for operating the entire installation for a period of fifteen (15) working days of ten (10) hours each, to enable the Owner's staff to get acquainted with the operation of the system. During this period, the contractor shall train the Owner's personnel in the operation, adjustment and maintenance of all equipment installed.

#### **1.7.17 Partial Ordering**

Owner through the Architect/Consultant/ Owner's site representative reserves the right to order equipment and material from any and all alternates, and /or to order high side and /or low side equipment and materials or parts thereof from one or more tenderers.

#### **1.8.18 Inspection**

All equipment/material to be supplied by the Contractor shall be offered for inspection at manufacturer's/supplier's works before delivery at site. No equipment shall be installed without the written clearance from MNG's representative.



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The contractor shall submit Quality Assurance Plan (QAP) for respective equipments for approval. QAP shall be prepared and furnished by the contractor in MNGL form no. 11.20 (4.4) F-10 (Annexure-A) alongwith their internal in process quality checks.

All equipment/material shall be procured by the Contractor well in time to avoid the delays on account of mandatory inspection procedures.


The inspection call shall be given by the Contractor minimum one week before the proposed inspection date.

## **2.0.0 EQUIPMENT SPECIFICATION**

### **2.1.1 Distribution panels/boards**

Main Distribution Panels and Sub-Distribution Panels shall be suitable for operation on 3 Phase/single phase, 415/240 volts, 50 cycles, neutral grounded at transformer. Distribution panels shall comply with the latest Relevant Indian Standards and Electricity Rules and Regulations and shall be as per, IS: 8623 (Part -I) 1993, IS: 13947 : 1993 , IS: 5578 – 1984, IS :11353:1985 and other related IS codes. The electrical panels shall be designed as per drawings enclosed.

1. Panel shall be manufactured as per the SLD enclosed. Panel shall be designed for a minimum of 40 KA / sec. Short Circuit current. Accordingly Incoming and Out going feeders shall be provided with SFUs/ MCCBs as per SLD of the same  
S.C. current capacity. MCCBs with current limiters to achieve the stated SC current shall not be acceptable.
2. Panel Bus Bar sizing (Cu) shall be done considering the ambient Temperature and the size of the enclosure etc., in any case, the de-ration of the bus bars shall not exceed 75% of the rated current carrying capacity indicated by bus-bar manufacturer.
3. Maximum operating height of any switch in the panel shall not exceed 1800mm from Final Floor Level.
4. FR PVC copper wires of reputed make shall be used for internal ( Power / control / auxiliary ) wiring of the panel.
5. Separate Cable Alley shall be used for terminating the Out Going cables.
6. Panel shall be free standing type and shall be of following features.
  - Floor Mounted
  - Modular construction , non draw out and dead front type.
  - Separate Al/Cu. Earth bus bar shall be provided through out the panel and provision for earthing the same at both the ends of the panel with suitable hole and Bolt / nuts and washers.

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7. Separate Control transformer of adequate KVA rating and 415 / 110/  $\sqrt{3}$  V shall be used for control and indication circuits.

8. Deliverables from The Main Distribution Panel Manufacturer.  
**Along with Tender :**

- GA drawings / Dimensional Drgs. / Data sheets.
- Single Line Diagram.
- Type test reports of similar panels not older than 5 years.

**After Order placement:**

- GA drawings / Dimensional Drgs /Foundation details/ Datasheets.
- Single Line Diagram
- Schematic and power & control wiring diagrams.
- Relevant Catalogues for safety devices.
- Filled in datasheets
- Bus bar sizing calculations considering the stated SC rating
- Temperature Rise Calculations for busbars.
- Control Transformer sizing calculations.
- BOM with quantities and makes.
  - a) Single line Diagram for electrical panel for mother station
  - b) Single Line Diagram for electrical panel for daughter station

## 2.1.2 Construction features

The distribution boards shall be non – drawout type of modular and compartmentalized construction. Distribution panels shall be of sheet steel construction suitable for indoor installation, dead front, and floor mounting type. The Distribution panels shall be totally enclosed, completely dust and vermin proof and shall be with hinged doors, Neoprene gasket and padlocking arrangement and shall be of protection class IP:54. All distribution panel /boards shall be suitable for the climatic conditions as specified in Special Conditions and for ambient temperature of 45° C . Steel sheets used in the construction of Distribution panels shall be 2 mm thick and shall be folded and braced as necessary to provide a rigid support for all components. The general construction shall conform to IS:8623-1993 (Part-1). The boards shall be single front execution with maintenance access from the front only.

A base channel of ISMC 100 (100x50x6mm) shall be provided at the bottom for floor mounted panels. Minimum clearance of 200 mm shall be provided between the floor of Distribution panels and the lowest unit. The cable terminals in the cable alley shall start from 300mm above the gland plate.

Distribution panels shall be of adequate size with a provision of spare switchgear as indicated in the Single Line Diagram. Modules shall be arranged in multi-tier. Knockout holes of appropriate size and number shall be provided in the Distribution panels in conformity with the location of





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cable/conduit connections. Removable sheet steel plates shall be provided at the top/bottom to make holes for additional cable entry at site if required.

Cable alleys shall be provided in the Distribution panels for easy clamping of all incoming and outgoing cables entering from the top/bottom. Minimum width of the cable alley shall be 250mm. Adequate supports shall be provided in cable compartment to support cables. All cable terminals / terminations vulnerable to inadvertent contact shall be shrouded by providing transparent insulating sheet of minimum thickness of 5 mm.

Every cabinet shall be provided with engraved metal nameplates. All live accessible connections shall be shrouded and minimum clearance between phase and earth shall be 20 mm and phase to phase shall be 25 mm.

All sheet steelwork shall undergo a process of degreasing, pickling in acid, cold rinsing, phosphating, passivating (seven tank processing) and then painted with electrostatic paint (Powder coating). The shade of colour of panel inside / outside shall be RAL 7032 and black colour for base channel.

Main horizontal busbars shall be of uniform size throughout the length.

#### **2.1.3 Labels**

Engraved metal labels shall be provided on all incoming and outgoing feeder. Circuit diagram showing the arrangements of the circuit inside the distribution panels shall be pasted on inside of the panel door and covered with transparent plastic sheet.

#### **2.1.4 Wiring**

Power and control terminals shall be segregated and shall be provided with necessary ferrule marking as per the wiring diagrams.

PVC insulated solid/stranded copper conductors of adequate size shall be used for internal wiring. The switch/MCCB of 100A or more shall be provided with busbars on incoming side.

Minimum size of the copper conductor for power shall be 4.0 mm<sup>2</sup> and that for the control wiring shall be 2.5 mm<sup>2</sup>. The CT secondary wiring shall be carried out using copper stranded conductor of 2.5mm<sup>2</sup>.

Ring type cable lugs shall be used for termination of wires of CT secondary circuit and wires of power circuit within the modules.

Non - current carrying metal/movable parts shall be properly grounded through flexible braided copper conductors.



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Phase insulating barriers shall be provided wherever it is not possible to maintain a minimum clearance of 19mm (between phase to neutral) and 25 mm( between phase to phase.)

**2.1.5 Painting**

All sheet steelwork shall undergo a process of degreasing, pickling in acid, cold rinsing, phosphating, passivating (seven tank processing) and then painted with electrostatic paint (Powder coating). The colour of panel inside / outside shall be RAL 7032 and black colour for base channel.

**2.1.6 Bus bar connections**

Bus bar and interconnections shall be of high conductivity electrolytic grade aluminium (E 91E) and of rectangular cross section suitable for carrying the rated full load current and short circuit current without overheating of phase and neutral bus bars and shall be extendable on either side. Bus bars and interconnections shall be insulated with heat shrinkable sleeve and shall be colour-coded. Bus bars shall be supported on glass fiber reinforced thermosetting plastic insulated supports at regular intervals to withstand the force arising from in case of short circuit in the system. All bus bars shall be provided in a separate chamber and all connections shall be done by bolting. Additional cross sectional area to be added to the bus bar to compensate for the holes. All connections between bus bars and breakers/MCCB/switches shall be through solid aluminium strips of proper size to carry full rated current and insulated with insulating sleeves. The distribution board shall be designed for the short circuit capacity of 35 kA or 28MVA for 1 sec.

Unless otherwise specified, in the case of external surface of enclosures of bus bar trunking system which shall be accessible but do not need to be touched during normal operation, an increase in the temperature rise limits of 25° C above ambient temperature shall be permissible for metal surface and of 15° C above ambient temperature for insulating surfaces as per IS 8623(Part-2) 1993.

Bus bar size for the Neutral shall be same as that of phases and Earth shall be half that of the main phase.

All joints shall be made after applying anti - oxidant petroleum jelly.

**2.1.7 Meters/CTs**

All currents more than 10A shall be measured through CTs. All phases shall be provided with CT of minimum burden of 10VA with 5A secondaries.

The CTs shall conform to the relevant IS. The design and construction shall be dry type, epoxy resin cast and suitable for withstanding thermal and dynamic stresses during short circuit conditions.

The secondary terminal of the CT shall be brought out suitably to a





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terminal block which shall be easily accessible for testing.

The protection CTs shall be of accuracy class 5P10 and that for the measurement shall be of accuracy class 1.

The ammeters and voltmeters shall be of taut band of square shape with 240° deflection type. The voltmeter /ammeter for incoming circuit shall be of 144x144 mm and that for the outgoing feeders shall be of 96x96 mm. size. Ammeter for motor circuit shall be of suppressed scale type. Voltmeter shall be provided through protection fuses. Ammeter shall be provided in each motor feeder.

The Indication lamps shall be of LED cluster type .

#### **2.1.8 Gland plate**

Cable gland plate (3mm thick sheet steel) shall be detachable and undrilled and shall be provided at the bottom to facilitate cable entry from the bottom. The size of the gland plate shall be adequate to accommodate all the cables conveniently.

#### **2.1.9 Safety Interlock**

The feeders with rotary switches and operating handle for MCCBs/SFU shall be provided with mechanical interlock so that it will be possible to open the module only when the switch fuse unit / MCCB is in OFF position. However it shall be possible to defeat this interlock.

#### **2.1.10 Moulded Case Circuit Breaker (MCCB):**

MCCB shall be Current Limiting and shall comprise Quick Make/break switching mechanism with Double Break Contact system, arc extinguishing device and the tripping unit shall be contained in a compact, high strength, heat resistant, flame retardant, insulating moulded case with high withstand capability against thermal and mechanical stresses. All MCCB's shall be capable of variable overload adjustment at site. All MCCB's rated 125 Amps and above shall have adjustable magnetic short circuit pick up.

The trip command shall override all other commands. MCCB shall employ maintenance free double break contact system to minimize the let thru' energies and capable of achieving discrimination upto full short circuit capacity of downstream MCCB. The manufacturer shall provide both discrimination tables and let thru energy curves.

The breaking capacity of MCCB's shall be 35kA. The breaking capacities shall be as per type-2 co-ordination as per IEC-947-2, 1989/ IS 13947-2,1993

The MCCB's shall be provided with rotary handle operating mechanism. The handle position shall give positive indication of 'ON', 'OFF' or 'Tripped'



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#### **2.1.11 Switch Fuse Unit**

The switch fuse unit shall be 415V, TPN AC23 duty with double break power contacts and shall be sheet steel enclosed type and shall conform to IS 13947 – 1993. Top and bottom cable chambers shall be provided additionally in all the SFUs rated 100A and above. The operating handle shall be rotary type and padlocking facility shall be given in the SFUs. The SFUs shall be provided with applicable feeder label/markings.

#### **2.1.12 Changeover Switch**

Changeover Switch shall be ON load 415V, 4 Pole AC-23 type of ratings as given in the SOR and shall conform to IS : 13947 –1993.

#### **2.1.13 Miniature circuit breaker (MCB)**

Miniature Circuit Breaker shall comply with IS-8828-1996/IEC898-1995. Miniature circuit breakers shall be quick make and break type for 240/415 V, AC 50 Hz application with magnetic thermal release for over current and short circuit protection. The breaking capacity shall not be less than 10 kA at 415 VAC. MCBs shall be DIN mounted. The MCB shall be Current Limiting type (Class-3). MCBs shall be classified (B, C, D ref IS standard) as per their Tripping Characteristic curves defined by the manufacturer. The MCB shall have the minimum power loss (Watts) per pole defined as per the IS/IEC and the manufacturer shall publish the values.

The housing shall be heat resistant and having a high impact strength. The terminals shall be protected against finger contact to IP20 Degree of protection. All DP, TP and TPN miniature circuit breakers shall have a common trip bar independent to the external operating handle.


#### **2.1.14 Earth Leakage Circuit Breaker Current Type (ELCB)**

##### **1. System of Operation**

Earth Leakage Circuit Breaker (ELCB) shall work on the principle of core balance transformer. The incoming shall pass through the toroidal core transformer. As long as the currents in the phase and neutral shall be the same, no electromotive force shall be generated in the secondary winding of the transformer. In the event of a leakage to earth, an unbalance shall be created which shall cause a current to be generated in the secondary winding, this current shall be fed to a highly sensitive miniature relay, which shall trip the circuit if the earth leakage current exceeds a predetermined critical value. ELCB shall be current operated independent of the line voltage, current sensitivity of 100/300 mA as required at 415 volts AC.

##### **2. Mechanical Operation**

The moving contacts of the phases shall be mounted on a common bridge, actuated by a rugged MNGL mechanism. Hence, the closing

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/opening of all the three phases shall occur simultaneously. This also shall ensure simultaneous opening of all the contacts under automatic tripping conditions.

3. Neutral Advance Feature  
The neutral moving contact shall be so mounted on the common bridge that, at the time of closing, the neutral shall make contact First before the phases; and at the time of opening, the neutral shall breaks last after allowing the phases to open first. This is an important safety feature, which is also required by regulations.
4. Testing Provision  
A test device shall be incorporated to check the integrity of the earth leakage detection system and the tripping mechanism. When the unit is connected to service, pressing the test knob shall trip the ELCB and the operating handle shall move to the "OFF" position.

### **2.2.0 Cables**

All cables shall be PVC insulated, PVC sheathed armoured, Copper/Aluminium conductor of the core & sizes as required and listed in the SOR. All cables shall be of approved make as given in the " List of Approved Makes (Annexure-I)."

All control cables shall be PVC insulated , PVC sheathed , armoured and of solid copper conductor of the core & sizes as required and listed in the SOR.

All cables shall conform to the latest version of IS:1554(Part I)

#### **Testing of cables**

Cables shall be tested at works for the acceptance tests before being dispatched to site by the Contractor/manufacturer.

Test shall also be conducted at site for insulation between phases and between phase and earth for each length of cable, before and after jointing. On completion of cable laying work, the following tests shall be conducted in the presence of the MNGL's site representative.

- a) Insulation Resistance Test
- b) Continuity Resistance test.
- c) Sheathing continuity test.
- d) Earth test.(in armored cables)

All tests shall be carried out in accordance with relevant Standard Code of Practice and Electricity Rules. The Contractor shall provide necessary instruments, equipment and labour for conducting the above tests and shall bear all expenses in connection with such tests. All tests shall be carried out in the presence of the MNGL's site representative.

### **2.3.0 Automatic Voltage Regulator**




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- 2.3.1** The Automatic Voltage Regulators shall be rated for 3 phase with neutral of the rating as per requirement and as per the SOR. The AVR shall comprise three nos. of single phase servo controlled voltage regulator connected to provide 415V, 3phase, 4 wire output with input voltage range of 260 to 480 volt. The AVR shall conform to latest version of IS:9815. The AVR of rating 20 kVA and above shall be of oil cooled type .
- 2.3.2** The AVR shall be designed for outdoor duty.
- 2.3.3** All the windings of the AVR shall conform to the class F insulation with the temperature rise limited to that for the class B.
- 2.3.4** Tenderer's scope of work and supply shall include complete design, supply, erection, testing and commissioning including all material required for the same.
- 2.3.5** The output voltage shall be 3 phase with neutral, 50 Hz, 415V +/- 1%
- 2.3.6** The regulator shall be designed for an ambient temperature of 45 deg cent. The absolute temperature of the AVR shall not exceed 85 deg cent.
- 2.3.7** The AVR shall be designed for the unbalanced load conditions as defined in the applicable national/international standards.
- 2.3.8** The AVR shall be designed such that it shall be possible to start the largest motor in the station with all the balance connected load in the station fed from the AVR and the system shall remain stable without causing tripping of any equipment due to voltage dip.
- 2.3.9** Loss of one phase in the primary supply voltage shall result in tripping of the regulator and there shall be indication to that effect.
- 2.3.10** In the event of failure of AVR and consequent tripping, the same shall be indicated at a remote location with audio visual alarm.
- 2.3.11** The AVR shall trip on high temperature condition i.e. at 80 deg cent. Provision for the same shall be provided in the AVR.
- 2.3.12** High and low voltage cutout shall be provided in the AVR.
- 2.3.13** A 4 pole MCCB of suitable rating shall be provided on output side of the AVR. THE MCCB shall be derated for the ambient temperature of 50 ° C.
- 2.3.14** AVR shall be provided with manual override for regulation of the voltage.
- 2.3.15** Following audio visual alarm shall be provided in wall mounted sheet steel enclosure box to be located in control room :

Cable between AVR and annunciation box in control room shall be provided.

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- a) Low voltage & High voltage
- b) Low oil level
- c) Unbalance phase
- d) Low / high frequency
- e) Over load

**2.3.16** The AVR shall be suitable for indoor with minimum ingress protection class of IP- 54.

**2.3.17** The input/output terminals shall be provided inside the cable boxes of adequate size and the cable entries in the cable box shall be from bottom.

**2.3.18** AVR shall be provided with bi-axial wheels for mobility in all directions.

**2.3.19** An effective arrangement for checking the oil level shall be provided outside the AVR.

**2.3.20** The Tenderer shall furnish following drawings/documents in triplicate for MNGL's approval.

- a) General arrangement drawing showing the dimensions and the maintenance clearances.
- b) Power supply scheme and the wiring diagram
- c) Operation and maintenance manual
- d) List of spare parts with ordering specs.

**2.3.21** The AVR shall be inspected by MNGL's representative and the inspection tests shall include the temperature rise test in addition to the routine tests at manufacturer's works.

#### **2.3.1 Lighting Distribution Board**

LDBs shall be supplied, erected, tested and commissioned by the Contractor. The lighting distribution board shall be of sheet steel construction and shall be wall recessed mounting type, double door construction, indicator lamp, Ammeter, Volt meter and shall be dust and vermin proof. The LDBs shall be of reputed make and MCBs used shall be of reputed make as per the Approved list of the Makes. The MCBs shall be rated for 10 kA fault rating. The bus bars shall be of rating not less than 100A for phase and the neutral. Each LDB shall be provided with ELCB and MCB of adequate rating and type (TPN/DP/SP as required) on the incoming side and outgoing side. LDB for Outdoor Lighting shall be complete with 24 Hours dual / multiple setting synchronous timer with battery backup, push button etc as required.

#### **2.4.0 Capacitor Banks**

##### **2.4.1 Scope**

Design, manufacture, supply, erection, testing and commissioning of Indoor type power correction capacitor banks for power factor improvement as per specification given below:



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**2.4.2 Standard**

Unless otherwise stated below, the power capacitors shall conform to IS: 2834 - 1986.

**2.4.3 Rating**

20 KVAR (or less) capacitor units shall be used to form a bank of capacitors of desired capacity.

**2.4.4 Construction**

The Capacitor shall be APP type. The elements shall be connected to the external bus bars through these leads in a series parallel connection to form a three phase unit.

The capacitor units shall be enclosure in wall mounting type sheet steel enclosed and controlled from PDB. The container of capacitors shall be hermetically sealed made out of 2 mm thick M S sheet steel and synthetic non-inflammable oil shall be used for insulation. Each standard unit shall be provided with a built in fuse.

Total Harmonic Distortion (THD) of 5% on voltage and current waveforms shall not affect the life of capacitors.  $415 \pm 10\%$  variation in line voltage shall not affect the life of the capacitors.

**2.4.5 Discharge Resistance**

Capacitors shall be provided with permanently connected discharge resistors so that residual voltage of capacitors is reduced to 50 volts or less within one minute after the capacitors are disconnected from the source of supply.

**2.4.6 Terminals**

Each capacitor bank shall be provided with a terminal chamber and cable glands suitable for termination of PVC insulated, PVC sheathed, steel armoured, copper conductor cables.

**2.4.7 Earthing**

Two separate earthing terminals shall be provided for earth connection of each bank.

**2.4.8 Testing**

The capacitor bank shall be subject to tests as specified in relevant Indian Standards at the factory and the test certificates shall be furnished in quadruplicate.

**2.4.9 Installation**

- I. Capacitor banks shall be installed as per installation manual of supplier and shall conform to relevant Indian Standards.
- II. All interconnections in the control panel shall be checked before commissioning.



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- III. Cable end boxes shall be sealed after cable connections to prevent absorption of moisture.
- IV. 6.5mm thick rubber matting of an approved make shall be provided in front of the full length of the capacitor bank and control panel.

**2.4.10 Testing and Commissioning**

- I. Insulation resistance shall be tested with a 1000 volts megger between phases and phase to earth.
- II. Residual voltage shall be measured after switching of the capacitors and the same shall not be more than 50 volts after one minute.
- III. Each discharge resistor shall be tested for its working.

**2.5.0 Cabling Accessories**

All cabling accessories like cable lugs, double compression cable glands, terminal blocks shall be of reputed and approved makes. The cable lugs shall be long barrel, heavy duty, solderless crimping type and shall be crimped with the help of hydraulic crimping tool.

**2.6.0 Earthing**

Each CNG station shall be provided with an effective earthing system the earth resistance value of which shall be less than 1 ohm. In case the earth resistance of 1 ohm is not achieved by one earth pit, more no. of earth pits shall be constructed in the vicinity of electrical room/electrical installations as per drawings or as directed by MNGL site incharge. All the non-current carrying metal parts of electrical installations and all metal conduits trunking, cable sheaths, switchgear, distribution panels, light fittings and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system. All metal work such as pipe lines, stairways etc shall be bonded to earth as specified. All earthing shall be in conformity with IS:3043 1987. Earth resistance value of each earth pit shall be tested individually and combined and records of the values noted shall be properly documented and submitted to MNGL(in 4 sets)

Separate earth pits for the Electronic earthing shall be constructed. The earth pits for the electronic earthing shall not be connected to the electrical earthing grid.

**2.6.1 Earth pits and earthing conductors:**

Earth pits shall be constructed at the designated locations as per the IS:3043 – 1987. The GI pipe shall be of 3.0 M length and 65 mm  $\phi$  and shall be of medium duty (Class–B type) as per the IS: 1239

GI strips of 40x5mm size shall be used as earthing conductor for the main earth grid and for the earthing of main electrical equipment, compressor skid/body and cascade etc. and also as lightning down - conductor.

G.I.strips shall be used for earthing of small equipment like J.B.s, starter





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panel, dispenser, lighting distribution boards, lighting poles etc. The G.I. strip shall be terminated through nut/bolts using spring washers. The size of the strip to be used for different equipment is indicated against clause 03.25

G.I. strips shall be extended by brazing/welding the lap jointed strip.

Zinc to be used shall conform to minimum Zn 98 grade as per requirement of IS: 209- 1992. Minimum weight of zinc coating for mild steel flats with thickness upto 6 mm in accordance with IS: 6745-19742 shall be 400 g/mm<sup>2</sup>

The Zinc coating shall be uniform, smooth and free from imperfections as flux, ash and dross inclusions, bare patches black spots, pimples, lumpiness, runs, rust stains bulky white deposits, blisters.

Mild steel flats shall undergo a process of degreasing pickling in acid, cold rinsing and then galvanizing. All joints and cut ends shall be properly painted with aluminum paint.

- 2.6.2** The earthing connections inside the electrical room and near the CNG compressor shall be terminated to the respective equipment through a G.I. plate of size 300x100x8mm thick with 10 nos. of holes suitable for 8mm dia nut and bolts. All terminations shall be done through spring washers.

**2.6.3 Connection of earthing conductors:**

Two runs of Main earthing conductors (40x5mm G.I. strip) shall be taken from the earth grid outside the electrical room to inside the electrical room. These earth conductors shall be terminated to three nos. of G.I. earth plate which shall be mounted onto the wall. The earth conductor of the specified size for earthing of all the electrical equipment inside the electrical room shall be taken from these earth plates the respective equipment. All joints in the G.I. strip shall be brazed. All joints through nut & bolts shall have spring washers.

Metal conduits, cable sheathing and armoring shall be earthed at the ends adjacent to distribution panel at which they originate, or otherwise at the commencement of the run by an earthing conductor in effective electrical contact with cable sheathing with the current carrying conductors within the flexible cord.

**2.7.0 BUILDING LIGHTING**

Building lighting shall be complete in all respects and shall include the followings:

- a) Providing, making, testing and commissioning of light points with TAC and FIA certified 1.5 sq. mm single core multi stranded copper conductor, PVC insulated, 1100 V grade wires in PVC conduit laid in ceiling / wall /ground in PVC pipes, complete with concealed G.I box, circuit wiring i.e. tapping from the DB, 1.5 sq mm insulated copper





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earthing connections etc. complete as required for all length of circuits

- b) Conduiting ,wiring , box and switches ,fittings and fixtures for electrical points, telephone/television points
- c) All finishes and any other works not specifically mentioned but required and handing over of premises , complete in all respects
- d) All light fittings/fans/fixtures /sockets /telephone/TV sockets etc as specified shall be provided.

Building lighting shall be provided as per the following guidelines for which a GA drawing and conduit layout drawing shall be submitted by the Contractor for approval before executing the work.

- A) Light fittings in the office, compressor room , electrical room , cash room, MMI Room and other such premises shall be as per drawing given by M/s MNGL official.


The no. of light fittings shall be calculated on the basis of one fitting per 6m<sup>2</sup> for (2 x 36 w) fixture and 3m<sup>2</sup> for (2x11w) CFL fixture.

Each room shall be provided with minimum one no. of 1400mm fan and more if area is more than 10m<sup>2</sup> at the rate of one per 10 m<sup>2</sup>.

The electrical room shall be provided with 4 nos. of 450 mm sweep industrial type exhaust fans.

Each Toilet shall be provided with one exhaust fan of 300mm sweep.

- B)
  - i) 6/16A 6 pin type Power sockets and circuit wiring with 4mm<sup>2</sup>, copper conductor PVC insulated wire shall be provided as below:-
    - a) 2 nos. in the Electrical room
    - b) 1 no. in the Compressor room
    - c) 2 nos. in the MMI room
    - d) 3 nos. in the Office Room
    - e) 1 no. near the place of Water Cooler
    - f) 1 no. in Cash Room
    - g) 2 nos. on the wall corner on the egress/engress side
  - ii) 20 Amp 3 pin Industrial type socket with 20A SP MCB in sheet steel enclosure for Air Conditioners.
- C) 6A plug socket shall be provided on each light/fan switchboard

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D) Telephone points shall be provided in the station alongwith MDF

E) Light points shall be provided on the building periphery at the upper floor for the signage lights.

### 2.7.1 Lighting Fixtures

The light fixture shall be complete with, lamp, control gear and ballast etc. All the tube lights shall be provided with power factor compensating condensers

Following type of light fittings or equivalent model shall be used of Philips or other approved make.

- |      |  |  |
|------|--|--|
| i)   | Office building/Stores/Cash Room/MMI Room                                | FCS 31/211<br>make Philips or eqv.           |
| ii)  | Electrical Room<br>501/236, HPF Air Compressor Room /workshop<br>or eqv. | TMC<br>make Philips                          |
| iii) | Street light pole mounted  | MRX 51/250 with<br>250 W HPIT lamp(Philips). |

Following type of flameproof and weather proof fittings shall be used of Baliga or Eqv. Type for the pole lights in hazardous area:-

Well glass light fitting of model no. FLPW 1095 suitable for 250W HPMV lamp

- Flameproof control gear box model FLP 925/250 for 250W HPMV lamp complete with the control gear.
- 4 way flameproof JB model FPJ 404/19 for ¾" ET entry with 4 way terminal strip.
- 250 W HPMV lamp
- Flameproof cableglands of type CG – 1011 for ¾ " ET entry as required.

### 2.7.2 Ceiling fans/ exhaust fans:-

- i) Ceiling fans shall be of 1200mm sweep and shall be complete with the solid state speed regulator.
- ii) Industrial type exhaust fans shall be of 450 mm sweep and 2900 rpm for the electrical premises and for other premises and shall be of 300 mm sweep for the toilets.

### 2.8.0 Street Light Poles

Steel tubular street light pole shall be swaged and welded construction as indicated in the schedule. Each pole shall comprise of a looping/terminal box clamped with top level 550 mm above ground level along with a suitable earth terminal. A base plate 300 x 300 x 10 mm shall be welded to



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the bottom of the pole. The looping box shall be provided with a suitable busbar arrangement to loop 2 cables of size as specified elsewhere. The pole shall be of the size/profile as given in the lighting pole drawings.

The steel tubular pole shall be suitable for mounting on concrete foundation, painted with black bituminous paint internally and externally up to the portion which goes inside the concrete and remaining part of exterior shall be painted as mentioned elsewhere in this specification. The civil work for street light pole foundation forms a part of erection. The street light poles shall be as per the following drawings:

- a) Light poles for Hazardous area – (attached in the tender)
- b) Light poles for Non Hazardous area - (attached in the tender)

**3.0 ERECTION  
SPECIFICATIONS Electrical  
Panels/Dist. Boards etc.**

- 3.0 All electrical panels/distribution board/electrical equipment/cables and other material shall be inspected again after receipt at site and shall be checked for completeness and damage etc.. Discrepancies if any shall be made up before taking up the erection.
- 3.1 All electrical panels shall be properly installed as per the applicable layout drawings. The installation shall be as per the applicable standards and Indian Electricity Rules . Panels shall be properly grouted/fixed to the base channel. The panels/switchboards shall be erected under the supervision of the manufacturer's supervisor and MNGL's representative. The manufacturer's supervisor shall be arranged by the Contractor. The panel shall be charged only after written clearance from manufacturer and MNGL. The site tests for all equipment shall be conducted as per the recommendation of the respective manufacturer.
- 3.2 Alignment/leveling etc. shall be thoroughly checked before fixing the panel permanently. The panel shall be fixed to the supporting channel through tac welding.
- 3.3 Bi-metallic washers shall be used at the points wherever Aluminum/Copper joints are involved.
- 3.4 All the meters and the protective relay and the associated CTs shall be tested and calibrated in the presence of MNGL's authorized representative and manufacturer's representative. The test and calibration reports thereof shall be documented and submitted to MNGL.
- 3.5 All the unused cable entries shall be properly plugged using brass nickel plated plugs.
- 3.6 The panels/boards shall be tested as per the relevant norms before charging.



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- 3.7 The cables inside the panel shall be terminated through the double compression cable glands and cable lugs.

**Cabling**

- 3.8 The cables shall be supplied, inspected, laid, tested and commissioned in accordance with drawings/ specifications and manufacturer's recommendations.

- 3.9 Cable terminations  
Cable termination shall be done in cable terminal box using solderless, heavy duty, long barrel type crimping lugs and proper size of glands of double compression type with earthing facility. All crimping shall be done by hydraulic crimping tool.

- 3.10 Bonding of cables

Where a cable enters any piece of apparatus, it shall be connected to the casing by means of an approved type of armor clamp and gland. The clamps must grip the armoring firmly to the gland or casing, so that no undue stress is passed on to the cable conductors and terminals.

- 3.11 Laying of cables  
Cables shall be laid by skilled and experienced workmen using adequate rollers to minimize stretching of the cable. The cable drums shall be placed on jacks before unwinding the cable. Great care shall be exercised in laying cables to avoid forming kinks. The relative position of the cables, laid on the cable tray shall be preserved and the cables shall not cross each other. At all changes in direction in horizontal and vertical planes, the cable shall be bent smooth with a radius as recommended by the manufacturers. All cables shall be laid with minimum one diameter gap and shall be clamped at every meter to the cable tray and shall be tagged for identification with aluminum tag and clamped properly.

- 3.12 The cabling shall be done as per the approved cable layout drawings.

- 3.13 All cables passing through walls or coming out of ground shall run through GI Pipes of adequate diameter and length for protection.

- 3.14 The cables while running on the exposed surface shall be laid on perforated G.I. cable trays and shall be properly fixed using cable clamps.

- 3.15 Cable tags shall be provided at every 10M interval along the cable length and also at the end points of the cable and in the cable pits. The cable tags shall be made of aluminum strip. The cable tags shall be assigned to each cable. The nomenclature for the cable tags shall be furnished to the Contractor by MNGL.



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- 3.16 The GI pipes when used for laying the cables shall be amply dimensioned . The power and control cables shall not be taken in the same conduit. Similarly the instrument cables shall not be laid along with power and control cables.
- 3.17 GI wire of minimum 3mm dia shall be left in the GI pipes while laying the pipes to pull the cable later.
- 3.18 All pipe ends shall be duly protected against ingress of mortar/debris etc.
- 3.19 Termination of the cables shall be carried out using heavy duty long barrel solderless crimping type cable lugs. All cable crimping shall be done with help pf hydraulic crimping tool.

**Earthing & Lighting protection:**

- 3.20 Earth pits shall be constructed as per IS:3043 (1987) and drawing provided by MNGL.
- 3.21 G.I. Strip of 25x6mm size shall be used as the main earthing ring conductor. The G.I. strip shall be extended lengthwise through a lap joint which shall be brazed/welded. The earth strip shall be covered under the topmost screed concrete. The earth strip when laid exposed on wall/floor shall be clamped properly at regular intervals.
- 3.22 The earth strip shall be made available inside the cable pits and near the equipment (to be earthed) for further extension/ terminations.
- 3.23 All terminations shall be through Galvanised / paassivated nut & bolts using spring washers and check nuts.
- 3.24 Earth pit and Earth strip layout shall be as per the approved drawing.
- 3.25 All equipment shall be grounded using earth conductor of sizes as indicated below:-
- |   |   |                   |
|---|---|-------------------|
| Electrical Panel/Distribution Board/              | - | Earthing at 2     |
| points using Electrical Switch box/Capacitor Bank |   | 25x6 mm           |
| G.I.strip   |   |                   |
| DG Set  | - | Earthing at 2     |
|   |   | points using 25x6 |
|   |   | mm G.I.strip      |
| Lighting Distribution Board /                     | - | Earthing at 2     |
|   |   | points using 25x6 |
|   |   | mm G.I.strip      |
| Compressor Skid                                   | - | Earthing at 2     |
|   |   | points using 25x6 |
|   |   | mm G.I.strip      |



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Building structure/columns	-	Earthing at 1 point using 25x6 mm G.I.strip
Cascade/Dispenser	-	Earthing at 2 point using 25x6 mm G.I.strip
Lighting Pole	-	Earthing at 2 point using 25x6 mm G.I.strip
Electrical Motors	-	Earthing at 2 point using 25x6 mm G.I. strip
Lightning down conductors	-	25x6 mm G.I. strip

### **3.26 Canopy Lighting**

- a. Supply, installation, testing and commissioning of lighting system for the canopy using the under lights as specified.
- b. The total lighting system shall be complete in all respects including earthing of the light fittings. The wiring for the canopy lights shall be done with 4 x 2.5 mm<sup>2</sup> copper conductors armoured cable of the approved make and shall be provided with inspection and maintenance covers/JBs etc. which shall be conveniently accessible. Not more than two canopy lights shall be controlled from one MCB. Accordingly the 2.5 mm<sup>2</sup> double circuit wiring phase & neutral) shall run from one switch and shall be looped inside the canopy. It shall be ensured that neutrals of the one circuit are not looped with neutral of the other circuit. All conduits carrying the wires shall be firmly secured in position.
- c. The electrical wiring of the canopy for the canopy lights and lighting fixture complete in all respects shall be supplied and installed as required.



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## **8. TECHNICAL SPECIFICATION FOR UPS SYSTEM & BATTERY SETS**

### **CONTENTS**

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2.0 STANDARDS

3.0 GENERAL REQUIREMENTS

4.0 DRAWING AND DOCUMENTS

5.0 INSPECTION

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ANNEXURE-II TECHNICAL DATA FROM

MANUFACTURER

ANNEXURE-III APPROVED VENDOR LIST FOR UPS AND BATTER

BANK ANNEXURE-IV CHECK LIST FOR UPS



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## **1.0 SCOPE**

The intent of this specification is to define the requirements of uninterrupted power supply system and the associated battery sets. Tenderer's scope of work includes design, manufacture, testing, packing and delivery to site and testing & commissioning of the complete UPS system with static by-pass, solid state voltage stabiliser for by-pass supply, distribution board and battery banks etc. as per this specification, data sheet and SOR.

## **2.0 STANDARDS**

**2.1** In general the equipment covered by this specification shall unless otherwise specified be in line with the requirement of any of the latest applicable standards of

- a) Bureau of Indian Standards
- b) British Standard Institution
- c) American Standard Institution
- d) International Electro Technical Commission

**2.2** Wherever the requirements in this specifications are in conflict with any of the above Standards, the requirements under this specification shall be binding.

## **3.0 GENERAL REQUIREMENTS**

### **3.1 Uninterrupted Power System**

#### **3.1.1 Basic Particulars for Design**

1. Basic Details
  - Suitable for industrial application.
  - The rating of the system shall be as per Schedule of Rates at 0.8 p.f. lagging at 45°C ambient.
  - 125% of the rated output for 15 minutes.
  - Automatic selection of available phase (out of three phases) in case of outage of power supply of the phase in use for feeding incoming power supply to the UPS.
  - Single phase voltage and frequency controlled output.
  - Single/ Dual redundant system with automatic static bypass, common DC battery and solid state voltage stabilizer as per data sheet and drawing.
  - The load shall normally be fed from the inverter.
  - Battery shall be suitable to maintain the power supply in the event of mains failure or battery charger failure for time period as indicated in Schedule of Rates.
  - Static by pass switch to connect the load to the mains supply through static voltage stabilizer or hot standby UPS, as per the configuration, without interruption to the load in the event of inverter failure.
  - AC Distribution board as per data sheet.
  - Space heater and panel illumination to be provided.





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2. Permissible Variations
  - a) Mains power supply system :-  
Voltage :  
+10%, - 20%  
Frequency :  $\pm 5\%$
  - b) Output of the uninterrupted power supply system while  
delivering a load of its rated capacity :-  
Voltage :  $\pm 1\%$   
Frequency :  $\pm 1\%$
  - c) Accuracy of static type voltage stabilizer for bypass supply  
shall be within  $\pm 2\%$
3. Protective Features
  - Short circuit and overload protection
  - DC Earth Fault

**3.1.2 Transformer**

1. Rating suitable for the application
2. Dry type, with class 'H' insulation
3.  $\pm 2.5\%$  tapings on primary side.

**3.1.3 Rectifier/ Battery Charger**

1. Switched ON through a MCCB
2. Charger size shall be based on the maximum inverter input load  
current and recharging current (in maximum time of 10 hours after  
complete discharge).
3. With transient and surge protection circuit in input circuit to protect  
UPS from surges and voltage Spikes.
4. With necessary smoothing reactor and filters
5. Automatic boost and float charging control
6. Protective features :
  - Maximum current limiting
  - Over temp. trip.
  - Boost charging and float charging current limiting with back  
up protection against overcharging.
7. Indications :
  - As per manufacturer's standard.

**3.1.4 Inverter**

1. With input circuit consisting of battery MCCB, battery filter and  
smoothing reactor.
2. DC/DC converter for voltage control
3. Control electronics
4. Series reactor and parallel filter
5. Output transformer
6. Protection against the following :
  - Abnormal output voltage



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- Abnormal link voltage
  - Over load trip
  - Low battery voltage
  - High transformer temperature
  - Auxiliary supply failure
7. Meters
- For output voltage
  - For output frequency
  - Ammeter
  - Battery current and voltage with indication of status - "in charge" or "discharge".
8. Static by-pass switch
- Static switch automatically switches the load to the reserve power supply or the mains whenever there is failure in inverter supply to the load.
  - Retransfer of load from stabilized bypass supply to the inverter in auto as well as in manual mode.
  - High speed fuses shall be provided for protecting the thyristors against accidental overload.

Following indications & alarms shall be provided in the by-pass module. Indications

- Load on bypass

**3.1.5 Constructional Features**

1. Unitised construction
2. Free standing, floor mounted, indoor type and complete with all interconnection.
3. Dust and vermin proof
4. Sheet steel clad
  - Minimum 2 mm thick for panels
  - Minimum 1.6 mm thick for doors and side covers
5. Units shall be self contained and serviceable
6. The arrangement and layout shall facilitate easy and convenient supervision of the unit while running as well as quick detection of disturbances and trouble shooting.
7. Copper earth bus bar shall run throughout the length of Panels. All doors & noncurrent carrying parts shall be suitably earthed.
8. Dimensions of panels shall be such that it can be accommodated in existing room if indicated in MR/ SOR.
9. The maximum and minimum operating height of the switches shall be 1800mm and 300mm respectively.

**3.1.6 Enclosure and Ventilation**

- Enclosure conforming to minimum IP-31 class.
- Units shall be provided with cooling fans and louvers.



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**3.2 Battery unit**

3.2.1 Ampere hour capacity of the battery shall be selected on the following basis:

- a) Load power factor of 0.8
- b) Aging factor of 0.8
- c) Battery state of charge factor of 0.95
- d) Minimum ambient temperature as specified in data sheet
- e) Backup time as specified in data sheet
- f) Maximum end cell voltage shall be 1.85 V.

3.2.2 The lead acid battery shall be of VRLA maintenance free type as per MR / SOR.

3.2.3 Sets of Indoor Stationary batteries of type as per enclosed data sheet complete with all required accessories as applicable including but not limited to the following shall be supplied with each battery set ;

- a) Battery stands in double row/ double tier formation as per battery manufacturer's standard.
- b) Cell testing voltmeter complete with leads- (1 no. per set).
- c) Spanner - (1 no. per set).

3.2.4 Overall dimensions of complete battery set shall be such that it can be accommodated in existing room if indicated in data sheet.

**4.0 DRAWINGS AND DOCUMENTS**

4.1 The following documents shall be submitted along with the offer :

- a) List of two years operation and maintenance spare.

4.2 The following drawings shall be submitted for approval within 3 weeks of award of contract.


- a) G.A. of panel and battery stand.
- b) Schematic
- c) Bill of Material
- d) Wiring diagram for reference.

4.3 Final drawings, operation & maintenance manual and erection instructions shall be submitted along with dispatch of equipments in number of sets as specified in the contract.

**5.0 INSPECTION**

Inspection and testing of equipment shall be carried out by the owner/ consultant at the works of the contractor on final product to ensure conformity of the same with the acceptable criteria of technical specification, approval drgs. and reference national/ international standards.

5.1 The contractor shall submit Quality Assurance Plan (QAP) for respective equipments within 3 weeks of award of contract.

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QAP shall be prepared and furnished by the contractor in MNGL Form No. 11.20(4.4) F-10 alongwith their internal in process quality checks.

- 5.2 'Type test' including 24 hr. heat run test shall be conducted on one UPS System of each rating and 'Acceptance test' on the remaining.
- 5.3 Batteries shall be tested for type and 'Acceptance Test'/ Routine Test at battery manufacturer's works and test reports shall be submitted for review and approval.
- 5.4 Final acceptance testing alongwith the batteries shall be done at site. Site acceptance test procedure shall be submitted by the Contractor alongwith QAP.



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**ANNEXURE - I**

**PURCHASER'S DATA FOR UPS**

1.0	<b>INPUT POWER SUPPLY</b>	
1.1	Voltage/freq./ phase :	415V (+10% -20%), 3 Phase, 50 Hz $\pm$ 5%
2.0	<b>SITE CONDITION</b>	
2.1	Design Ambient/ Minimum ambient	45°C / Min. 20°C
2.2	Max. relative humidity	98%
3.0	<b>SYSTEM REQUIREMENTS</b>	
3.1	Input Power Supply to System	415V , 3Phase, 50 Hz
3.2	Type of inverter	Transistorised (IGBT) or Latest proven technology
3.3	Rating (KVA at 0.8 pf.)	KVA as per Schedule of Rates
3.4	Overload capacity	125% for 10 min.
3.5	Mode of operation	Single with bypass as per SOR
3.6	Load p.f.	0.8 (with variation between 0.6 to 1.0)
3.7	Type of battery	<b>VRLA SMF</b>
3.8	Batter Sizing : i) Battery end cell voltage ii) Battery Derating Factor (Battery State of charge, Aging & Temperature Correction) iii) Load Power Factor iv) Battery backup time v) Battery stand formation	1.85 V/Cell 1.62 0.8 4 Hours Double Row and Double tier
3.9	Type of enclosure	Minimum IP-31
3.10	Cable entry	From bottom



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**ANNEXURE – II**

**TECHNICAL DATA FOR UPS  
(To be filled up by the Contractor)**

1.0	<b>INVERTER</b>	
1.1	Manufacturer's Ref. No./ Model No.	
1.2	Rating (at specified ambient) / no. of phases	
1.3	Applicable codes/standards	
1.4	Steady state output volt/freq (230 V $\pm$ 1%) (50 hz $\pm$ 1%)	
1.5	Input volt.- DC	
1.6	Synchronisation (inv. phase locked with main) in percentage	
1.7	Harmonics distortion for linear & non-linear loads (not more than 4% and 15% respectively).	
1.8	Mode of operation	Ref. SOR
1.9	Transient Response for 100% load variation	
1.10	Recovery time to reach steady state after above disturbance (in m sec)	
1.11	Overload capacity (125% for 10 mtrs.)	
1.12	Degree of protection of the panel.	
1.13	Noise Level (dB. A at 1 m) (not more than 75 dBA)	
1.14	Efficiency at 100% load (not less than 80% at 100% load)	
1.15	Type of control circuit (Static PWM)	
1.16	Crest Factors	1.3
2.0	<b>BATTERY CHARGER</b>	
2.1	Rating (Amp.) / kW	
2.2	Type of charger (Basic configuration)	
2.3	Output volt under float/boost charging condition	
3.0	<b>BATTERY</b>	




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3.1	Make	
3.2	Type (Enclose catalogue)	<b>VRLA</b>
3.3	AH rating (Enclose back up calculation)	
3.4	End cell volt. at specified discharge rate (V/ cell)	1.85 V / Cell
3.5	Output (Nominal) volts	
3.6	Nos. of cells	
3.7	Charging time( Hrs.) (10 – 12 hrs.)	
3.8	Battery Bank dimension (L*W*H)	
3.9	Accessories for battery	Included.
4.0	Control	
5.0	Indications and Alarm	
6.0	METERING	
7.0	UPS Dimension (L x W x H) including Battery.	
8.0	<b>OVERALL EFFICIENCY OF UPS SYSTEM</b>	
8.1	Ratio of output load to input drawn from mains when inverters are on and synchronised with bypass. a) At 100% load (not less than 80% at 8 p.f.) a) At 75% load b) At 50% load	
9.0	<b>RELIABILITY</b> a) MTBF / MTFR b) Availability factor	
10.0	DEGREE OF PROTECTION	
11.0	Heat loss for total system (W)	
12.0	Fault status compatible to hook-up with Owner's PC through RS 232/ RS 485 interface.	

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ANNEXURE – III		
APPROVED VENDOR LIST FOR UPS AND BATTERY BANK		
1.	BATTERIES (VRLA Type)	EXIDE / HBL-NIFE
2.	UPS	Aplab Emerson SYNERGY SYSTEMS
FOR ANY OTHER ITEMS WHICH ARE NOT LISTED ABOVE, SHALL BE SUBJECT TO MNGL APPROVAL.		





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**ANNEXURE - IV**

**CHECK LIST (To be filled up by tenderer)**

<b>Sl.No</b>	<b>Description</b>	<b><u>REMARKS</u></b>
1	Deviation from specification	Offer may be rejected if there is any deviation
2	Charger sizing calculation enclosed	
3	Battery sizing calculation enclosed	
4	Battery catalogue enclosed	
5	UPS Panel Catalogue enclosed	
6	Confirm compliance to Block diagram	
7	Inspection for UPS and battery as per specification.	
8	Dimension for UPS Panel, rectifier and Battery Bank enclosed.	
9	Unpriced schedule enclosed	
10	Break up for two years operation & maintenance spares enclosed for UPS	



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**Annexure-I**

**LIST OF APPROVED  
MAKES (ELECTRICAL)**

- 1. A.C. Distribution Board (PDB/MCC)**
  1. Alstom,
  2. Siemens Ltd.
  3. L&T
  4. Elecmech
  5. Venus control
  6. Bhartia (BCH)
  7. Havells(ECS)
  8. Indo Asian
  9. Control and Switchgear
  10. Kaybee Powelec (P) ltd. (chennai)
- 2. Automatic power factor correction relay**
  - 1 Alstom
  - 2 Syntron
  - 3 Phasitron
- 3. Automatic voltage regulator (AVR)**
  - 1 Automatic Electric
  - 2 SAI Electrical
  - 3 Selvon
- 4. Batteries (Nickel Cadmium)**
  - 1 Amco Batteries Ltd.
  - 2 HBL Nife Power Systems Ltd.
- 5. Batteries Lead Acid (VRLA type)**
  1. Amco Batteries Ltd.
  2. Exide Industries Ltd.
  3. Amara Raja Batteries Ltd.
  4. HBL Nife
- 6. Battery charger**
  1. Amara Raja
  2. Automatic electric
  3. Chabbi Electrical
- 7. Cable Glands Double Compression**
  1. Baliga
  2. Comet
  3. Dowel



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- 8. Cable jointing Termination kit**
  1. Raychem
  2. Yamuna Gases and Chemicals Ltd (Denson brand)
- 9. Cable lug**
  1. Dowells
  2. Jainsons
- 10. Ceiling / Exhaust / Pedestal Fans & Circulators**
  1. Crompton Greaves Ltd.
  2. Alstom Ltd.
  3. Khaitan Electricals Ltd.
  4. Orient General Industries Ltd.
  5. The Jay Engg. Works Ltd. (Usha Brand)
- 11. Change over switch**
  1. CGL
  2. L&T
  3. Siemens
  4. HPL SOCOMEC
- 12. Contactors – AC Power**
  1. Bhartia Industries Ltd.
  2. L&T Ltd.
  3. Siemens Ltd.
  4. Telemenchanique & Controls (India) Ltd.
  5. GE power controls
- 13. Contactors – DC Power**
  1. Bharat Heavy Electricals Ltd.
  2. Bhartia-Culter-Hammer Ltd.
  3. L&T
- 14. Control Transformers**
  1. Automatic Electric Ltd.
  2. Bhartia-Culter-Hammer Ltd.
  3. Indcoil Manufacturing Co.
  4. National Engineering Corporation
  5. KALPA Electrical
- 15. Control & Relays Panels**
  1. Alstom
  2. Bharat Heavy Electricals Ltd.
  3. Asea Brown Boveri Ltd.
  4. L&T
  5. Siemens
  6. BCH



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7. NGEF
- 16. Current transformer (Epoxy cast Resin)**
1. Automatic Electric
  2. kappa
  3. Voltamp
- 17. Digital meters (A/V/PF/Hz/KW/KWH)**
1. Enercon System Pvt. Ltd
  2. MECO
  3. Automatic Electric
- 18. Earth leakage circuit breaker (ELCB)**
1. L&T (Hager)
  2. Groupe Schneider
  3. MDS switchgear ltd
  4. Indikopp (Indio Asian fusegear ltd.)
  5. Havells India ltd
  6. GE Power Controls India pvt ltd
- 19. Electronic Energy meter**
1. ABB
  2. Secure meters
  3. L&T
- 20. HT AC Motors(3.3 & 6.6 KV)**
1. BHEL
  2. Crompton Greaves Ltd.
  3. Alstom Ltd.
  4. Kirloskar Electric Co. Ltd.
  5. NGEF Ltd.
- 21. HT Power Cable**
- 1 UNIVERSAL Cables Ltd.
  - 2 ASEAN Cables & Industries Ltd.
  - 3 CCI Ltd.
  - 4 NICCO Corporation Ltd. (Cable Division)
  - 5 FORT Gloster Industries Ltd.
  - 6 Industrial Cable (I) Ltd.
  - 7 TORRENT Cables Ltd (Upto 11 KV only)
- 22. Indicating Lamps**
1. Bhartia Industries Ltd.
  2. L&T Ltd.
  3. Siemens Ltd.
  4. GE Power Control India Pvt. Ltd
  5. Alstom



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- 23. KWH meter(flush type)**
1. L&T
  2. ALSTOM
  3. Simmco
- 24. Lighting Distribution board (standard prefabricated)**
1. MDS
  2. Indoasian
  3. Siemens
  4. Havells
  5. Schneider Electric
- 25. Lighting Fixtures ( Flameproof )**
1. Bajaj Electricals Ltd.
  2. Baliga Lighting Equipment Pvt. Ltd.
  3. Crompton Greaves Ltd.
  4. CEAG Flameproof Controlgear Pvt. Ltd.
  5. Flexpro Electricals Pvt. Ltd.
  6. Flame Proof Equipments Pvt Ltd.
  7. Sudhir Switchgear Pvt. Ltd.
  8. Philips
  9. Prompt Engg. Work
  10. Ex-Protecta
  11. Govan Industries(India) Pvt Ltd
  12. NEMA Switch Gear
  13. Sai industries
- 26. Lighting Fixtures /LED**
1. GE Lighting India Pvt. Ltd.
  2. Bajaj Electricals Ltd.
  3. Crompton Greaves Ltd.
  4. Philips India Ltd.
  5. Wipro
  6. Fourehune Art
- 27. LT AC Motors (Crane Duty)**
1. Crompton Greaves Ltd.
  2. Alstom
  3. Kirloskar Electric Co
  4. NGEF Ltd.
- 28. LT AC Motors (Flame Proof)**
1. Alstom Ltd.
  2. Bharat Bijlee Ltd.
  3. CGL
  4. KEC



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**29. LT AC Motors**

1. Siemens (above 160m frame)
2. NGEF
3. CGL
4. KEC
5. ABB
6. Alstom
7. Bharat Bijlee Ltd. (upto 250m frame)

**30. LT Air Circuit Breaker Panels**

1. Controls & Switchgear Co. Ltd.
2. Crompton Greaves Ltd.
3. Alstom
4. L&T
5. NGEF Ltd.
6. Siemens Ltd.
7. Andrew Yule & Co. Ltd.

**31. LT Capacitors**

1. Asea Brown Boveri Ltd.
2. Kapsales Electricals Ltd.
3. Madhav Capacitors Pvt. Ltd.
4. NGEF Ltd.
5. Shreem Capacitors
6. Universal Cables Ltd.
7. Usha Rectifier Corporation (I) Ltd.
8. Mehar Capacitors Pvt. Ltd.
9. Alstom

**32. LT Power Cable**

1. UNIVERSAL Cables Ltd.
2. ASEAN Cables & Industries Ltd.
3. CCI Ltd.
4. NICCO Corporation Ltd. (Cable Division)
5. FORT Gloster Industries Ltd.
6. Industrial Cable (I) Ltd.
7. TORRENT Cables Ltd.
8. KEI
9. Finolex Cables
10. Polycab
11. Havells

**33. Miniature Circuit Breaker (MCBs)**

1. Havell's India Ltd.
2. Indo Asian Fusegear Ltd.
3. MDS Switchgear Ltd.



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4. North West Switchgear Ltd.
5. S&S Power Switchgear Ltd.
6. Siemens Ltd.
7. L&T (Hager)
8. Groupe Schneider
9. Indo Asian fusegear ltd.
10. GE Power Control India Pvt. Ltd.

**34. Miniature Circuit Breakers (MCBs) and Lighting DB**

1. Havell's India Ltd.
2. Indo Asian Fusegear Ltd.
3. MDS Switchgear Ltd.
4. Siemens Ltd.
5. S&S Power Switchgear Ltd.
6. GE power controls India pvt. ltd

**35. Moulded Case Circuit Breakers (MCCBs)**

1. AEG-NGEF Ltd.
2. Crompton Greaves Ltd.
3. Alstom
4. L&T
5. Schneider Electric
6. GE Power Controls

**36. Overload Relays – Thermal**

1. Bhartia Industries Ltd..
2. L&T Ltd.
3. Siemens Ltd.
4. Telemenchanique & Controls (India) Ltd.
5. Schneider Electric

**37. Panel Mounted CTs / PTs**

1. Automatic Electric Ltd.
2. Gilbert & Maxwell Electricals Pvt. Ltd.
3. Kappa Electricals
4. Pragati Electricals Pvt. Ltd.
5. Silkaans Electricals Mfg. Co. Pvt. Ltd.

**38. Programmable Logic Controllers**

1. Allen – Bradley India Ltd.
2. Asea Brown Boveri Ltd.
3. Cegele India Ltd.
4. Fanuc GE Automation India Ltd.
5. Alstom,
6. L&T
7. Siemens Ltd.
8. SPA Computers Ltd.
9. Tata Honeywell ltd.



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**39. Protective Relays**

1. Asea Brown Boveri Ltd.
2. Easun Reyrolle Relays & Devices Ltd.
3. Alstom

**40. Push Buttons**

1. Bhartia Industries Ltd.
2. Alstom
3. L&T
4. Siemens Ltd.
5. Telemenchanique & Controls (India) Ltd.
6. GE power control India pvt. ltd.

**41. PVC insulated copper conductor stranded wire**

1. Finolex
2. Plaza
3. Havells
4. Universal

**42. Soft Starters**

- 1 Allen –Bradley India ltd .
- 2 Cegelec India ltd.
- 3 Crompton Greaves ltd.
- 4 Hi-Rel Electronics pvt.
- 5 Siemens

**43. Static Annunciators**

1. Advani – Oerlikon Ltd
2. Applied Electronics ltd
3. Control Dynamics
4. Alstom
5. Industrial instruments & Control
6. Instrumentation Ltd
7. Minilec Controls Pvt. Ltd
8. Piri Systems Pvt ltd
9. Procom Instrumentation pvt ltd
10. Semuda Corporation

**44. Switch Fuse unit (HRC type)**

1. L&T
2. Siemens
3. GE power controls
4. Bhartia
5. Schneider Electric
6. Control & Switchgear
7. Alstom





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**45. Switch Socket Outlets (Industrial)**

1. Best & Crompton Engineering Ltd.
2. Bhartia Industries Ltd.
3. Crompton Greaves Ltd.
4. Essen Engineering Company Pvt. Ltd
5. Alstom

**46. Switches – 6/16A Piano/ Plate, Switch Socket**

1. Anchor Electronics & Electricals Pvt. Ltd.
2. Kingal Electricals Pvt. Ltd.
3. North-West Switchgear Ltd.
4. Crabtree
5. MK India
6. Avantikopp

**47. Switches-Control/Selector**

1. Bhartia Industries Ltd.
2. Easum Reyrolle Relays & Devices Ltd.
3. Alstom
4. Kaycee Industries Ltd.
5. Siemens Ltd.
6. Salzer (L&T)
7. GE Power Controls India Pvt. Ltd

**48. Terminals Blocks (Polyamide body with Copper alloy metal parts)**

1. Connectwell
2. Elmex Controls Pvt. Ltd.
3. Phoenix Contact
4. Wago and control

**49. Timers, Auxiliary Contactors, Relays**

1. Bhartia-Culter-Hammer Ltd.
2. Electronic Automation Pvt. Ltd.
3. Alstom
4. L&T
5. OEN Connectors Ltd.
6. Siemens Ltd.
7. Telemechanique & Controls (India) Ltd.
8. GE Power controls India pvt ltd.

**50. UPS**

1. Emerson N/W power
2. DB power electronics
3. APLAB Ltd.
4. SYNERGY SYSTEMS.



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**51. V V V F Inverters**

- 1 Allen –Bradley India Ltd.
- 2 Cegelec India Ltd
- 3 Crompton Greaves Ltd.
- 4 Hi-Rel control Pvt. Ltd.
- 5 Kirloskar Electric Co. Ltd.
- 6 L&T
- 7 Siemens Ltd.

**Note:**

- 1) For any other items which are not listed above ,shall be subject to prior approval  
from **MNGL**



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**ANNEXURE-II**

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**ELECTRICAL CHECK LIST  
TO BE FILLED-UP BY  
TENDERER**

Sl. No.	Description	Remarks
1.	No deviation from the Electrical Specification/ SOR	
2.	Unpriced SOR enclosed with offer	
3.	List of similar electrical job undertaken during last three years has been enclosed with the offer	
4.	List of electrical personnel employed, with their qualification & experience, has been enclosed with the offer	
5.	Credential of electrical sub-contractor, enclosed with the offer	
6.	Photocopy of Electrical Contractor's <b>license – grade A</b> has been enclosed with the offer.	



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## **PART – IV**

### **PREAMBLE TO SCHEDULE OF RATES**

#### **CONTENTS**

- 0.0 PREAMBLE TO SCHEDULE OF RATES – GENERAL
- 1.0 DEMOLITION OF BRICK/STONE MASONRY
- 2.0 DISMANTLING OF BOLTED/WELDED STEEL FENCING
- 3.0 TEMPORARY BARRICADING
- 4.0 SURFACE DRESSING
- 5.0 EARTHWORK IN EXCAVATION
- 6.0 EARTHWORK IN HARD ROCK
- 7.0 EARTHWORK IN FILLING
- 8.0 SAND FILLING
- 9.0 STONE SOLING
- 10.0 BRICKWORK IN FOUNDATION
- 11.0 B/W IN SUPERSTRUCTURE
- 12.0 PCC WORK
- 13.0 RCC WORK IN FOUNDATION
- 14.0 RCC IN SUPER STRUCTURE
- 15.0 REINFORCEMENT IN CONCRETE
- 16.0 COMPOUND WALL
- 17.0 BUILDING WORK



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18.0 SOAK PIT AND SEPTIC TANK



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- 19.0 U/G WATER TANK
- 20.0 RCC FLOORING IN FORECOURT
- 21.0 PAVER BLOCK FLOORING
- 22.0 SINGLE SS TUBE TRENCH
- 23.0 DOUBLE SS TUBE TRENCH
- 24.0 EXTERNAL SEWERAGE AND WATER PIPING
- 25.0 CABLE CHAMBER CONSTRUCTION
- 26.0 EXTERNAL WATER PIPING SYSTEM (BOREWELL CONNECTION)
- 27.0 PLASTER IN CM 1:4
- 28.0 PAINTING
- 29.0 PAINTING (OBD)
- 30.0 WHITE WASHING
- 31.0 SUPPLY AND FIXING GRANITE STONE
- 32.0 IPS FLOORING
- 33.0 WEARING COURSE
- 34.0 POLYCARBONATE SHEETING
- 35.0 PROVIDING AND FIXING CERAMIC GLAZED WALL TILE
- 36.0 PROVIDING AND FIXING VITRIFIED TILES
- 37.0 STEEL STRUCTURE FABRICATION
- 38.0 PROVIDING AND FIXING FENCING STRUCTURE
- 39.0 PROVIDING AND FIXING FENCING GATE
- 40.0 PROVIDING AND FIXING CHEQUERED PLATE COVERS
- 41.0 PROVIDING AND FIXING SAFETY GUARD AROUND DISPENSER ISLAND



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- 42.0 CANOPY
- 43.0 PROVIDING AND FIXING AL GLAZED FRAMING DOOR
- 44.0 SUPPLY, INSTALLATION & FIXING MONOLITH
- 45.0 KERB STONE FIXING
- 46.0 POLYSULPHIDE FILLING IN THE JOINTS
- 47.0 PROVIDING AND LAYING CAPCELL BOARD
- 48.0 EXTERNAL DEVELOPMENT
- 49.0 RAIN WATER HARVESTING
- 50.0 SPEED BREAKER
- 51.0 ELECTRICAL DISTRIBUTION PANEL
- 52.0 LDB/ACDB BOARD
- 53.0 ELECTRICAL CABLING
- 54.0 ELECTRICAL LIGHTING POLE
- 55.0 ELECTRICAL UNDERLIGHTING FOR CANOPY
- 56.0 GI/CU EARTH STRIP LAYING
- 57.0 CONSTRUCTION OF CU EARTH PIT
- 58.0 CONSTRUCTION OF GI EARTH PIT
- 59.0 GI /PVC PIPE LAYING
- 60.0 GI CABLE TRAY LAYING
- 61.0 UPS AND BATTERY SET
- 62.0 BUILDING LIGHTING



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#### **0.00 PREAMBLES TO SCHEDULE OF RATES - GENERAL**

The Preamble to **Schedule of Item** is an integral part of the SCHEDULE OF RATES and rates and this is to be considered incorporated into the description of items themselves. For related drawings reference be made to Annexure-I.

The Contractor's rate for any item of work in the schedule of item shall, unless stated otherwise be held to include the cost of all materials including wastage, conveyance and delivery, unloading, storing, fabrication, hoisting, all labour for finishing to required shape and size, tools and plants, power fuel, consumables, all taxes & duties royalties, other revenue expenses, temporary facilities like roads etc.

The item shall include all the safety provisions listed below:

1. The site should be cordoned off on all sides by way of 3 Mt. High corrugated GI sheet fixed on metal pipes/angles, leaving space for only a Gate. This fencing should be fixed such that it is not possible for anyone to enter the site from any other location other than the Gate.
2. The gate should be made in metal with metal sheet cladding. A guard restricting entry of all unauthorized person/material on site should man the gate. The guard shall also maintain a register of all persons visiting site.
3. All persons including all labor, supervisors, visitors etc. on site must wear hand gloves, helmet and safety shoes. The responsibility of this shall rest with the main contractor.
4. All workmen while working on height shall wear safety helmets.
5. All workmen such as welders/ fitters etc. shall wear protective gloves, protective glasses etc. and as per the requirement and demands of the trade.
6. All excavated pits/holes shall be cordoned off with red tape with warning notice.
7. All inflammable material shall be kept in non-inflammable containers that are fixed with screwed on caps at all times. The containers should be marked with danger sign and the name of the material shall be marked on the outside. There should be at least one person who should be responsible for the safe custody of these materials.
8. All areas of work shall have appropriate safety signage depending





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on the nature of work, prominently displayed to prevent any mishap, particularly signs in fluorescent paint for night vision. These signs should be visible

from a reasonable distance for a vehicular traffic at designated speed limits for a given road/ location. All necessary city traffic rules and signage specifications shall be observed with strict adherence.

9. All gadgets must have required safety devices in working conditions as per the manufacturers' recommendations and the law of the country.
10. All the persons on site must be insured against injury and death due to accidents.
11. The contractor shall not use the site for any activity other than what it is authorised for.
12. Children below the age of 18 shall not be allowed to work on site. The contractor shall prepare a secured crèche adjacent to the site, for the children of labor working on site and there shall be at least one person dedicated to look after the safety and other needs of these children at all time.
13. All persons working at site shall be physically and mentally fit. The contractor shall ensure that no illegal activity takes place on site and that no person with doubtful past shall be engaged on site.
14. The contractor shall be responsible for the safety of all persons at site.
15. Consumption of liquor and smoking shall not be permitted on the site.
16. The site shall be illuminated at night when there is work in progress.
17. The contractor shall maintain a First-aid box at site to take care of any minor injury.
18. The storing of all inflammable/explosive material shall be done as per the laws of the country and best common practice.
19. All temporary electrical connections shall be done with the help of insulated connectors to prevent any sparking etc.
20. Contractor shall keep the Owner and Consultant completely indemnified by ensuring a completely safe working, keeping a third party insurance cover on site.



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## **PREAMBLE TO SCHEDULE OF RATES**

### **1.0 DEMOLITION OF BRICK/STONE MASONRY:**

Demolition of brick/stone masonry, PCC, pavor block, stone soling etc. and disposal to suitable location is included in the scope.

Brief description of major items shall be as follows:

- a. Demolition of brickwork/stone masonry, PCC, pavor block, stone soling etc. using suitable tools/machine etc..
- b. Collecting all the dismantled material at one designated place.
- c. Disposal of unserviceable and surplus earth to authorized dumping ground to any lead.
- d. Soil to be leveled and neatly dressed as per direction of EIC.

*Note :*

- i) *Payments for item shall be based on net volume of brick / stone masonry, PCC, pavor block dismantled under respective SOR item.*

Dismantling shall be done as per the instruction by EIC issued to the successful tenderer. Offer to be prepared by the tenderer based on the on lump sum unit rate (per Cu.M).

### **2.0 DISMANTLING OF BOLTED/WELDED STRUCTURAL STEEL**

**FENCING:** Dismantling of bolted/welded structural steel fencing structure and disposal to suitable location is included in the scope.

Brief description of major items shall be as follows:

- a. Dismantling of bolted / welded structural steel fencing structure etc. using suitable tools/machine etc.
- b. Collecting all the dismantled material at one designated place.
- c. Disposal of unserviceable material to authorized dumping ground to any lead.
- d. Area to be properly cleaned as per direction of EIC.

*Note :*

- i) *Payments for item shall be based on net RM of the length of bolted/welded structural steel fencing structure dismantled under respective SOR item.*

Dismantling shall be done as per the instruction by EIC issued to the successful tenderer. Offer to be prepared by the tenderer based on the on lump sum unit rate (per RM).



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### **3.0 TEMPORARY BARRICADING:**

Providing and fixing temporary barricading using GI sheets and ISA 50x50x6 mm, grouting of angle etc. complete in all respect as per direction of EIC

Brief description of major items shall be as follows:

- a. Taking pre-work and finished levels.
- b. Excavation,
- c. CC cutting
- d. Fixing ISA 50x50x6 mm by grouting with 1:3:6 mix
- e. GI sheets shall be properly held in position by grouted angles.

*Note :*

- i) *Payments for the item shall be based on length of barricading constructed*
- ii) *Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

Barricading shall be constructed as per direction of EIC. Offer to be prepared by the tenderer based on lump sum unit rate (per RM).

### **4.0 SURFACE DRESSING:**

Removal of vegetation, small trees, bushes malba etc., levelling the ground surface and disposal to suitable location is included in the scope.

Brief description of major items shall be as follows:

- a. Taking pre-work and finished levels.
- b. Removal of small trees, bushes, vegetation etc. as per direction of EIC.
- b. Stripping and grubbing the topsoil and preparation of sub-grade.
- c. De-watering of excessive water.
- d. Strutting and shoring to retain the earth.
- e. Disposal of unserviceable and surplus earth to authorized dumping ground to any lead.
- f. Soil to be leveled and neatly dressed as per direction of EIC.

*Note :*

- i) *Payments for item shall be based on net area of surface dressing under respective SOR item.*

Surface dressing work shall be done as per direction of EIC issued to the successful tenderer. Offer to be prepared by the tenderer based on lump sum unit rate (per Sq.M.).

### **5.0 EARTH WORK IN EXCAVATION/SITE GRADING:**

Complete earthwork in Excavation of earth/municipal waste/ malba/ etc. and disposal to suitable location is included in the scope.



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Brief description of major items shall be as follows:

- a. Taking pre-work and finished levels.
- b. Stripping and grubbing the topsoil and preparation of sub-grade.
- c. De-watering of excessive water.
- d. Strutting and shoring to retain the earth.
- e. Disposal of unserviceable and surplus earth to authorized dumping ground to any lead.
- f. Soil to be leveled and neatly dressed as per direction of EIC.

*Note :*

- i) *Payments for item shall be based on net volume of earth excavated under respective SOR item.*
- ii) *Payment for item earthwork in filling shall be compacted net volume of filling after deductions of foundations, culverts, etc.*
- iii) *No separate payment for excavation for foundation / sewerage / and brickwork (since cost of earthwork is included in respective items).*

Earthwork shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed drawings and on lump sum unit rate (per Cu.M)..

**6.0 EARTH WORK IN HARD ROCK:**

Complete earthwork in Excavation in hard rock including PCC, RCC, paver block flexible/rigid pavement etc. For filling with available serviceable earth or borrow earth is included in the scope.


Brief description of major items shall be as follows:

- a. Taking pre-work and finished levels.
- b. Stripping and grubbing the top surface and preparation of sub-grade.
- c. De-watering of excessive water.
- d. Strutting and shoring to retain the earth.
- e. Disposal of unserviceable and surplus material to authorized dumping ground to any lead.

*Note :*

- i) *Payments for item shall be based on net volume of earth excavated.*
- ii) *Payment for item earthwork in filling shall be compacted net volume of filling after deductions of foundations, culverts, etc.*
- iii) *No separate payment for excavation for foundation / sewerage / and brickwork (since cost of earthwork is included in respective items).*

Earthwork shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed drawings and on lump sum unit rate (per

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Cu.M).

## 7.0 EARTHWORK IN FILLING:

Complete earthwork in filling with approved soil as per direction of EIC etc is included in the scope.

Brief description of major items shall be as follows:

- Taking pre-work and finished levels.
- Stripping and grubbing the topsoil and preparation of sub-grade.
- Borrowing of approved quality good earth from any lead.
- Filling in layers of 150 mm.
- Watering and compaction up to 95% of its MDD with mechanical means.

*Note :*

- Payments for this shall be based on net volume of earth filled.*
- Payment for item earthwork in filling shall be compacted net volume of filling after deductions of foundations, culverts, etc.*
- No separate payment for excavation for foundation / sewerage / and brickwork (since cost of earthwork is included in respective items).*

Earthwork shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed drawings and on lump sum unit rate (per Cu.M).

## 8.0 SAND FILLING:

Complete works in sand filling is included in the scope.

Brief description of major items shall be as follows:

- Taking pre-work and finished levels
- Watering , rolling
- Filling in layers of 150 mm thickness.
- Consolidating and dressing the surface.

*Note : Payments to be done on completed work profiles by considering the plan dimensions only.*

Sand filling shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed drawings and on lump sum unit rate (per Cu.M).

## 9.0 STONE SOLING

Complete works in filling is included in the scope.

Brief description of major items shall be as follows:

- Taking pre-work and finished levels



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- b. Borrowing of approved quality sand/stone from any lead.
- c. Filling in layers of 300 mm.
- d. Providing and laying stone ballast 115-150 mm size in layers of 300 mm with spreading blinding material like sand, stone grit, watering and compaction with mechanical means etc. complete the surface as per specifications including cost of material.

*Note : Payments to be done on completed work profiles by considering the plan dimensions only.*

Stone soling shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed drawings and on lump sum unit rate (per Cu.M).

**10.0 BRICK WORK IN FOUNDATION**

Complete works in brick masonry in foundation is included in the scope.

Brief description of major civil items shall be as follows:

- i) Earth Work in excavation including back filling using serviceable surplus material or approved borrow material and transportation of excess earth beyond plot limits. Preparation of sub-base including de-watering and compaction.
- ii) PCC 1:3:6
- iii) Brick work with 1:4 cement mortar in foundation.
- iv) 40mm thick DPC in 1:2:4 wherever applicable.
- v) Plastering on exposed brick surfaces of 15 mm thickness in CM 1:4.
- vi) Lime wash on exposed surfaces of plaster.
- vii) Making weep holes of 150x150 with stone filter pack at 1.0-m intervals in both the directions.

*Note: Only net quantity of brick masonry volume shall be measured for payment purpose.*

The construction of brick foundation work shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed drawings and on lump sum unit rate (per Cu.M) of brickwork done.

**11.0 BRICK WORK IN SUPERSTRUCTURE**

Complete works in brick masonry superstructure is included in the scope.

Brief description of major civil items shall be as follows:

- i) Brickwork with 1:4 cement mortars in superstructure at all heights.
- ii) Providing shuttering / supports etc. as per requirement.

*Note : Only net brick masonry quantity excluding plaster thickness shall be measured for payment purpose.*



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The construction of brickwork in superstructure shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed drawings and on lump sum unit rate (per Cu.M) of brickwork done.

## **12.0 PCC WORK**

Providing and laying PCC 1:2:4, 1:3:6 & 1:4:8 in position, construction and handing over of PCC in foundations, substructure, superstructure and under floor including shuttering/ shoring/ stopper and embedment etc complete in all respects as per scope of work detailed construction drawings (to be released to contractor by owner), technical specifications and direction of Engineer-in-charge.

Brief description of major civil items shall be as follows:

- i) Preparation of bed including cleaning, leveling, compacting/tamping of surface and providing support from bottom and sides.
- ii) Providing shuttering and stoppers.
- iii) Providing inserts, pockets, recesses, holdfast etc.
- iv) Curing, rendering, finishes to match with adjoining surfaces etc.

*Note : For all these items only net PCC concrete quantity shall be measured for payment and PCC below brick work and RCC works is included in the respective item.*

The construction of PCC work shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed typical drawings and on lump sum unit rate (per Cu.M) of PCC work done.

## **13.0 RCC WORK IN FOUNDATION**

Complete works in RCC foundation for equipment foundation, compound wall, building foundations, canopy foundations, pile caps, built-up piles and other RCC works e.g. box culvert, pits, tanks etc. is included in the scope.

Brief description of major civil items shall be as follows:

- a) EarthWork in excavation including back filling using serviceable surplus/ borrow material.
- b) PCC 1:4:8 mud mat,
- c) Providing shuttering and strutting of all types
- d) RCC 1:1.5:3.
- e) Providing and fixing bolts/inserts.
- f) Non-shrink grouting over pedestals for structural base and high strength cementitious grout as per drawings for compressor/ D.G. bases. ( Payable in separate item )
- g) Plastering on exposed RCC surface.
- h) Under ground RCC water tanks with food grade paint on the inside.





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- (Painting of food grade paint is included in this item)
- i) Providing and fixing puddle flange for nozzles/inserts in R.C.C. water tanks fabricated from M.S. pipes upto 900 mm long, welded in the center to 6 mm thick M.S. square plate of size three times the pipe diameter as per standard details; whole piece to be hot dip galvanized, fixed to Reinforcement in RCC walls/slab as per drawing at the time of casting of RCC water tank complete.
  - j) Providing and fixing M.S. Structural work fabricated from standard sections e.g. M.S. rounds, angles, channels including cutting to size, drilling, welding, fixing and welding to insert plates in RCC structural members including cutting and making good the walls and floors for pipe supports from floor (in plant room), M.S. ladders and manhole covers for water tanks only.
  - k) Providing and fixing M.S. slotted angle iron 40x40x2 mm thick with stone enamel finish & fixed to brick masonry or RCC walls with 12 mm dia bolts embedded in cement concrete blocks 1:2:4 mix (1 cement: 2 coarse sand: 4 stone aggregate 12.5 mm nominal size) 100x100x100 mm size for masonry walls & with expandable anchor fasteners on RCC spaced not exceeding 600 mm with 15 mm dia G.I. spacer between wall & angle complete.

*Note : For all these items only net RCC concrete quantity excluding PCC/Mudmat shall be measured for payment (Bolts, inserts, angles channels will be paid in item structural steel fabrication but not in case of underground RCC tanks and SS tube trench).*

The construction of RCC work shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed typical drawings and on lump sum unit rate (per Cu.M) of RCC work.

**14.0 RCC WORK IN SUPERSTRUCTURE**

Complete works in RCC in superstructure for compound wall/retaining wall, columns & beams is included in the scope.

Brief description of major civil items shall be as follows:

- a) Providing shuttering and strutting of all types
- b) RCC 1:1.5:3
- c) Providing and fixing bolts/inserts.
- d) Providing and fixing M.S. Structural work fabricated from standard sections e.g. M.S. rounds, angles, channels including cutting to size, drilling, welding, fixing and welding to insert plates in RCC structural members including cutting and making good the walls.

*Note: For all these items only net RCC concrete quantity shall be measured for payment (Bolts, inserts, angles, channels will be paid in item structural steel fabrication).*

The construction of RCC work shall be done as per approved detailed





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construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed typical drawings and on lump sum unit rate (per CuM) of RCC work done.

**15.0 REINFORCEMENT STEEL:**

This includes supplying, fabricating and fixing HYSD reinforcing steel/TMT Grade Fe-415 as per shown in the drawings should be considered for payment is included in the scope.

Brief description of major civil items shall be as follows:

- a) Supply of reinforcing steel of approved make
- b) Straightening, cutting, bending
- c) Fixing in position as per drawing
- d) Fixing of chairs, etc.

*Note: For this item only quantity of steel as per the drawing issued to contractor shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

The carrying out of preparation of reinforcement steel work shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed typical drawings and on lump sum unit rate (per MT) of steel .

**16.0 COMPOUND WALL**

Complete civil works for the following buildings is included in the scope.

Brief description of major civil items shall be as follows:

- a) DPC 40 mm with cement concrete 1:2:4 if required.
- b) Brick work ( bricks as per SOR ) in super structure at all height and levels, in cement mortar 1:5
- c) RCC 1:2:4. Including steel reinforcement for coping.
- d) Cement plaster 1:6, 15 mm on both surfaces.
- e) Drip course 25 mm wide over coping.
- f) Grooves 12X12 mm in plaster as per design.
- g) Painting of internal wall surface with three coats of Acrylic emulsion paint as per SOR or approved by Engineer-in-charge, applied by brush followed by roller.
- h) External wall surface to be given 3 coats of white wash.
- i) Expansion joints shall be provided at corners as per drawings.
- j) Height of wall shall be 2100 mm from Finished floor level of forecourt.

The construction of the compound wall shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per RM) for complete compound wall work in superstructure.



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*Note : Only length of completed compound wall shall be measured for payment purpose.*

## **17.0 BUILDING WORKS**

Complete civil, plumbing, internal water supply and electrical works from plinth beam and above for RCC framed structure buildings are included in the scope.

### **RCC FRAMED STRUCTURE**

Brief description of major items of work shall be as follows:

- a) Setting out for all structures on site.
- b) All the buildings/rooms shall be RCC framed structure with cladding and partitions of brick masonry walls, including loft in RCC.
- c) DPC 1:2:4, with 40 mm thick.
- d) Anti-termite treatment to be applied to all the building foundations, plinth, under aprons and sub-floors.
- e) All structural concrete for RCC elements shall have a minimum strength of 20 MPA at 28 days (M-20 nominal mix as per IS)
- f) Masonry shall be in cement mortar 1:4 and with bricks of strength not less than 75 kg / cm<sup>2</sup>.
- g) Plastering on masonry structures shall be of thickness 15 mm on smooth face, 19 mm on rough surface and 6 mm on RCC ceiling/Chajjas. The cement mortar shall not be leaner than 1:3 on ceiling and 1:4 on walls. Grooves and drip-mould are also included in this item.
- h) Aluminium doors shall be of 10 mm thick glass (ASAHI / MODI TUFF)/or paneled with laminated board mounted on powder coated aluminium frames. Windows of full height shall be powder coated aluminium frame with 8 mm thick glass (ASAHI / MODI TUFF)/laminated board in-fill. Windows from sill height & Ventilators shall be powder coated aluminium frame with 5 mm thick glass louvers/fixed glazing, with powder coated aluminium hardware. All aluminium frames shall be fixed over aluminium rough ground.
- i) Aluminium louvers to be provided for electrical rooms as per approved manufacturers detail.
- j) Inside surfaces of office shall be finished with plastic emulsion paint of ICI, Asian paints, Berger and rest of the rooms shall be finished with oil bound distemper and painting of external walls of building with three coat of external acrylic emulsion paint with Polyurethane finish.
- k) Plumbing, Sanitation and Sewerage including CI rain water disposal from roof to the nearest manhole, CI piping, all including fittings, traps, SS gratings, painting of pipes, jointing, works as per requirement.
- l) White vitreous china sanitary fittings EWC, Washbasin, urinals etc of HSW or equivalent make, beveled edge mirror of Atul/Modiglass.



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- m) Toilet to have first quality chromium plated plumbing fittings, liquid soap dispenser, deodorant holder, coat hook, automatic photoelectric cell operated flushing system in urinal, china recessed toilet paper holder, anti cockroach chilly trap, in addition to above.
- n) P.T.M.T. fittings in 2nd toilet shall be provided.
- o) Water supply piping with GI pipe complete with all fittings and jointing, pipe work, bronze ball valves, with two overhead water tank (PVC 1000 L capacity each) with high pressure ball cock, level indicator, level control, and all its connections and platform, anti-mosquito over flow grating etc.
- p) RCC channels for cables, pipes etc. with chequered plate/ RC precast covers in control room/electrical room (as per requirement).
- q) Inserts shall be provided to suit the technological requirements.
- r) All exposed flat roofs shall be water proofed with two components elastic polymerised acrylic water proofing system using "Euco Elastic Plaster" manufactured by STP including finishing the surface with 40 mm thick cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone) admixed with water proofing compound confirming to IS: 2645 and finally finishing the surface with Trowel with neat cement slurry and preparation of roof surface with khurras at RWP locations.
- s) Under floors shall include filling of river sand and PCC 1:4:8 in level.
- t) Polished vitrified tiles of Kajaria/Somani/Orientor equivalent make on floor and thickness and 100 mm high skirting in office room with 6 mm grout.
- u) Ceramic anti-skid tiles of Regency, Kajaria, Orient etc. of matt finish on floors, 100 mm skirting and 2100 mm dado, as approved .
- v) Aluminium False ceiling of Luxalon, Trac or equivalent make in MMI control rooms lobbies etc as indicated and as per approved manufacturers detail.
- w) All finishes and any other works not specifically mentioned but required and handing over of premises, complete in all respects.
- x) External surfaces to be painted with Exterior premium emulsion paints, APEX of Asian Paints/ WEATHERCOAT of Berger/ WEATHERSHIELD OF ICI, and part fascia to be of DOMAL (as per approved design) as per detail, colour scheme, elevation as per approved manufacturer's detail and specified thickness. Aluminium composite panel to be used in elevation at specified locations.
- y) Conduiting, wiring, box & switches, fittings and fixtures for electrical points, telephone, television points and data cabling.
- z) Providing, making, testing and commissioning of light point, fan points, exhaust fan points, 6 Amp sockets, 16 Amp sockets, 20 Amp sockets and Sub-mains with 2.5 sq. mm single core multi strand copper conductor, PVC insulated, 1100 V grade wires in PVC conduit laid in ceiling/wall/ground in GI pipe, complete with grid plate switch 6/16 Amps.in concealed G I box, circuit wiring i.e. tapping from the DB, 1.5 Sq.MM. insulated copper Earthing



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connections etc. complete as required for all length of circuits and 1 light points controlled by one switch. Light points located on building areas are included.

- aa) Supply, installation, testing and commissioning of pre-wired wall/ ceiling/ false ceiling mounted type HPF fluorescent light fixtures including providing and fixing tubes, electronic chokes, starters, earthing, connections and mounting arrangements etc. complete as required. Procurement of light fixtures(ref. Electrical TS clause 03.00) subject to approval by MNGL Engineer-in-Charge:

**18.0 SOAK PIT AND SEPTIC TANK:**

Complete following civil work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Brick work ( bricks as per SOR ) in super structure at all height and levels, in cement mortar 1:5
- b) RCC 1:2:4. Including steel reinforcement for coping.
- c) Cement plaster 1:6, 15 mm on both surfaces.
- d) Chemical resistant paint, inserts, bolts, covers, aggregate/sand fill conduits, bitumen etc.
- e) Earthwork in excavation and backfilling, shoring/strutting
- f) Bailing and pumping out water.
- g. Plastering, plumbing, sanitation etc.

The construction of the soak pit and septic tank shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per no. of soak pit and septic tank constructed.).

*Note : Only no. of soak pit and septic tank constructed shall be measured for payment purpose. Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

**19.0 UNDERGROUND WATER TANK:**

Complete following civil work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Brick work ( bricks as per SOR ) in super structure at all height and levels, in cement mortar 1:5
- b) RCC 1:2:4. Including steel reinforcement for coping.
- c) Cement plaster 1:6, 15 mm on both surfaces.
- d) Chemical resistant paint, inserts, bolts, covers, aggregate/sand fill conduits, bitumen etc.
- e) Earthwork in excavation and backfilling, shoring/strutting
- f. Bailing and pumping out water.
- g. Plastering, plumbing, sanitation etc.



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The construction of the underground water tank shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per no. of underground water tank constructed.).

*Note : Only no. of underground water tank constructed shall be measured for payment purpose. Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

#### **20.0 RCC FLOORING IN FORECOURT:**

Complete civil works for the following RCC forecourt work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Soling with stones of 63-90 mm size in layer of 150 mm thickness
- b) PCC(1:3:6) layer of 100 mm thickness.
- c) RCC (1:1:2) of 150 mm thickness
- d) Reinforcing steel mesh preparation and fixing.
- e) Shuttering, finishing proper and in level

The construction of the RCC forecourt shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per Sq.M) for complete RCC forecourt work.

*Note : Only plan area of the RCC flooring carried out shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

#### **21.0 PAVER BLOCK FLOORING:**

Complete civil works for the following Paver block flooring work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Supply of approved CC interlocking paver blocks
- b) Supply and laying sand of approved specs.
- c) Excavation, site clearing.
- d) Shuttering, finishing proper and in level

The construction of the paver block flooring shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the



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enclosed architectural drawings and on lump sum unit rate (per Sq.M) for complete RCC forecourt work.

*Note : Only plan area of the paver block flooring carried out shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

## **22.0 SINGLE SS TUBE TRENCH IN FORECOURT:**

Complete civil works for the following SS Tube Trench work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Cleaning the surface of trench
- b) 100 mm thick PCC(1:4:8) base
- c) Supply and fixing of edge angle of ISA 75x75x6
- e) Supply and fixing of support angle of ISA 50x50x6 for supporting pipetrays @ 1000 mm c/c
- f) Cement plastering using CM 1:5 of 12 mm thickness
- g) Brickwork, Precast SFRC cover of appropriate sizes.

The construction of the SS tube trench shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per RM) for complete SS tube trench construction

*Note : Only length of the SS tube trench carried out shall be considered for payment. This item is covered under SOR item no. CON-13*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

## **23.0 DOUBLE SS TUBE TRENCH IN FORECOURT:**

Complete civil works for the following SS Tube Trench work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Cleaning the surface of trench
- b) 100 mm thick PCC(1:4:8) base
- c) Supply and fixing of edge angle of ISA 75x75x6
- e) Supply and fixing of support angle of ISA 50x50x6 for supporting pipetrays @ 1000 mm c/c
- f) Cement plastering using CM 1:5 of 12 mm thickness
- g) Brickwork, Precast SFRC cover of appropriate sizes.

The construction of the SS tube trench shall be done as per approved





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detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per RM) for complete SS tube trench construction

*Note : Only length of the double SS tube trench carried out shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

#### **24.0 EXTERNAL SEWERAGE AND WATER PIPING:**

Complete following civil work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Supply, laying, commissioning of RCC pipes of approved specs.
- b) Earth cutting, filling, disposal of surplus earth.
- c) Bed concrete
- d) Supply and laying gully trap/chamber, grease trap, etc.
- e) Earthwork in excavation and backfilling, shoring/strutting
- f) Bailing and pumping out water.
- g. Plastering, plumbing, sanitation etc.

The construction of the underground water tank shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (net Rm length of pipeline constructed.).

*Note : Only length of pipeline constructed shall be measured for payment purpose. Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*


#### **25.0 ELECTRICAL & WATER PIT CHAMBER CONSTRUCTION:**

Complete civil works for the following Electrical cable chamber work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Cleaning the surface of trench
- b) 100 mm thick PCC(1:4:8) base
- f) Cement plastering using CM 1:5 of 12 mm thickness
- g) Brickwork, Precast SFRC cover of appropriate sizes.

The construction of the chamber shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (each no.) for

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complete chamber construction

*Note : Only no. of chambers constructed shall be considered for payment.  
Rate to include cost of all material, labour, tools, tackles,  
equipment, hire charges, all leads, transportation,  
loading/unloading etc.*

## **26.0 EXTERNAL WATER PIPING SYSTEM (BOREWELL**

**CONNECTION)** Complete following civil, electrical, mechanical

work included in the scope. Brief description of major items shall be

as follows:

- a) Supply, laying, commissioning of MS HD water supply pipes of approved specs.
- b) Earth drilling, cutting, filling, disposal of surplus earth.
- c) Well site selection & chamber construction
- d) Supply and laying gully trap/chamber, grease trap, other fittings, water meter etc.
- e) Earthwork in excavation and backfilling, shoring/strutting
- f. Supply, installation and commissioning of borewell 150 mm dia & 75 meter deep and submersible pump of appropriate make, including wiring.
- g. Plastering, plumbing, sanitation etc.

The construction & commissioning of the borewell shall be done as per approved detailed technical specification, drawing & SOR to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the technical specification and SOR & on lump sum unit rate (number of borewell constructed.).

*Note: Only number of bore-well constructed shall be considered for payment purpose. Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

## **27.0 PLASTER IN CM 1:4:**

Complete works in **supply and providing cement plaster** is included in the scope.

Brief description of item shall be as follows: -

**Major civil items involved are:**

- a) Supply, mixing and application of proper mixture of cement and sand .
- b) Supply and fixing of chicken wire mesh at appropriate places etc.





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*Note : Only net area plastered shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles,  
equipment, hire charges, all leads, transportation,  
loading/unloading levies etc.*

**28.0 PAINTING (APEX/WEATHERSHIELD/WEATHERCOAT):**

Complete following civil work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Supplying, applying of 3 coats of approved paint, primer putty
- b) surface preparation, primer putty
- c) scaffolding etc.

Carrying out of painting as per tender document, SOR and direction of EIC.

*Note : Only no. sq. m of area painted shall be considered for payment purpose.. Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, etc..*

**29.0 PAINTING (OBD):**

Complete following civil work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Supplying, applying of 3 coats of approved paint, primer putty
- b) surface preparation, primer putty
- c) scaffolding etc.

Carrying out of painting as per tender document, SOR and direction of EIC.

*Note : Only no. sq. m of area painted shall be considered for payment purpose.. Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, etc*

**30.0 WHITE WASHING :**

Complete works in **white washing** is included in the

scope. Brief description of item shall be as follows: -

**Major civil items involved are:**

- a) Supply, mixing and application of proper mixture of lime, adhesive and blue pigment etc.

*Note : Only net area plastered shall be considered for payment.*



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*Rate to include cost of all material, labour, tools, tackles,  
equipment, hire charges, all leads, transportation,  
loading/unloading levies etc.*

### **31.0 PROVIDING AND FIXING GRANITE STONE**

Providing and fixing 20 mm thick granite polished, machine cut granite stone for dispenser islands and similar location of require size and approved quality laid over 20 mm thick base cement mortar 1:4 (1 cement: 4 coarse sand) with joints treated with white cement, mixed with matching pigment, epoxy touchups, including rubbing making edge moulding, curing etc. complete at all levels. Texture, colour, pattern of Granite will be decided by Engineer-in-charge.

*Note : Only net area of granite stone laid for the dispenser island shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles,  
equipment, hire charges, all leads, transportation,  
loading/unloading levies etc.*

### **32.0 IPS FLOORING:**

Providing and laying 40 mm thk. CC floor 1:2:4 (1 cement: 2 coarse sand: 4 stone aggregate of 12 mm nominal size), including floating coat of neat cement including shuttering/ shoring/ stopper and embedment etc complete in all respects as per scope of work detailed construction drawings (to be released to contractor by owner), technical specifications and direction of Engineer-incharge.

Brief description of major civil items shall be as follows:

- i) Preparation of bed including cleaning, leveling, compacting/tamping of surface and providing support from bottom and sides.
- ii) Providing shuttering and stoppers.
- iii) Providing inserts, pockets, recesses, holdfast etc.
- iv) Curing, rendering, finishes matching with adjoining surfaces etc.

*Note : For all these items only net quantity of IPS flooring done shall be measured for payment..*

The construction of IPS flooring shall be done as per approved detailed construction drawings to be issued to the successful tenderer. Offer to be prepared by the tenderer based on the enclosed typical drawings and on lump sum unit rate (per sq..M) of IPS flooring done.

### **33.0 WEARING COURSE OVER RCC FLOORING IN FORECOURT:**

Complete civil works for the following Wearing course work is included in



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the scope.

Brief description of major civil items shall be as follows:

- a) Cleaning the surface of RCC in forecourt
- b) Supply, laying and fixing of wire mesh of 4 mm thick and 75 mm square over RCC floor
- c) Preparation of concrete screed (1:1:2)
- e) Shuttering, finishing proper and in level

The construction of the Wearing court shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per Sq.M) for complete Wearing court work.

*Note : Only plan area of the Wearing course carried out shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

#### **34.0 POLYCARBONATE SHEETING:**

Complete works of **providing and fixing polycarbonate sheeting** is included in the scope.

Brief description of item shall be as follows: -

**Major civil items involved are:**

- a) Supply, fabricating and preparing canopy structure as per drawing.

The providing and fixing fencing structure shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC. Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per sq.m.) of polycarbonate sheeting fixed.

*Note : Only area of polycarbonate sheeting fabricated and fixed shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

#### **35.0 PROVIDING AND FIXING CERAMIC GLAZED WALL TILES:**

Complete civil works for the ceramic glazed tiles fixing on the wall and finishing is included in the scope.



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Brief description of major civil items shall be as follows:

- a) Cleaning the surface of wall and dressing for tile fixing.
- b) Supply, laying and fixing of ceramic glazed wall tile of 300 mm X 300 mm of approved make as per tender document.
- c) Preparation of cement screed and filing in the joints.
- e) Finishing proper and in level.

The ceramic glazed wall tile shall be fixed as per detailed technical specification of the tender and as per the instruction given to to the successful tenderer by the EIC. Offer to be prepared by the tenderer based on the lump sum unit rate (per Sq.M) for complete tile fixing work.

*Note : Only the area of the wall tiles fixed shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

### **36.0 PROVIDING AND FIXING VITRIFIED TILES:**

Complete civil works for the ceramic glazed tiles fixing on the wall and finishing is included in the scope.

Brief description of major civil items shall be as follows:

- a) Cleaning the surface of wall and dressing for tile fixing.
- b) Supply, laying and fixing of vitrified tile of 600 mm X 600 mm of approved make as per tender document.
- c) Preparation of cement screed and filing in the joints.
- d) Finishing proper and in level.

The vitrified tile shall be fixed as per detailed technical specification of the tender and as per the instruction given to to the successful tenderer by the EIC. Offer to be prepared by the tenderer based on the lump sum unit rate (per Sq.M) for complete tile fixing work.

*Note : Only the area of the wall tiles fixed shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

### **37.0 STEEL STRUCTURE FABRICATION:**

Complete works in **steel structure fabrication** is included in the scope. Brief description of item shall be as follows: -

**Fabrication** of cascade supporting and covering structures, Hoarding, cat Ladders and LCV loading & unloading platform & other structures



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including **supply** of raw materials, transportation and delivery at site, site assembly and erection of structures at appropriate locations including application of primer and finishing paints, all works as per specification and drawings. Scope includes all consumables, preparation, wastages, testing charges, sheeting, and fasteners etc as per specifications. Scope includes preparation of fabrication drawings, their approval by Owner and preparation of as-built details.

The steel structure fabrication shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per Kg.) of steel structure fabricated

*Note : Only quantity of steel structure fabricated shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**38.0 PROVIDING AND FIXING FENCING STRUCTURE :**

Complete works in **providing and fixing fencing structure** is included in the scope.

Brief description of item shall be as follows: -

**Major civil items involved are:**

- b)** Supply, fabricating and preparing fencing structure as per drawing.
- c)** GI weldmesh made from 3 mm GI wire @ 75 mm c/c
- d)** Painting with enamel paint
- e)** Making pockets for post fixing
- f)** Grouting pockets with PCC (1:2:4)

The providing and fixing fencing structure shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per RM.) of fencing structure fixed

*Note : Only length of fencing structure fabricated and fixed shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**39.0 PROVIDING AND FIXING FENCING GATE:**



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Complete works in **providing and fixing fencing gate** is included in the

scope. Brief description of item shall be as follows: -

**Major civil items involved are:**

- a) Supply, fabricating and preparing fencing gate as per drawing.
- b) GI weldmesh made from 3 mm GI wire @ 75 mm c/c
- c) Painting with enamel paint
- d) Making pockets for post fixing
- e) Fixing of hinges and locking arrangement
- f) Grouting pockets with PCC (1:2:4)

The providing and fixing fencing gate shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (No.) of fencing gates fixed

*Note : Only number of fencing gates fabricated and fixed shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**40.0 PROVIDING AND FIXING CHEQUERED PLATE COVERS:**

Brief description of item shall be as follows: -

Chequered plate in approved panel or over steel structure including cutting, welding, hoisting, fixing in position has to be provided and fixed.


Two or more coats approved quality synthetic enamel over priming coat of approved steel primer to be applied.

The chequered plate fabrication shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per Kg.) of chequered plate covers fabricated and fixed in position

*Note : Only quantity of chequered plate fabricated and fixed in position shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**41.0 PROVIDING AND FIXING SAFETY GUARD AROUND THE DISPENSER**

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**ISLAND & LCV:**

Brief description of item shall be as follows: -

Providing and fixing safety guard with MS pipe and grouting with high strength mortar as per the technical specification, drawings and direction of EIC.

Major works involved are as follows:

- 80 mm heavy duty MS pipe of approved make.
- High strength grout mortar of approved make
- Painting with approved paint material.

The safety guard fabrication, fixing and finishing shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note : Only quantity of chequered plate fabricated and fixed in position shall be considered for payment. This item is covered for Dispenser Island & LCV*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**42.0 CANOPY**

Complete structural ,roofing,flasecelling,ACM ,Speder & over all work for canopy is included in the scope.

Brief description of major items shall be as follows:

Supply, fabrication, erection and handing over of structural steel fabricated canopy (85Kg/Sqmt +-15%) including roof sheeting as per specification, Pre-coated Steel false ceiling system with powder coated finishes as per manufacturers instruction and specification, gutters, facia, flashings, Rain water pipes and gutter, painting, complete in all respects as per scope of work, detailed construction drawings, technical specification and directions of Engineer-in-charge. (Plan area shall be considered for measurement.)  
***Rate Included in item for Supply, fabrication, erection and handing over of 4MM thick, 1MM Wide and approximate 68RM ACP Canopy Facia along with approximate 60 SQMT column cladding by 4mm thick ACP sheet.***

- Providing, cutting, fabrication and erection of canopy structure fabricated with in structural steel, fixed on RCC footing with base plates, permanent bolts with plane and spring washers.





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- b. Providing, cutting, fabrication and installation of cold rolled 'Z' purlins in place.
- c. Providing, cutting, fabrication and installation of canopy roof covering with 0.6 mm thick (TCT) Zinalume/ galvalume colour coated (fy =345 mpa) sheets having profile depth 28-32mm and pitch 186-250mm with zinalume coating 150gsm and 35 microns super polyester colorbon XRW quality ( BHP make or equivalent) fixed with steel hex head self-drilling fasteners with integral washers and EPDM seals.
- d. Providing, cutting, fabrication and installation of canopy false ceiling with TRAC 150 F of Interarch (or equivalent) coil coated (Pre-painted) steel false ceiling system comprising of 150 mm wide x 17 mm deep roll formed out of 0.50 mm thick polyester coated galvanized steel panels, fixed on steel runner of 34.5 mm width x 48 mm deep manufactured out of 0.60 mm thick precoated galvanized steel with rigid suspension of 20x20x0.5 mm fixed with steel brackets/clips etc. The suspension system should be meant of exterior use. The carrier shall be suspended at 1mtr c/c supported from purlin and suspension angle at 500 mm c/c. panel shall be factory cut to provide minimum joints. The longitudinal joints shall have additional special G.I. Splice in between two panels. The carrier joint shall have a carrier splice maintaining a module of 150 mm. The ceiling shall be clipped on to the suspended carriers after they are aligned and leveled. Cutting for fixing of light fittings shall be done as per the cutout required to fit the fixture. The work shall be carried out under a specialized and experienced supervisor.
- e. Providing, cutting, fabrication and installation of gutters in 2.0 mm thick MS Sheet with stiffeners, laid to slope.
- f. Providing, cutting, fabrication and installation of flashing, facia etc in 0.6 mm thick of the same material as of roof sheeting laid to slope.
- g. Providing and laying of 125 NB(M) MS Pipe conforming to IS:1161 as rainwater pipe with bends etc. from gutter to nearest manhole including cowl.
- h. Providing cutout in the false ceiling for the under lights as required. The under lights and wiring for the canopy, sinages shall be payable as per electrical SOR and Technical specifications.
- i. Painting all structural members with one coat of Zinc phosphate primer (DFT 35 microns) & two coats of synthetic enamel (DFT 25 microns each).





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- j. Electrical wiring from the base of column up to its complete distribution over the canopy wherever required.

*Note : 1. The net area of completed canopy shall be measured for Payment purpose if canopy is rectangular in plan & Gross rectangular area shall be measured in case canopy is curved in plan (on sq. m. rate basis) for canopy structure only - including the false ceiling, roofing, finishes etc. but including electrical and facia works.*

- 2. The foundation work for canopy shall be covered under separate SOR item.*

Canopy shall be erected as per approved detailed drawings submitted by the successful tenderer & approved by MNGL. Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per Sq.m) of canopy area constructed in plan.

**42.B.- Warehouse shed in steel structure with corrugated coated GI sheet**

Brief description of major items shall be as follows:

The tentative weight of structural steel shall be 35 kg/m<sup>2</sup> of Shed area. A variation of +/- 15% structural weight shall be deemed included in the item. Any increase/ decrease beyond this limit shall attract payment/rebate @ Rs 45000/- per Tonne.

Providing, cutting, fabrication and erection of canopy structure fabricated with in structural steel, fixed on RCC footing with base plates, permanent bolts with plane and spring washers.

Providing, cutting, fabrication and installation of cold rolled 'Z' purlins in place.

Providing, cutting, fabrication and installation of Shed Roof & all around harozotical & vertical ( ground level to roof level( Ht apx 6-7 m) covering with 0.8 mm thick (TCT) Zincalume/ galvalume colour coated (fy =345 mpa) sheets having profile depth 28-32mm and pitch 186-250mm with zincalume coating 150gsm and 35 microns super polyester colorbond

Providing, cutting, fabrication and installation of gutters in 2.0 mm thick MS Sheet with stiffeners, laid to slope.

Providing and laying of 125 NB(M) MS Pipe conforming to IS:1161 as rainwater pipe with bends etc. from gutter to nearest manhole including cowl.

Providing cutout in the false ceiling for the under lights as required. The under lights , fan & all Electrical Work and wiring for the shed, Technical



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specifications.

Painting all structural members with one coat of Zinc phosphate primer (DFT 35 microns) & two coats of synthetic enamel (DFT 25 microns each).

Electrical wiring from the base of column up to its complete distribution over the Shed wherever required

#### **43.0 PROVIDING AND FIXING ALUMINIUM GLAZED FRAMING DOOR:**

Brief description of item shall be as follows: -

Providing and fixing aluminium glazed framing door at the designated place and as per the technical specification, drawings and direction of EIC.

Major works involved are as follows:

- a) Supply of aluminium glazed door and all the necessary fixture arrangement as per the approved technical specification of the tender document and as per the direction of EIC.
- b) Fixing in place using approved fixture material.
- c) Painting with approved paint material.
- d) Finishing as per the direction of EIC.

The Al glazed door fixing and finishing shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note : Only area of the door fabricated, fixed and finished in position shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

#### **44.0 SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF MONOLITH:**

Brief description of item shall be as follows: -

Design, supply, transportation, installation, testing and commissioning of monolith structure at the designated place and as per the technical specification, drawings and direction of EIC.

Major works involved are as follows:

- a) Preparing drawings as per technical specification of the tender, drawings in tender & discussion with Engineer In Charge
- e) Supply & transportation of monolith and all the necessary fixture arrangement as per the approved technical specification of the tender document and as per the direction of EIC.



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- f) Fixing in place using approved fixture material.
- g) Laying & fixing all the cables & lights as per finalized design in consultation with EIC.
- h) Finishing & Commissioning of Monolith as per the direction of EIC.

Design, supply, transportation, installation, testing & commissioning of Monolith shall be done as per approved detailed construction drawings, tender document by the successful tenderer and as per direction of EIC

*Note : Only number of such Monolith commissioned shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**45.0 KERB STONE**

Complete works in fixing of kerb stone is included in the

scope. Brief description of major items shall be as

follows:

Kerb stone of approved make at or near ground level as per approved pattern and setting in position with cement mortar 1:3 shall be provided and fixed. This includes the cost of required centering, shuttering and finishing smooth with 6 mm thick cement plaster 1:2 on exposed surfaces with hardener, over 75 mm thick PCC 1:4:8 bed (Kerb stone blocks shall have niche with reflective material fixed on it).

The kerb stone fixing shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note : Only length of kerb stone fixed in position shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**46.0 POLYSULPHIDE FILLING IN THE JOINTS:**

Complete civil works for the following polysulphide filling work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Cleaning the surface of gap between the RCC panels.
- b) Making the surface of filling properly leveled by machine cutting.
- c) Supply and fixing of Capcell board and polysulphide sealant



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e) Finishing and making proper level of the polysulphide sealing joint

The construction of the Wearing court shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per Sq.M) for complete Wearing court work.

*Note : Only plan area of the Wearing course carried out shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

#### **47.0 PROVIDING AND LAYING CAPCELL BOARD:**

Complete civil works for the following capcell board laying work is included in the scope.

Brief description of major civil items shall be as follows:

- a) Cleaning the surface of gap between the RCC panels.
- b) Making the surface of filling properly leveled by machine cutting.
- c) Supply and fixing of Capcell board of 25 mm thickness in position.
- d) The fixing shall be done by spreading sand in between.

The construction of the Wearing court shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note : Only area of capcell board laid shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies disposal of surplus earth, compaction etc.*

#### **48.0 EXTERNAL DEVELOPMENT:**

Complete work of external development is included in this scope of work. Brief description of major items is as follows:

- a) Soil preparation including manure, pesticide, sweet soil etc.
- b) Making plant pits/surfaces
- c) Planting of plant material and watering etc.
- d) Maintaining plants till growth

*Note: Payment of external development shall be done as per actual area developed. External development work shall be done as per approved detail construction drawing given to successful bidder.*

#### **49.0 PROVIDING AND CONSTRUCTING RAIN WATER HARVESTING SYSTEM:**

Brief description of item shall be as follows: -



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Providing, constructing & commissioning of Rain Water Harvesting system at the designated place and as per the technical specification, drawings and direction of EIC.

Major works involved are as follows:

- a) Supply of the entire materials and all the necessary fixture arrangement as per the approved drawing, technical specification of the tender document and as per the direction of EIC.
- b) Excavation, providing base layers of sand, gravel, etc.
- c) Construction of brick masonry/RCC wall pit as per drawing.
- d) Providing manhole cover.
- e) Finishing as per the direction of EIC.

The Rain Water harvesting system shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note : Only no. of such Rain Water Harvesting system commissioning shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

#### **50.0 SUPPLYING, CONSTRUCTING & FIXING IN PLACE SPEED BREAKER:**

Brief description of item shall be as follows: -

Supplying, constructing & fixing in place speed breaker at the designated place as per the technical specification, drawings and direction of EIC.


Major works involved are as follows:

- a) Supply of the entire materials and all the necessary fixture arrangement as per the approved drawing, technical specification of the tender document and as per the direction of EIC.
- b) Excavation for installation.
- c) Construction of speed breaker as per drawing..
- d) Finishing as per the direction of EIC.

The speed breaker installation shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note : Only no. of such Speed Breaker installed shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation,*

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*loading/unloading levies etc.*

#### **51.0 ELECTRICAL DISTRIBUTION PANEL:**

Complete work under this head is as follows: -

##### **Major electrical items involved are:**

- Design and supply of power distribution board/emergency panel of approved make as per SOR, single line diagram etc.
- Installation, testing, commissioning of power distribution board/emergency panel of approved make as per SOR, single line diagram etc.

The total work shall be done as per approved drawings issued to the successful tenderer and as per direction of EIC.

*Note : Only no. of power distribution board / emergency panel commissioned shall be considered for payment. This item is covered under SOR item no. E-1*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading etc.*

#### **52.0 ELECTRICAL LIGHTING DISTRIBUTION BOARD/ACDB :**

Complete work under this head is as follows:: -

##### **Major electrical items involved are:**

- Supply, installation, testing and commissioning of wall mounted lighting DB/ACDB of double door type etc.
- Supply of mounting frame, sheet steel enclosure
- Supply and fixing of hardware, connections including cable glands, lugs, earthing and painting, arrangement for termination of cable/wires including 3 phase and neutral busbar etc.

The total work shall be done as per approved drawings issued to the successful tenderer and as per direction of EIC.

*Note : Only no. of lighting distribution board / ACDB commissioned shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading etc.*

#### **53.0 ELECTRICAL CABLING WORK:**

Complete works in for cabling is included in the scope. Brief description of item

shall be as follows: -



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**Major electrical items involved are:**

- a) Supply of cable of required sizes and make as per SOR
- b) Laying, testing and termination of cable of required sizes and make as per SOR

The total cable supply, laying, testing, termination etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per RM) of electrical cabling work carried out.

*Note : Only length of cable laid, tested and terminated shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading etc.*

#### **54.0 SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ELECTRICAL LIGHTING POLE :**

Complete works for electrical pole light is included in the

scope. Brief description of item shall be as follows: -

**Major electrical items involved are:**

- a) Supply, installation, testing and commissioning of lighting pole, light fittings, HPIT lamp/LED lamp complete with junction box equipped with terminal for incoming and outgoing cables and armoured cable of approved specification, drawings etc.
- b) Laying, testing and termination of cable of required sizes and make as per SOR
- c) Civil foundation for pole fixing.

The total cable supply, laying, testing, termination etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note : Only no. of polelight commissioned shall be considered for payment.  
Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading etc.*

#### **55.0 SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF UNDERLIGHTS OF CANOPY:**

Complete works for electrical pole light is included in the

scope. Brief description of item shall be as follows: -





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**Major electrical items involved are:**

- a) Supply, installation, testing and commissioning of light fittings, HPIT lamp complete with junction box equipped with terminal for incoming and outgoing cables and armoured cable of approved specification, drawings etc.
- b) Laying, testing and termination of cable of required sizes and make as per SOR

The total cable supply, laying, testing, termination etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note : Only no. of canopy underlights commissioned shall be considered for payment.*

**56.0 SUPPLY AND LAYING OF EARTHING GI/COPPER STRIP:**

Complete works in for earthing strip is included in the

scope. Brief description of item shall be as follows: -

**Major electrical items involved are:**

- a) Supply of earthing strip of required sizes, material and make as per SOR
- b) Laying, testing and connection of earthing strip of required sizes, material and make as per SOR

The total earthing strip supply, laying, testing, connection etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per RM) of electrical earthing strip laid, tested and connected.

*Note : Only length of earthing strip laid, tested and connected shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**57.0 CONSTRUCTION OF COPPER EARTH PITS:**

Complete works in for earthing pits is included in the

scope. Brief description of item shall be as follows: -

**Major electrical items involved are:**

- a) Supply, laying of GI pipe 3.0 m long of required sizes, and make as per SOR
- b) Supply, laying, fixing in place of Copper plate of 600x600x3 mm as per SOR





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- c) Charcoal, salt, earthing strip, watering
- d) Brick masonry, Cast Iron cover

The total earth pit supply, laying, testing, connection, etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (No.) of electrical earthing pits constructed

*Note : Only no. of earth pits constructed, tested and connected shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading etc.*

#### **58.0 CONSTRUCTION OF GI EARTHPIES:**

Complete works in for earthing pits is included in the

scope. Brief description of item shall be as follows: -

##### **Major electrical items involved are:**

- a) Supply, laying of GI pipe 3.0 m long of required sizes, and make as per SOR
- b) Supply, laying, fixing in place of GI plate of 600x600x3 mm as per SOR
- c) Charcoal, salt, earthing strip, watering
- d) Brick masonry, Cast Iron cover

The total earth pit supply, laying, testing, connection, etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (No.) of electrical earthing strip laid, tested and connected.

*Note : Only no. of earth pits constructed, tested and connected shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

#### **59.0 SUPPLY AND LAYING OF GI/PVC PIPES:**

Complete works in for GI/PVC pipe work is included in the

scope. Brief description of item shall be as follows: -

##### **Major electrical items involved are:**

- a) Supply, laying of GI/PVC pipe of required sizes, and make as per SOR
- b) Connection between different earth chambers
- c) Fixing in place using sockets/bends etc. as per direction of EIC



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d) Brick masonry, Cast Iron cover

The total length of GI pipes supplying, laying, fixing, etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per RM) of GI pipes supplied, laid and connected.

*Note : Only length of GI/PVC pipes supplied, laid, fixed and connected shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading etc.*

#### **60.0 SUPPLY AND LAYING OF PERFORATED GI CABLE TRAYS:**

Complete works in for GI pipe work is included in the

scope. Brief description of item shall be as follows: -

##### **Major electrical items involved are:**

- i) Supply, laying of GI cable trays of required sizes, and make as per SOR
- j) Connection between different earth chambers
- k) Fixing in place using sockets/bends etc. as per direction of EIC
- l) Brick masonry, Cast Iron cover

The total length of GI pipes supplying, laying, fixing, etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (per RM) of GI pipes supplied, laid and connected.

*Note : Only length of GI pipes supplied, laid, fixed and connected shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading etc.*

#### **61.0 SUPPLY, INSTALLATION AND COMMISSIONING OF UPS AND**

**BATTERY:** Complete works in for Supply, installation and commissioning of UPS of rated capacity is included in the scope.

Brief description of item shall be as follows: -

##### **Major electrical items involved are:**

- a) Design, manufacture, shop testing, inspection, packing, forwarding, transportation, delivery at site of UPS of approved make and direction of EIC



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- b) Testing and commissioning at site the UPS system
- c) All interconnecting cables between UPS and battery bank etc. as per direction of EIC
- d) Stands for UPS and battery etc.
- e) UPS with proper rectifier/charger and battery as per SOR and direction of EIC

The supplying, installation and commissioning of 3kVA UPS and battery, etc. shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC Offer to be prepared by the tenderer based on the enclosed architectural drawings and on lump sum unit rate (each no.) of UPS and battery of rated capacity supplied, installed and commissioned.

*Note : Only number of UPS and battery of rated capacity supplied, installed and commissioned. shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading levies etc.*

**62.0 BUILDING LIGHTING:**

Complete works for building lighting/fixtures is included in the

scope. Brief description of item shall be as follows: -

**Major electrical items involved are:**

- c) Supply, installation, testing and commissioning of building lighting, power plug socket including concealed point wiring with heavy duty PVC conduit earth wire, MCB's, TMC's, FCS, wall mounted fans etc. of the tender specifications and as per direction of EIC
- d) Laying, testing and termination of cable of required sizes and make as per SOR

The total work shall be done as per approved detailed construction drawings to be issued to the successful tenderer and as per direction of EIC

*Note: Only no. of units of each power socket/FCS/TMC/Wall mounted fan commissioned shall be considered for payment.*

*Rate to include cost of all material, labour, tools, tackles, equipment, hire charges, all leads, transportation, loading/unloading etc.*

**63.0 Liquid Tack Coat:**

**Scope**

The work shall consist of the application of single coat of low viscosity liquid bituminous material to existing bituminous, cement concrete or primed granular surface preparatory to the



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superimposition of a bituminous mix, as specified in the contractor or as instructed by the Engineer-in-Charge and applied as specified in the nomenclature of item.

**Materials**

The binder used for tack coat shall be either cationic bitumen emulsion (RS1) complying with IS:8887 or suitable low viscosity paving bitumen of VG 10 grade conforming to IS:73. The use of cutback bitumen RC:70 as per IS:217 shall be restricted only for sites at sub-zero temperatures or for emergency applications as directed by the Engineer-in-Charge. The type and grade of binder for tack coat shall be as specified in the contract or as directed by the Engineer-in-Charge.

**Construction**

**Equipment:** The tack shall be applied by a self propelled or towed bitumen pressure sprayer, equipped for spraying the material uniformly at specified rate. Hand spraying shall not be permitted except in small areas, inaccessible to the distributor, or narrow strips, shall be sprayed with a pressure hand sprayer, or as directed by the Engineer-in-Charge. Preparation of Base The surface on which the tack coat is to be applied shall be clean and free from dust, dirt and any extraneous material, and be otherwise prepared in accordance with the requirements. The granular or stabilized surfaces shall be primed immediately before the application of the tack coat, the surface shall be swept clean with a mechanical broom, and high pressure air jet, or by other means as directed by the Engineer-in-Charge.

**Application of Tack Coat** The application of tack coat shall be at the rate specified in below Table and it shall be applied uniformly. If rate of application of tack coat is not specified in the contract, then it shall be the rate specified in table below. No dilution or heating at site RS1 bitumen emulsion shall be permitted. Paving bitumen if use for tack coat shall be heated to appropriate temperature in bitumen boilers to achieve viscosity less than 2 poise. The normal range of spraying temperature for a bituminous emulsion shall be 20 C to 70 C and for cutback, 50 C to 80 C. The method of application of tack coat will depend on the type of equipment to be used, size of nozzles, pressure at the spray bar and speed or forward movement. The contractor shall demonstrate at a spraying trial, that the equipment and method to be used is capable of producing a uniform spray, within the tolerances specified.

Table : Rate of application of tack coat

Type of Surface	Rate of Spray of Binder in Kg per sq.m
Bituminous surfaces	0.20-0.30
Granular surfaces treated with primer	0.25-0.30
Cement concrete pavement	0.30-0.35

**Curing of Tack Coat** The tack coat shall be left to cure until all the volatiles have evaporated before any subsequent construction is started. No plant or vehicles shall be allowed on the tack coat other



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than those essential for the construction.

Measurement of Payment Tack coat shall be measured in terms of surface area of application in square metres

Rate The contract unit rate for tack coat shall be payment in full for carrying out the required operations including for all components i.e. labour, equipments and machinery as described above.

The unit of measurement for this item shall be 'M2'.

V. Hot Premixed Bituminous Macadam work:

Scope:

This work shall consist of construction in a single course having 60 mm to 100 mm thickness or in multiple courses of compacted crushed aggregates premixed with a bituminous binder on a previously prepared base to the requirements of these Specifications. Since the bituminous macadam is an open-graded mix, there is a potential that it may trap water or moisture vapour within the pavement system. Therefore, adjacent layer (shoulders) should have proper drainage quality to prevent moisture-induced damage to the BM.

Material:

Bitumen : The bitumen shall be viscosity grade paving bitumen complying with the Indian Standard Specification IS:73, or as otherwise specified in the item. The type and grade of bitumen to be used shall be specified in the Contract. The type and grade of bitumen to be used would depend upon the climatic conditions and the traffic. Guidelines for selection of bitumen are given in Table below:

Table

Selection Criteria For Viscosity-Graded (VG) Paving Bitumen Based On Climatic Conditions

Lowest Daily Mean Air Temperature, °C	Highest	Daily	Mean	Air
Less than 20°C	20 to 30°C	More than 30°C		
More than -10°C	VG-10	VG-20	VG-30	
-10°C or lower	VG-10	VG-10	VG-20	

Coarse Aggregates - excepting strength which shall be max 40% for Los Angeles Abrasion Value and Aggregate Impact Value of max 30%.

Fine aggregates shall consist of crushed or naturally occurring mineral material, or a combination of the two, passing the 2.36 mm IS Sieve and retained on the 75 micron sieve. These shall be clean, hard, durable, dry and free from dust and soft or friable matter, organic or other deleterious matter. Natural sand shall not be allowed in binder courses. However, natural sand upto 50 percent of the fine aggregate may be allowed in base courses. The fine aggregate shall have a sand equivalent value of not less than 50 when tested in accordance with the requirements of IS 2720 (Part



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37). The plasticity index of the fraction passing the 0.425 mm IS Sieve shall not exceed 4, when tested in accordance with IS 2720 (Part 5).

Proportioning of Material: The combined aggregate grading shall not vary from the lower limit on one sieve to the higher limit on the adjacent sieve to avoid gap grading. The aggregate may be proportioned and blended to produce a uniform mix complying with the requirements in Table. The bitumen content and appropriate thickness are as per Table

Nominal maximum aggregate size is the largest specified sieve size upon which any of the aggregate material is retained.

\*\* Corresponds to specific gravity of the Aggregate being 2.7. In case aggregates have specific gravity more than 2.7, bitumen content can be reduced proportionately. Further, for regions where highest daily mean air temperature is 30° C or lower and lowest daily mean air temperature is – 10° C or lower, the bitumen content may be increased by 0.5 percent.

Aggregate Grading and Binder Content : When tested in accordance with IS 2386 Part 1 (wet sieving method), the combined grading of the coarse and fine aggregates and added filler for the particular mixture shall fall within the limits shown in Table for bituminous macadam.

Preparation of the Base: The base on which bituminous macadam is to be laid shall be prepared, shaped and compacted to the required profile as appropriate, and a prime coat, shall be applied as specified, in accordance with the provisions or as directed by the Engineer-in-charge. The surface shall be thoroughly swept clean by a mechanical broom, and the dust removed by compressed air, in locations where mechanical broom cannot get access, other approved methods shall be used as directed by the Engineer-in-charge.

Tack Coat : Where the material on which the bituminous macadam is to be placed is bitumen bound surface, a tack coat shall be applied as specified, in accordance with above item no.IV, or as directed by the Engineer-in-Charge.

Mixing and Transportation of the Mixture : Pre-mixed bituminous materials, shall be prepared in a hot mix plant of adequate capacity and capable of yielding a mix of proper and uniform quality with thoroughly coated aggregates. Appropriate mixing temperatures are given in Table 16.41A of these Specifications; the difference in temperature between the binder and aggregate should at no time exceed 14°C. In order to ensure uniform quality of the mix and better coating of aggregates, the hot mix plant shall be calibrated from time to time. The essential features of the hot mix plants are given in Annex. A of IRC:27. If a continuous type mixing plant is used, the Contractor must demonstrate by laboratory analysis that the cold feed combined grading is within the grading limits specified for that bituminous bound material. In the case of a designed job mix, the bitumen and filler content shall be derived using this combined grading. Bituminous materials





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shall be transported in clean insulated vehicles, and unless otherwise agreed by the Engineer, shall be covered while in transit or awaiting tipping. Subject to the approval of the Engineer, a thin coating of diesel or lubricating oil may be applied to the interior of the vehicle to prevent sticking and to facilitate discharge of the material.

Mixing, Laying and Rolling Temperatures for Bituminous Mixes (Degree Celsius)

Bitumen

Viscosity

Grade	Bitumen Temperature	Aggregate Temperature	Mixed	Material
Temperature	Laying Temperature	*Rolling Temperature		
VG-40	160-170	160-175	160-170	150 Min. 100 Min.
VG-30	150-165	150-170	150-165	140 Min 90 Min
VG-20	145-165	145-170	145-165	135 Min. 85 Min.
VG-10	140-160	140-165	140-160	130 Min 80 Min.

\* Rolling must be completed before the mat cools to these minimum temperatures.

Cleaning of Surface : The surface on which the bituminous work is to be laid shall be cleaned of all loose and extraneous matter by means of a mechanical broom and air jet. or any other approved equipment/ method as specified in the contract. The use of a high pressure air jet from a compressor to remove dust or loose matter shall be available full time on the site, unless otherwise specified in the Contract.

Spreading : Prior to spreading the mix, the base shall be prepared by carrying out the required operation. Except in areas where a mechanical paver cannot get access, bituminous materials shall be spread, leveled and tamped by an approved self-propelled paving machine equipped with an electronic sensing device. The essential features of the paver finisher shall conform to Annex A of IRC:27. As soon as possible after arrival at site, the materials shall be supplied continuously to the paver and laid without delay. The rate of delivery of material to the paver shall be regulated to enable the paver to operate continuously. The travel rate of the paver, and its method of operations, shall be adjusted to ensure an even and uniform flow of bituminous material across the screed, free from dragging, tearing and segregation of the material. In areas with restricted space where a mechanical paver cannot be used, the material shall be spread, raked and leveled with suitable hand tools by experienced staff, and compacted to the satisfaction of the Engineer-in-charge. The minimum thickness of material laid in each paver pass shall be in accordance with the minimum values given in the relevant parts of these Specifications. When laying binder course or wearing course approaching an expansion joint of a structure, machine laying shall stop 300 mm short of the joint. The remainder of the pavement up to the joint, and the corresponding area beyond it, shall be laid by hand, and the joint or joint cavity shall be kept clear of surfacing material.



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Bituminous material, with a temperature greater than 145°C, shall not be laid or deposited on bridge deck waterproofing systems, unless precautions against heat damage have been approved by the Engineer-in-charge.

Rolling / Compaction : Bituminous materials shall be laid and compacted in layers which enable the specified thickness, surface level, regularity requirements and compaction to be achieved. Compaction of bituminous materials shall commence as soon as possible after laying. Compaction shall be substantially completed before the temperature falls below the minimum rolling temperatures stated in the relevant part of these Specifications. Rolling of the longitudinal joints shall be done immediately behind the paving operation. After this, rolling shall commence at the edges and progress towards the center longitudinally except that on super elevated and unidirectionally cambered portions, it shall progress from the lower to the upper edge parallel to the center line of the pavement. Rolling shall continue until all roller marks have been removed from the surface. All deficiencies in the surface after laying shall be made good by the attendants behind the paver, before initial rolling is commenced. The initial or breakdown rolling shall be done with 8 – 10 tonnes dead weight smooth-wheeled rollers. The intermediate rolling shall be done with 8 – 10 tonnes dead weight or vibratory roller or with a pneumatic tyred roller of 12 to 15 tonnes weight having nine wheels, with a tyre pressure of at least 5.6 kg/sqcm or 0.56 MPa. The finish rolling shall be done with 6 to 8 tonnes smooth wheeled tandem rollers. Rolling shall be continued until the specified density is achieved, or where no density is specified, until there is no further movement under the roller. Where compaction is to be determined by density of cores the requirements to prove the performance of rollers shall apply in order to demonstrate that the specified density can be achieved. In such cases the Contractor shall nominate the plant, and the method by which he intends to achieve the specified level of compaction and finish at temperatures above the minimum specified rolling temperature. Laying trials shall then demonstrate the acceptability of the plant and method used. Bituminous materials shall be rolled in a longitudinal direction, with the driven rolls nearest the paver. The roller shall first compact material adjacent to joints and then work from the lower to the upper side of the layer, overlapping on successive passes by at least one-third of the width of the rear roll or, in the case of a pneumatic-tyred roller, at least the nominal width of 300 mm. In portions with super elevated and unidirectional camber, after the edge has been rolled, the roller shall progress from the lower to the upper edge. Rollers should move at a speed of not more than 5 km per hour. The roller shall not be permitted to stand on pavement which has not been fully compacted, and necessary precautions shall be taken to prevent dropping of oil, grease, petrol or other foreign matter on the pavement either when the rollers are operating or standing. The wheels of rollers shall be kept moist with water, and the spray system provided with the machine shall be in good working order, to prevent the mixture from adhering to the wheels. Only sufficient moisture to prevent adhesion between the wheels of rollers and the mixture should be used. Surplus water shall not be allowed to stand on the partially compacted





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pavement.

**Joints :** Where joints are made, the material shall be fully compacted and the joint made flush in one of the following ways: (a) All joints shall be cut vertical to the full thickness of the previously laid mix. All loosened material shall be discarded and the vertical face coated with a suitable viscosity grade hot bitumen, or cold applied emulsified bitumen. While spreading the material along the joint the material spread shall overlap 25 mm to 50 mm on the previously laid mix beyond the vertical face of the joint. The thickness of the loose overlap material should be approximately a quarter more than the final compacted thickness. The overlapped mix shall be dragged back to the hot lane so that the roller can press the small excess into the hot side of the joint to obtain a high joint density. (b) By using two or more pavers operating in echelon, where this is practicable, and in sufficient proximity for adjacent widths to be fully compacted by continuous rolling All longitudinal joints shall be offset at least 300 mm from parallel joints in the layer beneath or as directed, and in a layout approved by the Engineer-in-charge. Joints in the wearing course shall coincide with either the lane edge or the lane marking, whichever is appropriate. Longitudinal joints shall not be situated in wheel track zones.

**Opening to Traffic :** The newly laid surface shall not be open to traffic for at least 24 hours after laying the completion of compaction, without the approval of the Engineer-in-Charge in writing.

**Surface Finish and Quality Control of Work:** The surface finish of the completed construction shall conform to the requirements of section 900 of MORTH Specifications. For control of the quality of materials supplied and the works carried out the relevant provisions of Section 900 of MORTH Specifications.

**Arrangement for Traffic :** During the period of construction, arrangements for traffic shall be made in accordance with the provisions of specification and as per direction of the Engineer in-charge.

**Rate :** The rate includes the cost of all material, labour, machineries and equipments in all the operations described above

The unit of measurement for this item shall be 'M2'.

#### VI. Liquid Seal Coat:

**Scope** This work shall consist of the application of a seal coat for sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall (camber).

Seal coat shall be of either of the two types specified below: (A) Liquid seal coat comprising of an application of all layer of bituminous binder followed by a cover of stone chips. (B) Premixed seal coat comprising of a thin application of the aggregate premixed with bituminous binder.

**Materials**



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**Binder :** The binder and its quantity shall be a penetration bitumen of a suitable grade as specified in the item or as directed by the Engineer-in-charge

**Stone Chips for Seal Coat:** The stone chips shall consist of angular fragments of clean, hard, tough and durable rock of uniform quality throughout. They should be free of soft or disintegrated stone, organic or other deleterious matter. Stone chips shall be of 6.7 mm size defined as 100 per cent passing through 11.2 mm sieve and retained on 2.36 mm sieve. The quantity used for spreading shall be 0.09 cubic metre per 100 square metre area. The stone chips shall satisfy the quality requirements in Table 16.31 bituminous except that the upper limit for water absorption value shall be 1 per cent.

Table:

Sl. No	I.S. Sieve (mm)	Cumulative % passing by weight of total aggregate
--------	-----------------	---

- |    |       |        |
|----|-------|--------|
| 1. | 0.6   | 100    |
| 2. | 0.3   | 95-100 |
| 3. | 0.075 | 85-100 |

\* The elongation test to be done only on non-flaky aggregate on the sample.

\*\* This test is only required if the minimum retained coating in the stripping test is less than 95%.

**Fine Aggregate :** The aggregate shall be sand or grit and shall consist of clean, hard durable, uncoated dry particles and shall be free from dust, soft or flaky/elongated material, organic matter or other deleterious substances. The aggregate shall pass 2.36 mm sieve and be retained on 180 micron sieve. The quantity used for premixing shall be 0.06 cubic metres per 100 square metres area. Stones or fine aggregate shall be used as specified in item.

**Construction Operations**

**Preparation of Surface :** The seal coat shall be applied immediately after laying the bituminous course which is required to be sealed. Before application of seal coat materials, the surface shall be cleaned free of any dust or other extraneous matter.

**Construction of Seal Coat with Stone Chips :** Bitumen shall be heated to 150oC - 163oC and sprayed at the rate specified on the dry surface in a uniform manner with a self-propelled mechanical sprayer

Immediately after the application of binder, stone chips which shall be clean and dry, shall be spread uniformly at the rate specified on the surface preferably by means of a self –propelled or towed mechanical grit spreader so as to cover the surface completely. If necessary, the surface shall be brushed to ensure uniform spread of chips. Immediately after the application of the cover material, the entire surface shall be rolled with a 8-10 tonne smooth wheeled steel roller, 8-10 tonne static weight vibratory roller, or other equipment approved by the Engineer after laying trials if required. Rolling shall commence at the edges and progress towards the



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centre except in super elevated and unidirectional cambered portions where it shall proceed from the lower edge to the higher edge. Each pass of the roller shall uniformly overlap not less than one-third of the track made in the proceeding pass. While rolling is in progress, additional chips shall be spread by hand in necessary quantities required to make up irregularities. Rolling shall continue until all aggregate particles are firmly embedded in the binder and present a uniform closed surface.


**Construction of Seal Coat with Premixed Fine Aggregate :** A mixer of appropriate capacity and type approved by the Engineer-in-charge shall be used for preparation of the mixed material. The plan shall have separate dryer arrangements for heating aggregate. The binder shall be heated in boilers of suitable design, approved by the Engineer-in-Charge to the temperature appropriate to the grade of bitumen or as directed by the Engineer-in -Charge. The aggregates shall be dry and suitably heated to a temperature between 150oC and 165oC or as directed by the Engineer-in-charge before these components are placed in the mixer. Mixing of binder with aggregates to the specified proportions shall be continued until the latter are thoroughly coated with the former. The mix shall be immediately transported from the mixing plant to the point of use and spread uniformly on the bituminous surface to be sealed. As soon as a sufficient length has been covered with the premixed material, the surface shall be rolled with an 8-10 tonne smooth-wheeled roller. Rolling shall be continued until the premixed material completely seals the voids in the bituminous course and a smooth uniform surface is obtained.

**Opening to Traffic** In the case of seal coat with premixed fine aggregate traffic may be allowed soon after final rolling when the premixed material has cooled down to the surrounding temperature. In the case of seal coat with stone chips traffic shall not be permitted to run on any newly sealed area until the following day. In special circumstances, however, the Engineer-in-charge may open the road to traffic immediately after rolling, but in such case traffic speed shall be rigorously limited to 16 km. per hour until the following day.

**Measurement for Payment** Seal coat, for both items shall be measured as finished work over the area specified to be covered, in square metres at the thickness specified in the item.

**Rate** The rate for seal coat shall be cost of all materials, labour and equipment involved in operation described above.

The unit of measurement for this item shall be 'M2'.

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## PART – V

### SCHEDULE OF RATES FOR

**Tender for appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.**

**BID NO. Bid No.: MNGL/CP/2022-23/219**

Schedule of Rates (SOR) is enclosed on e-tendering portal.

**Evaluation Formula: Evaluation shall be done as per Clause No. 4.0 of Annexure –I to IFB.**

**Note :** The quantities indicated in SOR against all individual item are tentative and may vary considerably depending upon site condition, methodology adopted as per site requirement with due approval of Owner/ Consultants.

#### **General Note:**

- All SOR item shall be quoted by the bidder in the price part of the bid, otherwise bid will be rejected.**
- Prices quoted shall be inclusive of all taxes/duties and nothing extra shall be payable by the owner except for statutory variation in Goods & service tax rate during the contractual period. Bidder shall note that any error in estimating these taxes & Duties (GST) will be to Bidder's Account**

**Bidder's Signature & Seal** \_\_\_\_\_



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NATURAL GAS LIMITED**

**Tender for appointment of an agency for carrying out Civil, Structural & Electrical works for construction of CGS cum MS station at Sinner in Nashik GA.**

**Bid No.: MNGL/CP/2022-23/219**

## **PART – V I**

# **QUALITY PLAN FOR CIVIL WORKS**



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**ANNEXURE – I**

**QUALITY PLAN FOR CIVIL WORKS**

Sl. No.	Item	Type of Check/ Tests	Frequency of tests	Sample to be procured (Kg.)	Sample to be tested	Ref. Documents Acceptance Standards	Records	Remarks
1	AGGREGATE a) Coarse	i) Sp. Gravity	Once per source	10 kg	2 kg.	IS : 2386 (P-III)	Contractor to keep records as per Standard Formats	
				(Larger than 10 mm)				
				5 kg	1 kg			
				(10 mm to 4.75 mm)				
		ii) Voids Content	Once per source	150 kg	60 kg.	IS : 2386 (P-III)	-do-	
				(over 40 mm)				
				100 kg	30 kg			
				(40 mm to 4.75 mm)				
		iii) Absorption	Once per source	10 kg	2 kg.	IS : 2386 (P-III)	-do-	
				(Larger than 10 mm)				
				5 kg	1 kg			
				(10 mm to 4.75 mm)				
		iv) Sieve analysis	Every change of source/ 200m <sup>3</sup> of stack		50 kg	IS : 383-1970  IS : 2386 (P-I)	-do-	
				(63 mm & above)				
				50 kg	15 kg			
				(40mm to 62mm)				
				10 kg	2 kg			
				(20mm to 39mm)				
				2 kg	0.5 kg			
				(10 mm to 19mm)				
		v) Impact test	Once per source	5 kg	1 kg	IS : 2386 (P-IV) IS: 383	-do-	
		vi) Abrasion test	-do-	300 kg	50 kg	-do-	-do-	
		vii) Crushing value	-do-	30 kg	7 kg	-do-	-do-	
		viii) Deleterious Material	-do-	5 kg	0.5 kg	IS : 2386 (P-III) IS: 383	-do-	
		ix) Soundness	-do-	100 kg	10 kg	IS : 2386 (P-V)	-do-	
		x) Acid & Alkali reactivity	-do-			IS : 2386 (P-VII) IS : 2386 (P-VIII)	-do-	
		xi) Flakiness	-do-	150 kg	60 kg		-do-	
				(more than 40mm)				
				100 kg	30 kg			
				(40mm to 4.75mm)				
		xii) Bulk Density	-do-				-do-	



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Sl. No.	Item	Type of Check/ Tests	Frequency of tests	Sample to be procured (Kg.)	Sample to be tested	Ref. Documents Acceptance Standards	Records	Remarks
2	AGGREGATE b) Fine	i) Sieve Analysis	Once per source	2 kg	0.2 kg.	IS: 2386 (P-I)	Contractor to keep records as per Standard Formats	
		ii) Particle size & shape	-do-	5 kg	0.5 kg.	IS : 2386 (P-I) IS: 386	-do-	
		iii) Deleterious material	-do-	5 kg	0.5 kg.	-do-	-do-	
		iv) Soundness	-do-	10 kg	1 kg	-do-	-do-	
		v) Acid & alkali reactivity	-do-				-do-	
		vi) Silt & clay content	-do-	10 kg	0.3 kg	IS : 2386 (P-II) IS : 383	-do-	
3	REINF. STEEL	i) Min. Yield stress	Each source			IS : 1852 IS : 1786	Manufacturer's Certificate	
		ii) Min. ultimate tensile strength	-do-			-do-	-do-	
		iii) Tolerance	Random			-do-	-do-	
		iv) Elongation	-do-			-do-	-do-	
		v) Physical Checks - free from cracks, surface laminations, imperfect edges, spacers, chairs spacings, clear cover, laps, joining etc.	-do-			-do-	Standard records; as per specifications and drawings.	



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Sl. No.	Item	Type of Check/ Tests	Frequency of tests	Sample to be procured (Kg.)	Sample to be tested	Ref. Documents Acceptance Standards	Records	Remarks
4	CEMENT	i) Fineness	Once per 100t			IS:4031/269 IS: 1489 & IS:455	Manufacturer's Certificate	
		ii) Normal consistency	-do-			-do-	-do-	
		iii) Initial & final setting time	-do-			-do-	-do-	
		iv) Soundness: a) Expansion b) Autoclave test	-do-			-do-	-do-	
		v) Compressive strength	-do-			-do-	-do-	
		vi) Specific gravity	-do-			-do-	-do-	
5	CONCRETE	i) Workability	Slump @2H mix.			IS : 456 IS : 1199	-do-	
		ii) Crushing strength	6 cubes/ 35 cum.			IS : 516	-do-	





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