MAHARASHTRA NATURAL GAS LIMITED
(MNGL)

(A JOINT VENTURE OF GAIL (India) Limited & BPCL)

CNG & CITY GAS DISTRIBUTION
FOR PUNE

Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA.

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

Bid Document No.: MNGL/CP/2022-23/04

VOLUME I of II

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SECTION I

INVITATION FOR BIDS (IFB)

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OPEN DOMESTIC COMPETITIVE BID
(THROUGH E-TENDERING MODE)

NOTICE FOR INVITATION OF BIDS (IFB)
FOR

Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA

1.0 INTRODUCTION

1.1 **Maharashtra Natural Gas limited ('MNGL')** (hereinafter referred as Purchaser), is supplying Piped Natural Gas (PNG) to domestic, commercial and Industrial consumers and Compressed Natural Gas (CNG) to automobiles in the State of Maharashtra & Karnataka. MNGL is in the process of increasing its compression capacity for CNG distribution.

2.0 BRIEF DESCRIPTION OF PROJECT

2.1 The present project is Design, Supply, Installation and Commissioning of LNG Storage & Regasification System in the state of Maharashtra to ensure uninterrupted supply of natural gas to Domestic, Commercial and Industrial consumers. MNGL invites bids through single stage two envelopes system from eligible bidders for Design, Supply, Installation and Commissioning of LNG storage & regasification system in the state of Maharashtra as defined in bid document.

3.0 BRIEF SCOPE

3.1 SUPPLY PORTION

Scope includes Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA, as mentioned below:

Proposed Capacity (40,000 SCMD) & Equipment setup plan at DODI		
Item Description	**Quantity**	**Total Approx. Capacity / Flowrate**
Vacuum Insulated Storage Tank	56*2	112 KL
Submerged Unloading Pump	(1+1)	350 LPM
HP Pump	(1+1)	30 LPM
MP Pump	(1+1)	100 LPM
HP Vaporizer	(1+1)	200 to 250 Bar @ 650SCMH
MP Vaporizer	(1+1)	33 to 38 Bar @ 2400SCMH
LP Vaporizer	(1+1)	4 Bar @ 600SCMH

Proposed Capacity (1,00,000 SCMD) & Equipment setup plan at MALEGAON		
Item Description	**Quantity**	**Total Approx. Capacity / Flowrate**
Vacuum Insulated Storage Tank	114*2	228 KL
Submerged Unloading Pump	(1+1)	350 LPM
HP Pump	(2+1)	60 LPM
MP Pump	(2+1)	200 LPM
HP Vaporizer	(2+1)	200 to 250 Bar @ 2400SCMH
MP Vaporizer	(2+1)	33 to 38 Bar @ 4000SCMH
LP Vaporizer	(2+1)	4 Bar @ 1200SCMH

3.1.1 Scope includes Design and supply of Instrumentation, automation, PLC & SCADA system, safety system etc. complete in all respects to satisfy all applicable codes and statutory norms in India.

3.1.2 Scope also includes Design and supply of Electrical items pertaining to LNG area and Scope also include Design and supply of Firefighting facilities as per T4S and PNGRB guidelines complete in all respects to satisfy all applicable codes and statutory norms in India and as per tender specifications

3.1.3 Supply of Special Tools & Tackles to carry out Erection, Start-up, Commissioning, Operation and Maintenance of supplied package. The scope shall also include obtaining approvals/taking permissions from statutory authorities (PESO approvals etc.)

***Note**: The work will be executed on Turnkey Basis. Civil works, architectural works and structural works are excluded from the scope of the present tender. However, Bidder shall furnish the detailed construction drawings of foundations of their vessels/ equipment/ supports etc. which shall be constructed by the contractor through another tender.*

3.2 OPERATION AND COMPREHENSIVE MAINTENANCE PORTION

3.2.1 Supply of manpower for Operation and Maintenance Services during Warranty Period (1st year) & four years after Warranty period.

3.2.2 Comprehensive Maintenance Services during Warranty Period (1st year) & four years after Warranty period inclusive of consumables and spares.

3.2.3 All local approvals / NOC (including District Magistrate NOC) including PESO approval for complete system & for items as per relevant Codes, PESO & PNGRB requirement for LNG Storage & Regasification System.

4.0 TYPE AND DURATION OF CONTRACT

4.1 Rates will be firm and fixed during the contract period.

4.2 Supply of LNG Equipment: The duration of contract shall be Six (06) months from the date of issuance of LOI/PO/LOA/NOTIFICATION OF AWARD.

4.3 Operation & Comprehensive Maintenance: The duration for comprehensive maintenance shall be five (05) years (1 year during warranty and 04 years post warranty).

5.0 SCHEDULE FOR SUPPLY OF STORES / WORKS

Delivery of LNG dispensing facilities shall be in lots. All LNG equipment shall be supplied & commissioned as per schedule given below.

5.1 Supply:

Schedule for Supply:

Sl. No.	Item Description	Completion Period
1.	Design, Engineering, Manufacturing, Inspection, Supply, Transportation, Installation, Testing & Commissioning of LNG Equipment.	6 (Six) Months from date of Purchase Order by MNGL

Delivery basis to be on FOT store / site basis.

5.2 Service Portion

Sr. No.	Description	Completion Period
1.	Operation & Maintenance Services	5 years after commissioning of system.

6.0 BID VALIDITY

6.1 Bid should be valid for 4 (Four) Months from the last date of bid submission.

7.0 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.

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.)

8.0 DETAILS OF BID DOCUMENTS

Tender document number	MNGL/CP/2022-23/04 dated 06.04.2022
ITEM(S)	Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA.
TYPE OF BID	Open Domestic Competitive Bidding
TIME SCHEDULE	As per Sr. No. 5 above
EARNEST MONEY/ BIDSECURITY	Rs.2,00,000/- in the form of Demand Draft/BG to be in favor 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 A/c No: 35310073625 IFSC Code : SBIN0008966
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	12.04.2022, 11:00 Hrs.
Bid submission due date and time	27.04.2022 till 15:00 Hrs. IST
Bid Submission at	https://etenders.gov.in
Techno-commercial bid opening date and time	28.04.2022 at 16:00 Hrs. IST
Price bid opening date and time	Date and time shall be intimated later
Address for submission of EMD/Bid Security and venue for pre-bid meeting and opening of bids	Chief Manager (C&P) C&P Department, Maharashtra Natural Gas Limited, Pride Purple Coronet, 2nd Floor, Baner Road, Baner, Pune – 411045
Contact details	Telephone: +91 (20) 25611000/1190/1157 Email: gasaid@mngl.in / manan.gupta@mngl.in

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.

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 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.

9.0 BID SECURITY

Bid Security/EMD is applicable. Same shall be submitted as per clause no. 18 of ITB.

10.0 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 at following e-mails:
gasaid@mngl.in, manan.gupta@mngl.in

Note: Tender no. & subject should be in 'subject' of the e-mails sent.

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, 2nd 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.

11.0 BID EVALUATION CRITERIA (BEC)

A. TECHNICAL CRITERIA:

A.1 The bidder shall have designed, manufactured, supplied, installed and ready for commissioning "Cryogenic LNG storage tanks (at least one number of minimum capacity 56 KL) and regasification unit" in previous 7 years reckoned from bid due date.

A.2 The bidder should be a manufacturer of cryogenic storage tank. In case bidder is not a cryogenic storage tank manufacturer, then the bidder must furnish a written agreement from their foreign manufacturer (having manufacturing unit outside India) to own complete responsibility of design, QA/QC, after sales technical support, unconditional guarantee/warrantee, post warrantee service and after sales support to the purchaser along with bidder. The authority certificate shall be valid up to the completion of contract in accordance with the bid document.

A.3 Bidder can also qualify based on past experience required as per clause no. A. 1 & 2 above, of their foreign manufacturer (having manufacturing unit outside India as a supporting company) subject to fulfilling conditions as per clause no. C here in below.

A.4 One manufacturer can quote through one supplier and a supplier shall offer product of only one manufacturer for particular type of cryogenic storage tank. The bid shall be liable for rejection in case of the change of the proposed manufacturer after the submission of offer.

Note: -

1. Experience of bidder acquired as a sub-contractor can be accepted against submission of certificate from end user by such bidder along with other specified documents.

2. A Job executed by a Bidder for its own plant/ project cannot be considered as

experience for the purpose of meeting BEC of this Tender Document. However, jobs executed for Subsidiary/Fellow subsidiary/Holding company will be considered as experience for the purpose of meeting BEC subject to submission of tax paid invoice (s) duly certified by Statutory Auditor of the Bidder towards payments of statutory tax in support of the job executed for Subsidiary/Fellow subsidiary/Holding company. Such Bidders to submit these documents in addition to the documents specified to meet BEC.

3. Bidding through JV or in a Consortium is not permitted.

Documents Required to be uploaded/submitted by bidder along with the bid for qualification of BEC:

BEC Cl. No.	Description	Documents Required for Qualification
A.1	Experience	a) Copy of detailed Work Order/Purchase Order / Contact along with Schedule of Rates. (b) Copy of completion certificate issued by end user / Owner (or their consultant who has been duly authorized by owner to issue such certificate). OR Execution certificate (issued by the end user/owner/authorized consultant) in place of completion certificate for meeting the stipulated experience criteria provided that the asset for which the said execution certificate has been issued is ready for commissioning. **Note: The completion certificate / execution certificate shall have details like work order no. / client name, date, brief scope of work, completion date etc.**
A.2	Manufacturer of cryogenic storage tanks	Valid ISO/ NSIC/ MSME certificate or any other statutory document to prove that bidder is a manufacturer of cryogenic storage tanks. **Note: The statutory document submitted should indicate that the bidder is a manufacturer of cryogenic storage**

		tanks.
A.3	Bidder using credentials of foreign Manufacturer: Proof of foreign manufacturer (having manufacturing unit outside India) of cryogenic storage tanks meeting past experience as per A.1 & A.2	Bidder to submit the foreign manufacturer's copy of, a) Documents required against sl. no. A.1 & A.2 above in respect of foreign manufacturer meeting BEC- technical. b) Documents as stated under Clause No. C below (i.e. Supporting company clause of this BEC). c) A written agreement from their foreign manufacturer (having manufacturing unit outside India) to own complete responsibility of design, QA/QC, after sales technical support, unconditional guarantee/warrantee, post warrantee service and after sales support to the purchaser along with bidder. The authority certificate shall be valid up to the completion of contract in accordance with the bid document. d) Bidders to submit a declaration Letter stating that they are qualifying based on their foreign manufacturer's past supply experience.
A.4	Undertaking as per BEC	Bidder in his letter head shall furnish the declaration in compliance of BEC clause A.4.
Note to Clause no A.2	Job executed for Subsidiary / Fellow subsidiary/ Holding company	Tax paid invoice(s) duly certified by statutory auditor of the bidder towards payment of statutory tax in support of the job executed for Subsidiary / Fellow subsidiary/ Holding company.
All documents in support of Technical Criteria of Bid Evaluation Criteria (BEC) to be furnished by the bidders shall necessarily be duly certified/ attested by Chartered Engineer and Notary public with legible stamp with latest date.		

B **FINANCIAL CRITERIA:**

B.1 **Turnover**

The bidder should have achieved a minimum annual turnover as under in any one of the last 3 (three) audited financial years i.e., 2019-20, 2020-21 and 2021-22: -

Part No.	Item Description	Minimum Annual Turnover Requirement
1	LNG-LCNG Station Plan at Dodi in Nashik GA	Rs.8.00 Cr.
2	LNG-LCNG Station Plan at Malegaon in Nashik GA	Rs.9.50 Cr.

Note: In case bidder quotes for more than one part, the requirement of Turnover shall be on cumulative basis.

B.2 **Net worth**

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

B.3 **Working Capital**

The bidder should have a minimum working capital as under as per latest audited balance sheet i.e., for the year 2021-22.

Part No.	Item Description	Minimum Working Capital Requirement
1	LNG-LCNG Station Plan at Dodi in Nashik GA	Rs.1.60 Cr.
2	LNG-LCNG Station Plan at Malegaon in Nashik GA	Rs.1.90 Cr.

Note: In case bidder quotes for more than one part, the requirement of Working Capital shall be on cumulative basis.

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.

Bidders 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.

If the audited financial results of the immediate preceding financial year i.e. 2021-22 is not available, then the audited financial results of the year immediately prior to 2021-22 i.e. 2020-21 shall be considered for calculation of Net Worth and

Working Capital and audited Financial Results of the year 2018-19, 2019-20 & 2020-21 shall be considered for calculation of Annual Turnover as specified at **Cl. B of Financial Criteria**.

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

C. ELIGIBILITY CRITERIA OF A BIDDER IN CASE BID IS SUBMITTED ON THE BASIS OF TECHNICAL EXPERIENCE OF FOREIGN BASED ANOTHER COMPANY (SUPPORTING COMPANY) AS UNDER

Eligibility criteria in case bid is submitted on the basis of technical experience of FOREIGN BASED ANOTHER COMPANY (SUPPORTING COMPANY) which holds more than fifty percent of the paid-up share capital of the bidder company or vice versa shall be as per below:

- Offers of those bidders (not under Consortium arrangement) who themselves do not meet the technical experience criteria as stipulated in BEC and are quoting based on the experience of foreign based another company (supporting company) can also be considered. In such case the supporting company should hold more than fifty percent of the paid up share capital of the bidding company or vice versa.
- However, the supporting company should on its own meet the technical experience as stipulated in the BEC and should not rely on any other company or through any other agreement like technical collaboration agreement.
- In that case as the bidding company is dependent upon the technical experience of another company with a view to ensure your commitment and involvement of the companies involved for successful execution of the contract, the participating bidder should enclose the following agreement/ guarantees/ undertakings along with the techno-commercial bid.
    - An agreement (as per format enclosed Format F-1) between the bidder and the supporting company.
    - Guarantee (as per format enclosed at format F-2) by the supporting company to MNGL for fulfilling the obligation under the Agreement.
    - Undertaking by supporting company to provide a performance bank guarantee (as per format and instructions enclosed at format F-3) equivalent to 50% of the value of the PBG which is to be submitted by the bidding company, in case of being the successful bidder.

- In case where foreign based supporting company does not have permanent establishment in India as per Indian Income Tax Act, the bidding company can furnish performance bank guarantee for an amount, which is sum of PBG amount to be submitted by the bidder and additional PBG amount required to be submitted by the supporting company subject to the condition that supporting company have 100% paid up equity share capital of the bidder either directly or through intermediate subsidiaries or vice versa.
- In such case bidding company shall furnish an undertaking that their foreign based supporting company is not having any permanent establishment in India in terms of Income Tax Act of India.
- Undertaking from the supporting company to the effect that in addition to invoking the PBG submitted by the bidding company, the PBG provided by supporting company shall be invoked by MNGL due to non-performance of the bidding company.
- Note: In case supporting company fails to submit Bank Guarantee as per (iii) above, EMD/SD submitted by the bidder shall be forfeited.
- The Financial BEC of the tender is to be met by bidder on their own.

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

12.0 GENERAL

12.1 Purchaser (MNGL) reserves the right to increase or decrease the scope of work of bidders before or after award of work

12.2 Purchaser reserves the right to place the order for part quantity.

12.3 Bid document is non-transferable.

12.4 Bids through Hardcopy/ Fax / E-mail shall not be accepted.

12.5 Owner will not be responsible for cost incurred in preparation and submission of bids.

12.6 Owner reserve the right to reject any or all the bids received at its discretion without assigning any reason whatsoever. MNGL also reserves the right to cancel the tender without assigning any reason whatsoever.

12.7 Contact details of owner is given below:

Chief Manager (C&P)
C&P Department,

Maharashtra Natural Gas Limited,
Pride Purple Coronet, 2nd Floor,
Baner Road, Baner,
Pune – 411045
Telephone: +91 (20) 25611000
Email: gasaid@mngl.in, manan.gupta@mngl.in

13.0 Mandatory Requirement:

1. As per Government Guidelines (Department of Public Enterprises vide OM no. dated DPE/7(4)/2017-Fin.(Part-I) dated 30.07.2020 forwarded department of Expenditure's OM No. F.6/18/2019-PPD dtd. 23.07.2020 and Order (Public Procurement No. 1) Dtd. 23.07.2020, Order (Public Procurement No. 2) Dtd. 23.07.2020, Order (Public Procurement No. 3) Dtd. 24.07.2020 imposing restrictions under Rule 144 (xi) of General Financial Rules (GFRs), 2017 on grounds of Defence of India and National Security for Compliance.

2. Accordingly, any bidder which is required to comply with requirements of provisions mentioned above would require registration with the Competent Authority constituted by the Department for Promotion of Industry and Internal Trade (DPIIT). Bidder to submit Undertaking as per Attachment-I of IFB.

Attachment 1

UNDERTAKING ON LETTERHEAD

To,
M/s Maharashtra Natural Gas Limited,
Pride Purple Coronet, 2nd 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:
Date:

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

SECTION II

INSTRUCTIONS TO BIDDERS (ITB)

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A. INTRODUCTION

1.0 SCOPE OF BID

1.1 The Purchaser invites bids through e-tendering mode for **Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA** as mentioned in the tender documents.

1.2 The bid document specifies the contractor scope of work, terms and conditions.

1.3 All terms, conditions and specifications of the bidding document shall be construed as applicable in general, unless specifically indicated to the contrary.

1.4 Bidders shall quote in the manner as specified in the bidding document. Owner reserves the right to evaluate and accept bids at their sole discretion**.** The provisions of this clause shall supersede any contrary provisions expressly stated or implied anywhere else in the bidding document.

1.5 The successful Bidder (the “Supplier”) shall complete delivery of Goods along-with services (if any as per tender) as per Specification, Scope of Supply/Job, Special Conditions of Contract within the period stated in tender/ bid documents.

1.6 Throughout the Bid Documents,

a. The terms 'Bid', 'Tender' & ‘Offer’ and their derivatives [Bidder/ Tenderer, Bid/ Tender/ Offer etc.] are synonymous.

b. 'Day' means 'Calendar Day'

c. The singular shall include the plural and vice versa wherever the context so requires.

2.0 ELIGIBLE GOODS AND SERVICES AND ORIGIN OF GOODS

2.1 All goods and related services to be supplied under the contract shall have their origin only in source countries, which are not prohibited to trade with by any law or rules made there under having the force of law of the Union of India or any state Government of India.

2.2 For purposes of this clause, “Origin” means the place where the goods are mined, grown, or produced, or the place from which the related services are supplied. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

2.3 The origin of goods and services need not be from the home country of the Bidder.

2.4 **Acceptance of goods in deviation to specified specifications**
Normally goods with deviation from requisite specifications will not be accepted. However, in exceptional circumstances, it may be accepted, at sole discretion of MNGL, where the goods are of superior specification.

3.0 ONE BID PER BIDDER

3.1 Each bidder shall submit only one bid. A bidder who submits or participates in more than one bid will be disqualified. If bid of companies which is managed & controlled by same group of individuals (common owners / proprietor, common partner/ common directors), the participation in a particular tender by more than one such bidder will not be allowed and bids will be disqualified.

3.2 Also, if this fact is known at a later stage during bid evaluation or even after finalization of contract, the award will be made null and void and appropriate action including forfeiting of security deposit in any form and putting the firms on holiday list will be taken.

3.3 Alternative bids are not acceptable.

3.4 The provisions mentioned at clause no. 3.1 herein above 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.

4.0 SITE VISIT

4.1 The bidder is advised to visit and examine the site of works and its surroundings and obtain for himself at his own responsibility all information that may be necessary for preparation of the bid and entering into the Contract. The cost of visiting the site shall be at bidder's own expenses.

4.2 The bidder and any of his personnel or Agents will be granted permission by the Owner to enter upon his premises and lands for the purpose of such inspection, but only upon the explicit condition that the bidder, his personnel or agents will release and indemnify the Owner and his personnel and agents from and against all liability in respect thereof and will be responsible for personnel injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, cost and expenses incurred as a result thereof.

5.0 COST OF BIDDING

5.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Purchaser will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

6.0 NON-TRANSFERABILITY OF THE BID DOCUMENTS

6.1 Bid document is non-transferable.

B. THE BID DOCUMENTS

7.0 CONTENT OF BID DOCUMENTS

7.1 The Goods required, bidding procedures, and contract terms are prescribed in the bid documents. In addition to the Invitation for Bids (IFB), the bid document includes:

- Volume I Commercial Section consisting of:
- Invitation for Bids (IFB)
- Instructions to Bidders (ITB)
- General Conditions of Contracts (GCC)
- Special Conditions of Contracts (SCC)
- Forms and Formats
- Schedule of Rates (SOR)
- Volume II –Material Requisition, Technical Specifications, etc

7.2 The Bidder is expected to examine all instructions, forms, terms, and specifications in the bid documents. The Bid Documents together with all its attachment thereto and Corrigendum (if any), shall be considered to be read understood and accepted by the bidder. Failure to furnish all information required by the bid documents or to submission of a bid not substantially responsive to the bid documents in every respect will be at the Bidder's risk and may result in the rejection of its bid.

8.0 CLARIFICATION ON BID DOCUMENTS

8.1 A prospective Bidder requiring any clarification of the bid documents may notify the Purchaser and / or the Consultant as the case may be, in writing or by cable (hereinafter, the term 'cable' is deemed to include electronic mail and facsimile) at the address indicated in the tender. The Owner / Consultant will respond in writing to any request for clarification of the bid documents which it receives after issue of the bid documents but prior to at least two (02) working days before the pre-bid meeting date. Written copies of the Owner's response (including an explanation of the query but not necessarily identifying the source of inquiry) will be hosted on websites enlisted at sl. No. 8 in IFB along with the corrigendum, if required, before the bid due date (not through the minutes of the Pre-Bid

Meeting). All such clarifications issued shall deem to form a part and parcel of the Bid documents.

8.2 Any clarification or information required by the Bidder but same not received by the Employer/ PMC by way of above is liable to be considered as "no clarification / information required".

8.3 The Bidder shall submit their queries / clarifications to MNGL in the format available in tender.

9.0 AMENDMENT OF BID DOCUMENTS

9.1 At any time prior to the deadline for submission of bids, the Owner / Consultant, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, may modify the bid documents by issuing addenda and or Corrigendum.

9.2 Any addendum / corrigendum / clarifications to bidders query thus issued shall be part of the bidding documents and shall be hosted on websites enlisted at sl. No. 8 in IFB before bid due date. Bidders desirous to submit its bid have to take into consideration of all the addenda / corrigenda / clarifications to bidder's query hosted on the above websites before submitting the bid.

9.3 Bidders are advised to visit e-tendering website from time to time to get updated information / documents.

9.4 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.

9.5 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.

C. PREPARATION OF BIDS

10.0 LANGUAGE OF BID

10.1 The Bid prepared by the bidder, all correspondences and documents relating to the bid exchanged by the bidder and the Owner, shall be written in the English language only. Any printed literature furnished by the bidder may be written in another language, provided that this literature is accompanied by an English translation, in which case, for purpose of interpretation of the Bid, the English translation shall govern.

10.2 In the event of submission of any document/ certificate by the bidder in a language other than English, the English translation of the same duly authenticated by Chamber of Commerce of bidder's country shall be submitted by the bidder along with the bid.

10.3 In exceptional cases, the English translation authenticated by Indian High Commission / Consulate may be accepted at sole discretion of MNGL.

11.0 DOCUMENTS CONSTITUTING THE BID

11.1 The bid prepared by the bidder shall comprise of the following components that are required to be provided/uploaded on E-tendering portal.

11.1.1 Scanned documents (duly signed by the authorized signatory) to be uploaded by the bidder on the portal as per list appended to this tender document named "DOCUMENTS TO BE UPLOADED ON E-TENDER PORTAL".

11.1.2 Techno-commercial information by the bidder in the specified format on the e-tender portal (reference checklist of TECHNO-COMMERCIAL SHEET appended to this tender document)

11.1.3 Price bid SOR as per prescribed format on the e-tender portal. (for reference, format is provided at Section – "Schedule of Rates")

Note:

i) All pages of the bid offer to be signed and stamped by an authorised representative (as describe in bid document) of the bidder**.**

ii) Bidder must ensure numbering of all pages submitted in bid document. Further total number of pages submitted in bid document must be mentioned in the covering letter of bid submitted.

iii) **Prices if received in Unpriced Bid shall not be considered for evaluation and bid shall be summarily rejected.**

12.0 BID FORM

The Bidder shall complete all the Bid Forms attached in Section-V of bid document and submit the same as a part of "Techno-Commercial Un-priced bid "as per clause no. 21 of ITB.

In two part bidding as specified in IFB, Bidder shall furnish bid in two parts, the first part will contain all bid forms with related documents, SOR without prices and bid security but not the price schedule, the second part will contain price schedule, each such part being furnished on e-tendering website

https://etenders.gov.in as per instructions for bid submission available in the tender/ e-tendering website.

13.0 BID PRICES

13.1 The Bidder shall indicate in the appropriate Price Schedule the unit prices and total bid price of the goods & services it proposes to supply under the contract.

13.2 Bidder shall indicate the following in the Schedule of Rates,

i) Basic Unit rate including Packing, Forwarding & transportation charges and all taxes & duties except GST for each quoted SOR line item
ii) Unit rate for Installation, Erection and Commissioning (excluding GST)
iii) Unit Rate for Operation charges (excluding GST)
iv) Unit rate for Comprehensive Maintenance charges (excluding GST)
v) GST on above i), ii), iii) & iv)
vi) Bidders to indicate HSN/SAC Code & % of GST applicable in un-priced SOR.

Note:
Anti-profiteering clause: As per Clause 171 of GST Act, it is mandatory to pass on the benefit due to reduction in rate of tax or from input tax credit to the consumer by way of commensurate reduction in prices. The Supplier may note the above and quote their prices accordingly.

14.0 PRICE VARIATION

14.1 Rates will be firm and fixed during the contract period.

15.0 BID CURRENCY

15.1 Bidders shall submit bid in Indian Rupees only.

16.0 DOCUMENTS ESTABLISHING BIDDER'S ELIGIBILITY AND QUALIFICATION

16.1 Pursuant to ITB, the Bidder shall furnish, as part of its bid, documents establishing the Bidder's eligibility to bid and its qualifications to perform the contract if its bid is accepted.

16.2 The documentary evidence of the Bidder's qualifications to perform the contract if its bid is accepted shall establish to the Purchaser's satisfaction:

- that the Bidder has the financial, technical, and production capability necessary to perform the contract;
- that the Bidder meets the qualification criteria stipulated in the Tender.

17.0 DOCUMENTS ESTABLISHING GOOD'S ELIGIBILITY AND CONFORMITY TO BID DOCUMENTS

17.1 Pursuant to ITB, the Bidder shall furnish, as part of its bid, documents establishing the eligibility and conformity to the bid documents of all goods and services which the Bidder proposes to supply under the contract.

17.2 The documentary evidence of the eligibility of the goods and services shall consist of a statement in the Price Schedule of the country of origin of the goods and services offered and a certificate of origin (for goods other than that of Indian origin) issued at the time of shipment shall confirm the same.

17.3 Wherever appropriate the documentary evidence of conformity of the goods and services to the bid documents may be in the form of literature, drawings, and data, and shall consist of:

- detailed description of the essential technical and performance characteristics of the goods;
- an item-by-item commentary on the Purchaser/ Consultant's Technical Specifications demonstrating substantial responsiveness of the goods and services to those of the specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications.

17.4 For purposes of the commentary to be furnished pursuant to ITB above, the Bidder shall note that standards for workmanship, material, and equipment, as well as references to brand names or catalogue numbers designated in the Technical Specifications, are intended to be descriptive only and not restrictive.

18.0 BID SECURITY

18.1 Pursuant to the provisions of IFB and ITB, the Bidder shall furnish, as part of its bid, a bid security in the amount specified in the Tender.

18.2 The bid security is required to protect the Purchaser against the risk of Bidder's conduct, which would warrant the security's forfeiture.

18.3 Bid security/EMD against e-tender can be submitted either through online e-payment mode or in the form of Bank Guarantee (BG) or Demand Draft (DD) or Banker's cheque (BC) or Letter of Credit from any Nationalized/ Scheduled Indian Bank or by the branch of a reputable international bank located in India as per proforma attached in the Tender document. Bid security in the form of Bank Guarantee shall be valid for sixty (60) days beyond the validity of the bid (of 4 months).

In case of DD or BC, the same should be in favour of MAHARASHTRA NATURAL GAS LIMITED payable at Pune.

To enable the bidders to utilize online transaction option, Bank details of MNGL are specified in Sl. No. 8 of IFB above.

Bidder is required to upload the successful Transaction Details along with their e-bid. In case of online transaction, submission of EMD in original is not applicable.

18.4 Non-submission of EMD (in form of BG/ DD/ BC/ Letter of Credit in physical form) to purchaser's office as mentioned in IFB may render the bid liable for rejection.

18.5 Any bid not secured in accordance with ITB Clauses may be treated as non-responsive and rejected.

18.6 Original Bid Security in the form of BG/ DD/ BC/ Letter of Credit shall be submitted sealed in an envelope clearly superscribing "Bid Security – Original" along with the name and address of bidder, tender subject, tender document number and shall be addressed to the address given in Section-IFB. If the envelope is not sealed and marked as above, the Purchaser will assume no responsibility for the misplacement of the EMD and its consequential rejection.

18.7 Earnest Money Deposit so paid will be refunded to the unsuccessful bidders after the award of work. For bidders who have submitted their EMD through any of the e-payment mode, refund of the EMD amount shall be made to the account as mentioned in their profile on the e-tender portal.

18.8 The successful Bidder's bid security will be discharged upon such Bidder accepting the award and furnishing the performance security and confirmation of the same (from issuing bank).

18.9 The bid security may be forfeited, if:

- The bidder withdraws its bid during the period of bid within its validity; or
- The bidder revises / modifies their bids suo moto affecting the bid requirement; or
- The bidder does not accept the LOA/PO/Contract; or
- Execution of job has not started as per timelines defined in tender document; or
- It is established that bidder has indulged in corrupt and fraudulent practice or have submitted forged documents the bid security shall be forfeited in addition to other action like putting the vendor on holiday after following the due process; or
- The bidder does not accept the correction of errors; or
- The bidder fails to furnish "Contract Performance Guarantee / Security Deposit", in accordance with tender conditions, upon award.

18.10 **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.**

18.11 Bidders submitting their EMD in the form of BG/DD/ BC/ Letter of Credit have to upload a scanned copy of the same on the e-tender portal. During bid opening, any bid uploaded without such scanned copy shall be summarily rejected. Bidders submitting bid security in the form of BG/DD shall submit the same in physical form within 7 working days from the date of bid opening, failure of which may render the bid liable for rejection. Bidders are required to submit EMD in a separate sealed envelope super scribing the tender number and that it contains EMD.
Working days shall be arrived after considering Five (5) days working in a week at MNGL's office & any gazetted holiday in Pune.

18.12 In case of forfeiture of EMD/ Bid Security, the forfeited amount will be considered inclusive of tax and tax invoice will be issued by MNGL. The forfeiture amount will be subject to final decision of MNGL based on other terms and conditions of order/ Contract.

18.13 EMD / Bid Bond will not be accepted in case the same has reference of 'remitter' / 'financer' other than bidder on the aforementioned financial instrument of EMD / Bid Bond submitted by the bidder and bid of such bidder will be summarily rejected.

19.0 PERIOD OF VALIDITY OF BIDS

19.1 Bids shall remain valid for 4 (Four) Months after the date of bid submission prescribed by the Purchaser and will reject the bid having shorter validity period as non-responsive.

19.2 In exceptional circumstances, the Purchaser may request the Bidder for an extension of the period of validity. The request and the responses thereto shall be made in writing. The bid security provided under ITB shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request for extension of its bid validity will not be required nor permitted to modify its bid.

20.0 AGENTS IN INDIA

20.1 Deleted

D. SUBMISSION OF BIDS

21.0 INSTRUCTION FOR ONLINE BID SUBMISSION

21.1 The bidders are required to submit soft copies of their bids electronically on the Central Public Procurement (CPP) Portal i.e. http://etendrs.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.

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, 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 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" i**n 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**

22.0 DEADLINE FOR SUBMISSION OF BIDS

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 the due date.

22.2 The EMD (if applicable) in physical form must be received by Owner (MNGL) at the address as specified in IFB but not later than the time and date as specified in IFB. The Owner may, in exceptional circumstances and at its discretion, on giving reasonable notice by fax or any written communication to all prospective bidders who have been issued the bid document extend the deadline for the submission of bids in which case all rights and obligations of the Owner and bidders, previously subject to the original deadline will thereafter be subject to deadline as extended.

22.3 No bids shall be allowed to be submitted after the due date and time on the E-tender portal, in any case whatsoever. In case the bidder has not clicked the Final Submission button till the due date and time, the bid will automatically be rejected by the e-tender portal and such bid will be considered non-submitted.

23.0 LATE BIDS

23.1 Bidders have to upload scanned copy of their document towards EMD (Declaration for Bid Security/ EMD (if in the form of BG)/ Exemption certificate, as applicable), on the e-tender portal. During bid opening, any bid uploaded without such document toward EMD shall be summarily rejected.

23.2 Bidders submitting EMD in the form of BG/ DD/ BC/ Letter of Credit (if applicable) have to ensure that the same in physical form reaches MNGL's office within 7 working days from the date of bid opening. Failing to do so may render the bid to be considered as Late Bid. Such bid shall not be considered for further evaluation.

23.3 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.

24.0 MODIFICATION AND WITHDRAWAL OF BIDS

24.1 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.

Note:
In case bidder wants to modify its bid, the bidder should not click on 'Withdraw' button. Please note that upon clicking withdraw button, bidder will not be allowed to participate in that tender again. 'Withdraw' button is only meant for the case when bidder needs to withdraw their participation from a specific tender.

24.2 No bid can be modified after the deadline for submission of bid.

24.3 No bid shall be allowed to 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. Withdrawal of a bid during this interval shall result in the bidder's forfeiture of its bid security (if applicable), pursuant to clause 18 of ITB or other actions as per tender conditions.

E. OPENING AND EVALUATION OF BIDS

25.0 OPENING OF BIDS BY THE PURCHASER/CONSULTANT

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

25.2 The Bidder's names bid modifications or withdrawals, and the presence or absence of requisite Bid Security (EMD) and such other details as the Owner, at its discretion, may consider appropriate, will be announced at the opening. No bid shall be rejected at bid opening, except for late bids, which shall be later returned unopened to the concerned Bidder pursuant to ITB Clause 23.

25.3 Bids (and modifications sent pursuant to ITB Clause 24) 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 Owner/ Consultant any documents pertaining to its bid is not being acknowledged and relevant portions read out.

25.4 The Owner/ Consultant will prepare a bid opening statement to be signed by all representatives present during bid opening, if so required by the Purchaser.

26.0 CLARIFICATION OF BIDS

26.1 All the bidders must ensure adequacy and sufficiency of their document while submitting bid in all respects. Bid shall include all documents confirming to the tender terms and conditions, BEC and the tender specifications in Toto failing which their bids are liable to be rejected.

26.2 During evaluation of the bids, the Owner / Consultant may, at its discretion, if required, ask the Bidder for a clarification of its bid. The request for clarification and its response shall be through the e-tendering portal only, and no change in the prices or substance of the bid shall be sought, offered, or permitted.

27.0 PRELIMINARY EXAMINATION

27.1 The Purchaser/Consultant will examine the bids to determine whether they are complete and meets the “Bid Evaluation Criteria” of the Bidding Documents, whether required sureties have been furnished, whether the documents have been properly signed and whether the bids are generally in order.

27.2 The Purchaser/Consultant may waive any minor informality, nonconformity, 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.

27.3 Purchaser reserves the right to not to open the bids of those bidders with whom purchaser experience with regard to performance of any earlier contract/ equipment has been found to be lacking.

27.4 Prior to the detailed evaluation, pursuant to ITB, the Purchaser/Consultant will determine the substantial responsiveness of each bid to the bidding documents. For purposes of these Clauses, a substantially responsive bid is one, which conforms to all the terms and conditions of the Bid Documents without deviations.

27.5 If a bid is not substantially responsive, it will be rejected by the Purchaser/Consultant and shall not subsequently be made responsive by correction of the nonconformity by the Bidder.

27.6 CONFIDENTIALITY

During Bid Process: Information relating to the examination, clarification, evaluation, and comparison of Bids, and recommendations for the award of a Contract, shall not be disclosed to any person(s) not officially concerned with such process.

27.7 CONTACTING THE EMPLOYER

From the time of Bid opening to the time of award of Contract, if any Bidder wishes to contact the Employer on any matter related to the Bid, it should do so in writing.

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 and action shall be initiated as per procedure in this regard.

28.0 REJECTION CRITERIA

28.1 Minor unconformities may be neglected and/or bidders may be required to rectify such minor unconformities.

28.2 Any deviation/unconformity on following conditions will result in summarily rejection of the bid:

(i) Bid security (EMD) i.e. non-submission along with bid offer or bid security (EMD) not complying with the bid requirements, if applicable.
(ii) Submission of contract performance bank guarantee as per tender.
(iii) Period of validity of bid.
(iv) Firm & fixed prices throughout execution of contract.
(v) Specifications.
(vi) Delivery/ Completion schedule.
(vii) Resolution of dispute/ arbitration clause.
(viii) Schedule of Rates / Price Schedule in other than prescribed format or with insertion of any condition(s).
(ix) Price Reduction Schedule.
(x) Force Majeure.
(xi) Applicable laws.
(xii) Scope of work.
(xiii) Guarantee / Warranty/ Defect Liability Period.
(xiv) Disclosure of prices in unpriced bid.
(xv) If the estimated price impact of the unquoted items is more than 10% of the bidder’s quoted price.
(xvi) Non-submission of declaration regarding Holiday Listing status.
(xvii) Quoting Comprehensive Maintenance charges less than or more than, as prescribed in clause no 21 of SCC.
(xviii) Any modification in SOR and Guaranteed parameters (Annexure I) in the submitted bid offer.
(xix) If any cell in Guaranteed parameters (Annexure I of Volume II of II) is left blank.
(xx) Any other condition specifically mentioned in the tender document elsewhere that non-compliance of the clause lead to rejection of bid.

Note: Bidders are advised to submit their bids in strict compliance with the specifications and other stipulations as per tender terms and conditions. Bidders are advised not to stipulate deviations.

29.0 OPENING OF PRICE BID

29.1 The Bidders who meet the qualification requirement and whose bids have been 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 of 24 hours. The place, date and time of price bid opening will be informed to all such bidders. The Bidders' authorized representatives who are present shall sign a register evidencing their attendance.

29.2 The bid prices and discounts, if any stated in the price schedules will be announced during price bid opening.

30.0 CONVERSION TO SINGLE CURRENCY

30.1 Deleted

31.0 EVALUATION AND COMPARISON OF PRICES

31.1 The Purchaser will evaluate and compare the bids which have been determined to be substantially responsive.

31.2 Evaluation shall be done on part wise overall L-1 basis to the Purchaser. In case of tie for L1 bidder, the order shall be placed on the bidder having highest turnover during the preceding 3 Financial Years i.e., 2019-20, 2020-21 and 2021-22.

Note to clause no. 31.0:

- Prices if received in Unpriced Bid Envelope / Cover-1 shall not be considered for evaluation and bid shall be summarily rejected.
- Prices are to be submitted strictly as per the Schedule of Rate of the bidding documents; MNGL shall not be responsible for any failure on the part of the bidder to follow the instructions.
- Bidders are advised NOT to mention Rebate/Discount separately, either in the SOR format or anywhere else in the offer. In case Bidder(s) intend to offer any Rebate/ Discount, they should include the same in the item rate(s) itself under the "Schedule of Rates (SOR)" and indicate the discounted unit rate(s) only.
- If any unconditional rebate has been offered in the quoted rate, the same shall be considered in arriving at evaluated price. However, no cognizance shall be taken for any conditional discount for the purpose of evaluation of the bids.

- In case, it is observed that any of the bidder(s) has/have offered suo-moto Discount after submission of bid, such reduction/ discounts shall not be considered for evaluation. However, in the event of the bidder emerging as the lowest evaluated bidder without considering the discount/ rebate(s), then such discount/ rebate(s) offered by the bidder shall be considered for Award of supply/ work and the same will be conclusive and binding on the bidder.
- In the event as a result of techno-commercial discussions or pursuant to seeking clarifications / confirmations from bidders, while evaluating the un-priced part of the bid, any of the bidders submits a sealed envelope stating that it contains revised prices; such bidder(s) will be requested to withdraw the revised prices failing which the bid will not be considered for further evaluation.
- **Tenders not in Prescribed Forms**
  If quotations are received from the party in their own format instead of on the prescribed format against the tender, such quotations may not be considered for evaluation.

31.6 **CORRECTION OF ERRORS**

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:

Discrepancy between unit price & total price: If there is a discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity of any item or between sub-total and the total price, the unit or sub-total price shall prevail, and the total price shall be corrected. If there is a discrepancy between words and figures, the amount in words will prevail.

The amount stated in the bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors. If the bidder does not accept the corrected amount of bid, its bid will be rejected, and the bid security shall be forfeited.

32.0 CONTACTING THE PURCHASER/ CONSULTANT

32.1 From the time of bid opening to the time of contract award, if any Bidder wishes to contact the Purchaser/ Consultant on any matter related to the bid, it should do so in writing.

32.2 Any effort by a Bidder to influence the Purchaser/ Consultant in its decisions on bid evaluation, bid comparison, or contract award may result in the rejection of the Bidder's bid.

F. AWARD OF CONTRACT

33.0 POST-QUALIFICATION

33.1 In the absence of pre-qualification, the Purchaser/Consultant will determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated responsive bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB.

33.2 The determination will take into account the Bidder's financial, technical, and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Purchaser/Consultant deems necessary and appropriate.

33.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's bid.

34.0 AWARD CRITERIA

34.1 The Purchaser will award the contract to the successful Bidder(s) whose bid has been determined to be substantially responsive and has been determined to be the lowest evaluated bid for each part separately, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily.

34.2 In case of a tie at the lowest bid (L1) position between two or more bidders, the order/LoA will be placed on the bidder who has higher/ highest turnover in the preceding 3 financial years i.e. 2019-20, 2020-21 & 2021-22.

35.0 DELETED

36.0 PURCHASER'S RIGHT TO VARY QUANTITIES

36.1 The quantity mentioned in SOR is for obtaining the unit rates and evaluation purpose. The Purchaser reserves the right at the time of contract award or during tenancy of contract to increase or decrease the quantity of goods and services originally specified in the Schedule of Requirements without any change in unit price or other terms and conditions.

37.0 PURCHASER'S RIGHT TO ACCEPT OR REJECT ANY OR ALL BIDS

37.1 The Purchaser reserves the right to accept or reject any bid in full or part, to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to the affected Bidder or Bidders. Purchaser also reserves the right not to accept lowest rates quoted by the bidder.

38.0 NOTIFICATION OF AWARD

38.1 Prior to the expiration of the period of bid validity, the Purchaser will notify the successful Bidder in writing by LOA (Letter of Acceptance) or registered letter or by e-mail that its bid has been accepted.

38.2 The date of LOA (Letter of Acceptance) for notification of award will be effective date of start of contract.

38.3 The bidder shall promptly, but not later than Seven (7) days of notification of award shall furnish its acceptance of notification of award and submit the Contract-Cum-Equipment Performance Bank guarantee pursuant to ITB & SCC Clause within period stipulated for the same.

38.4 The Purchaser will discharge the bid security of unsuccessful Bidders as early as possible.

38.5 LOA read in conjunction with bid documents shall be binding on Bidder.

39.0 CONTRACT CUM EQUIPMENT PERFORMANCE BANK GUARANTEE

39.1 Bidder shall furnish the Contract Cum Equipment Performance Bank Guarantee (CPBG) in accordance with the bid document, in the Format provided in the bid document. The bank guarantee shall be in the same currency as of Letter of award / Contract.

39.2 Bidder shall be required to submit Contract-Cum-Equipment Performance Bank Guarantee (CPBG) in the form of Bank Guarantee (BG) or Demand Draft (DD), issued by a nationalized bank or a scheduled Indian bank or by the branch of a reputable international bank located in India or by an international reputed bank from abroad provided in that case, the guarantee is confirmed through any bank as above located in India. In case of foreign bank which is not a scheduled bank in India, a Bank Guarantee issued by such bank shall be required to be counter guaranteed by a scheduled bank incorporated in India and registered with Reserve Bank of India.

39.3 The successful bidder can also submit the Security Deposit/ Contract Performance Guarantee through online banking transaction i.e. IMPS/NEFT/RTGS etc. For this purpose, the details of MNGL's Bank Account is mentioned in IFB. While remitting, the bidder must indicate "Security Deposit/ Contract Performance Guarantee against FOA/DLOA/PO no. _____ (contractor/ vendor to specify the FOA/DLOA/PO No.)" under remarks column of respective bank portal. The contractor/vendor shall be required to submit the successful transaction details to the dealing officer immediately through email/letter and necessarily within 30 days from the date of Notification of award.

39.4 Further, the bidder can submit CPBG on line through issuing bank to MNGL directly as per Ministry of Finance (MOF) Department of financial service direction vide letter ref number F.No.7/112/2011-BOA dated 17th July 2012. In such cases confirmation will not be sought from issuing banker by MNGL.

39.5 In case of forfeiture of Contract Performance Security/ Security Deposit, the forfeited amount will be considered inclusive of tax and tax invoice will be issued by MNGL. The forfeiture amount will be subject to final decision of MNGL based on other terms and conditions of order/ contract.

39.6 CPBG / Security Deposit will not be accepted in case the same has reference of 'remitter' / 'financer' other than bidder on the aforementioned financial instrument of CPBG / Security Deposit submitted by the Supplier / Contractor / Service Provider.

Refer SCC for CPBG applicable for this tender.

40.0 CORRUPT OR FRAUDULENT PRACTICES

40.1 It is required that all concerned in the entire procurement process to observe the highest standard of ethics during the said process. In pursuance of this policy, the Purchaser/Consultant:

- (a) defines for the purposes of this provision, the terms set forth below as follows:
  - (i) "corrupt practice" means the offering, giving, receiving 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 Borrower, 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 Borrower 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, either indefinitely or for a stated period of time, to be awarded a Bank-financed contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a Bank financed contract.

40.2 Furthermore, Bidders shall be aware of the provision stated in General Conditions of Contract (GCC).

41.0 ELIGIBLE BIDDERS

41.1 The bid received from bidders put on holiday / ban by any Government Organization / Public Sector or their joint ventures/ MNGL for any forgery, Corrupt or Fraudulent Practice or unethical behaviour, shall not be considered.

41.2 The Bidder should not be under any liquidation, court receivership or similar proceedings on Due Date of Bid Submission.

41.3 In case there is any change in status of the declaration prior to award of contract, the same has to be promptly informed to MNGL by the bidder.

It shall be the sole responsibility of the bidder to inform MNGL in case the bidder is under any liquidation, court receivership or similar proceedings on Due Date of Bid Submission and during the course of finalization of the tender. Concealment of the facts shall tantamount to misrepresentation of facts and shall lead to action against such Bidders as per tender conditions.

41.4 **Power of Attorney**:

Power of Attorney to be issued by the bidder in favour of the authorised employee(s), in respect of the particular tender, for purpose of signing the documents including bid, all subsequent communications, agreements, documents etc. pertaining to the tender and act and take any and all decision on behalf of the bidder (including Consortium, if allowed to bid in the tender). Any consequence resulting due to such signing shall be binding on the Bidder (including Consortium).

(I) In case of a Single Bidder, the Power of Attorney shall be issued as per the constitution of the bidder as below:
   a) In case of Proprietorship: by Proprietor
   b) In case of Partnership: by all Partners or Managing Partner
   c) In case of Limited Liability Partnership: by any bidder's employee authorized in terms of Deed of LLP
   d) In case of Public / Limited Company: PoA in favour of authorized employee(s) by Board of Directors through Board Resolution or by the designated officer authorized by Board to do so. Such Board Resolution should be duly countersigned by Company Secretary / MD / CMD / CEO.

(II) In case of a Consortium (if allowed to bid in the tender), Power of Attorney shall be issued both by Leader as well as Consortium Member(s) of the Consortium as per procedure defined herein above in favour of employee of Leader of Consortium.

The Power of Attorney should be valid till award of contract / order to successful bidder.

41.5 The authorized employee(s) of the Bidder shall be signing the Bid and any consequence resulting due to such signing shall be binding on the Bidder.

41.6 Bids shall be evaluated as per Bid Evaluation Criteria (BEC) as provided in IFB Section.

42.0 SINGLE POINT RESPONSIBILITY

42.1 The bidder shall submit bid on single point sole/prime bidder responsibility basis. Bidder shall therefore not submit offer on consortium or joint bid basis. Bids submitted by Joint venture/ Consortium shall be summarily rejected.

42.2 The sole (prime) bidder alone (in whose name the bid document has been issued) will have single point responsibility for all contractual purposes and will be over all responsible for complete execution of the contract as per scope, terms & conditions defined in the Bid Document.

42.3 The status of all the other vendor(s)/collaborator(s), (if any), referred/identified by the bidder in their offer shall be that of bidder's sub-vendor/supplier/sub-contractor.

43.0 MENTIONING OF PAN NO. IN INVOICE/BILL

43.1 As per CBDT Notification No. 95/2015 dated 30.12.2015, mentioning of PAN no. is mandatory for procurement of goods/services/works/consultancy services exceeding Rs. 2 Lacs per transaction. MNGL's PAN No. is AAECM5536G.

Accordingly, service provider should mention their PAN no. in their invoice/ bill for any transaction exceeding Rs. 2 lakhs. As provided in the notification, in case service provider do not have PAN no., they have to submit declaration in Form 60 along with invoice/ bill for each transaction.

Payment of supplier/ contractor / service provider/ consultant shall be processed only after fulfilment of above requirement.

SECTION III

GENERAL CONDITIONS OF CONTRACT (GCC)

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GENERAL CONDITIONS OF CONTRACT

1.0 DEFINITIONS

1.1 All the initial capitalised terms used in the Agreement shall have the meaning as ascribed to such term hereunder:

(a) **'Agreement' or 'Contract'** means the agreement entered into between the Purchaser / Owner and the Supplier, including all attachments and appendices thereto and all documents incorporated by reference therein, as modified, reinstated or amended from time to time.

(b) **'Completion Schedule' or 'Delivery Schedule'** means a schedule approved by the Owner for completion of all obligations of the Supplier under the Agreement.

(c) **'Contract Documents'** mean all the documents referred to in the Agreement for discharging the requisite obligations by respective party.

(d) **'Contract Price'** means the price payable to the Supplier under the Contract for the full and proper performance of all its contractual obligations.

(e) **'Day', 'Month' or 'Year'** means calendar day, calendar month or calendar year.

(f) **'Engineer In-charge'** means an authorized representative of the Purchaser / Owner, if any, to which the Purchaser / Owner has entrusted various tasks in relation to the carrying out of his Project and in particular the implementation of the relevant Agreement. The Engineer is fully empowered to represent the Purchaser / Owner. For avoidance of doubt, Consultant may be an Engineer. In case the Agreement does not specify the intervention by the Engineer, the rights and obligations are exercised and borne by the Purchaser / Owner, mutatis mutandis.

(g) **'Effective Date'** means a date on which Supplier's obligations will commence and thereupon Delivery Schedule and/or Completion Schedule will be drawn up.

(h) **'Goods'** means all of the equipment, machinery, and/or other materials which the Supplier is required to supply to the Purchaser / Owner under the Agreement.

(i) **'GCC'** means the General Conditions of the Contract contained in this section.

(j) **'Inspector'** means any person or outside Agency nominated by Purchaser / Owner to inspect equipment, stage wise as well as final, before despatch, at Supplier's works and/or on receipt at Site as per terms of the Agreement.

(k) **'Notification of Award'** means date which is earlier of either a Fax of Intent (FOI) or Letter of Intent (LOI) or Purchase Order (PO) or Letter of Award (LOA) issued to a successful bidder for award of the work pursuant to bidding process.

(l) **'Purchaser' or 'Owner'** shall mean Maharashtra Natural Gas Ltd. (MNGL), a company incorporated in India having its registered office at Plot No.27, A Block, 1st Floor, PMPML Bus Depot Commercial Building, Shivajinagar, Pune – 411005, India. The term OWNER includes its successors & assigns.

(m) **'Services' or 'Ancillary Services'** means those services ancillary to the supply of the Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance,

training and other such obligations of the Supplier covered under the scope of the Agreement.

(n) **'Site' or 'Purchaser's stores'** means the place or places named in tender document.

(o) **'SCC'** means the Special Conditions of the Contract forming a part of the Contract Documents.

(p) **'Supplier' or 'Seller' or 'Contractor' or 'Vendor'** means the individual person or firm or body corporate supplying the Goods and/or Services under the Agreement.

(q) **'FOT' –** means that the Goods or supply items or services shall be delivered and done at site(s) warehouses or places mentioned by the Purchaser on FOT (Free on Terminal) basis.

2.0 APPLICATION

2.1 These General Conditions of Contract shall apply to the extent that they are not superseded by provisions of the Contract Agreement.

3.0 CONTRACTOR TO INFORM

3.1 The Contractor / Supplier / Seller shall be deemed to have carefully examined all contract documents to his entire satisfaction. Any lack of information shall not in any way relieve the Contractor / Supplier / Seller of his responsibility to fulfil his obligation under the Contract.

4.0 SCOPE OF CONTRACT

4.1 Scope of the CONTRACT shall be as defined in the Purchase Order / Contract specifications, drawings and Annexure thereto. For provisions not covered under the Purchase Order / Contract, provisions of General Conditions of Contract (GCC) and Special Conditions of Contract (SCC) of the tender document against which the Purchase Order / Contract has been placed shall prevail.

4.2 Completeness of the equipment shall be the responsibility of the Seller. Any equipment, fittings and accessories which may not be specifically mentioned in the specifications or drawings, but which are usual or necessary for the satisfactory functioning of the equipment (successful operation and functioning of the equipment being Seller's responsibility) shall be provided by Seller without any extra cost.

4.3 The Seller shall follow the best modern practices in the manufacture of high grade equipment notwithstanding any omission in the specifications. The true intent and meaning of these documents is that Seller shall in all respects, design, engineer, manufacture and supply the equipment in a thorough workmanlike

manner and supply the same in prescribed time to the entire satisfaction of Purchaser.

4.4 The Seller shall furnish 2 nos. copies in English language of Technical documents, final drawings, preservation instructions, operation and maintenance manuals, test certificates, spare parts catalogues for all equipment's to the Purchaser.

4.5 The documents once submitted by the Seller shall be firm and final and not subject to subsequent changes. The Seller shall be responsible for any loss to the Purchaser / Consultant consequent to furnishing of incorrect data/drawings.

4.6 All dimensions and weight should be in metric system.

4.7 All equipment to be supplied and work to be carried out under the Contract shall conform to and comply with the provisions of relevant regulations / Acts (State Government or Central Government) as may be applicable to the type of equipment / work carried out and necessary certificates shall be furnished.

4.8 The Seller shall provide cross sectional drawings, wherever applicable, to identify the spare part numbers and their location. The size of bearings, their make and number shall be furnished.

4.9 Specifications, design and drawings issued to the Seller along with RFQ and Contract are not sold or given but loaned. These remain property of Purchaser / Consultant or its assigns and are subject to recall by Purchaser / Consultant. The Seller and his employees shall not make use of the drawings, specifications and technical information for any purpose at any time except for manufacture against the Contract and shall not disclose the same to any person, firm or corporate body, without written permission of Purchaser / Consultant. All such details shall be kept confidential.

4.10 Seller shall pack, protect, mark and arrange for despatch of equipment as per instructions given in the Contract.

5.0 INTERPRETATION OF CONTRACT DOCUMENTS

5.1 Notwithstanding the sub-divisions of the contract documents into 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.

5.2 Where any portion of the General Condition of Contract is repugnant to or at variance with any provisions of the Special Conditions of Contract then, unless a different intention appears the provisions of the Special Conditions of Contract

shall be deemed to override the provisions of the General Conditions of Contract and shall to the extent of such repugnancy, or variations, prevail.

6.0 COUNTRY OF ORIGIN

6.1 For purpose of this Clause, 'origin' means the place where the Goods were mined, grown, or produced. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility from its components.

6.2 The origin of Goods and services may be different from the nationality of the Supplier.

7.0 STANDARDS

7.1 The Goods supplied under this Agreement shall conform to the standards mentioned in the Technical Specifications and when no applicable standard is mentioned, to the authoritative standards appropriate to the Goods' in country of origin. Such standards shall be the latest issued by the concerned institution.

8.0 CONFIDENTIALITY

8.1 The Supplier cannot, without agreement of the Purchaser, disclose nor enable third parties to benefit from the documents drawn up in the course of his obligations under the Agreement or information received from the Purchaser / Consultant / Engineer / Inspector.

8.2 Further, Supplier is not allowed to publish copy or transmit to third parties the documents that are transmitted to him by Purchaser or Consultant or Engineer or Inspector. The Purchaser or Consultant retains the right to claim damages from the supplier in the case where these documents have been used without such written consent.

8.3 However, these obligations do not apply to documents for which it can be demonstrated that,

- Such documents were already public before these were communicated to the other party, or have become public since without any fault or negligence of the party concerned, or
- Such documents were already in its possession without having obtained them directly or indirectly from the other party, or
- Such documents were obtained from an independent source that had neither direct nor indirect secrecy commitment to the other party.

8.4 Regarding the application of this clause, the experts appointed by the Purchaser / Engineer are not considered as third parties, and for this reason they have to respect, towards the Supplier, the same obligations as the Purchaser in these matters.

8.5 Any document, other than the Agreement itself as enumerated in GCC Clause 1.1 (a), shall remain the property of the Purchaser and shall be returned (all copies) to the Purchaser on completion of the Supplier's obligations under the Agreement.

8.6 The Seller shall not, without the Purchaser's / Consultant's prior written consent, disclose the Contract or any provision thereof, or any specification, plan, drawing, pattern, sample or information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Seller in the performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only as far as may be necessary for purpose of such performance.

9.0 CONTRACT OBLIGATIONS

9.1 If after award of the contract, the Seller does not acknowledge the receipt of award or fails to furnish the performance guarantee within the prescribed time limit, the Purchaser reserves the right to cancel the contract and apply all remedies available to him under the terms and conditions of this contract.

9.2 Once a contract is confirmed and signed, the terms and conditions contained therein shall take precedence over the Seller's bid and all previous correspondence.

9.3 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.

9.4 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.

10.0 MODIFICATION IN CONTRACT

10.1 All modifications leading to changes in the Contract with respect to technical and/or commercial aspects including terms of delivery, shall be considered valid only when accepted in writing by Purchaser / Consultant by issuing amendment to the Contract. Issuance of acceptance or otherwise in such cases shall not be any ground for extension of agreed delivery date and also shall not affect the

performance of contract in any manner except to the extent mutually agreed through a modification of contract.

10.2 Purchaser / Consultant shall not be bound by any printed conditions or provisions in the Seller's Bid Forms or acknowledgment of Contract, invoices, packing list and other documents which purport to impose any conditions at variance with or supplemental to Contract.

11.0 DELAYS BY OWNER OR HIS AUTHORISED AGENTS

11.1 In case the Contractor's performance is delayed due to any act or omission directly attributable to Owner 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 Owner has caused delay in the Contractor's performance of his Work against written request by contractor and after Owner's verification.

11.2 No adjustment in Contract Price shall be allowed for reasons of such delays and extensions granted, except when contractor is requested by Owner to maintain the agreed time schedule of completion by engaging additional Contractor's personnel for additional time beyond stipulated working hours as also on Sundays and Holidays and achieve the completion date / interim targets.

12.0 PATENT RIGHTS

12.1 The Supplier shall alone bear the liability and costs of any prejudicial consequence of any infringement of all or part of the patents, industrial trademarks, designs and models relating to the Goods.

Therefore, the Supplier shall make the arrangements at his own expense with the holders and pay the royalties, obtain the necessary licenses and authorizations, failing which he agrees to modify the Goods to the extent needed to avoid any such infringement.

12.2 In case of legal action or proceedings for infringement against the Owner, the Supplier undertakes to:

- Stand up for the Owner in the defence of his rights and interests;
- Save Purchaser harmless of any legal, financial and other consequences as may result to him from the legal action or proceedings;
- Bear all the damages and interests as may be due to the holders of the patents, industrial trademarks, designs and models, in principal, costs and interests;
- Reimburse to the Purchaser, at the Purchaser's first request, the costs of any nature whatsoever, including the fees of lawyers, experts and

technical advisers, etc. incurred due to or on the occasion of the legal action or proceedings;

- To modify if need to be and without delay, the incriminated Goods / equipment, or have it replaced, free of charge, by equivalent Goods / equipment free of any infringement. Supplier alone shall bear all the costs, risks and liability that result thereof including the costs of dismantling, erecting, adapting or modifying such Goods/ equipment and starting up, etc.

12.3 In case of legal action or proceedings for infringement brought against the Purchaser, the Supplier has the right to participate in the Owner's defence. Any transaction with the third party in such cases shall be discussed and jointly agreed by the parties, wherever feasible.

12.4 The modifications to be brought to the Goods must have the prior consent of the Purchaser. This consent cannot in any way lessen the obligations of the Supplier that result from the present article, also in cases when new legal action or proceedings are initiated following the modifications that were made.

13.0 CONTRACT-CUM-EQUIPMENT PERFORMANCE BANK GUARANTEE

13.1 Within 21 days from the receipt of notification of award of the Contract / Purchase Order, the Seller shall furnish Performance Guarantee to the Purchaser in the form of Demand Draft or Bank Guarantee from any Nationalized / Scheduled bank, in the format provided in the Tender Document.

13.2 The performance guarantee shall be denominated in the currency of the Contract.

13.3 The Performance Bank Guarantee shall be valid for a duration of 90 days beyond the expiry of Contract period / Defect Liability Period / Warranty Period, whichever later. The claim period of the Performance Bank Guarantee (BG) shall be further one month beyond the validity of the BG. The Bank Guarantee will be discharged by Purchaser not later than 6 months from the date of expiration of the Seller's entire obligations, including any warrantee obligations, under the Contract.

13.4 The CPBG shall be refunded after successful completion of the contract and after adjustment of any and all dues of the MNGL which may arise during the execution of the contract and a confirmation that contractor has cleared all its dues pertaining to the contract and all liabilities etc., in addition indemnifying MNGL against any future claims, if any.

13.5 The Company shall have the right to forfeit the security deposit in case of non-satisfactory performance of the contract.

14.0 INSPECTIONS AND TESTS

14.1 The Supplier will submit to Purchaser the Quality Assurance Plan (QAP) regarding design, manufacture and testing of all the items required under the Agreement within 15 days of Notification of Award. Purchaser will then review the QAP and inform the Seller, the stages when the Purchaser / Inspector / Engineer would witness the tests and/or inspect the Goods under manufacturing, beyond which the progress of the specified activity / manufacturing will not proceed, without written approval. Such points during the progress of work under the Agreement shall be called as Customer Hold Points (CHP's)

14.2 The Seller will inform Purchaser fifteen (15) Days in advance for readiness of material for all such identified CHP's.

14.3 The Purchaser or its representative shall have the right to inspect and / or to test the Goods to confirm their conformity to the requirements of the Agreement at no extra cost to the Purchaser. SCC and / or the Technical Specifications shall specify what inspections and tests the Purchaser requires and to the extent feasible, where they are to be conducted. All costs for such inspections and tests except the cost of travel, boarding and lodging of the Purchaser's representative / Inspector shall be to the account of the Supplier. The Purchaser shall notify the Supplier in writing, in a timely manner, of the identity of any such representatives, (if outside of Purchaser's organisation) retained by it for these purposes.

14.4 The inspections and tests may be conducted on the premises of the manufacturer or Supplier or its sub-supplier(s), at point of delivery, and / or at the Goods' final destination. If conducted on the premises of the manufacturer or Supplier or its sub-supplier(s), all reasonable facilities and assistance, including access to drawings and production data, shall be provided by the Supplier to the inspectors at no charge to the Owner.

14.5 Should any inspected or tested Goods fail to conform to the Specifications, the Owner may reject the Goods, and the Supplier shall either replace the rejected Goods meeting the Specification requirements or make alterations necessary to meet Specification requirements free of cost to the Purchaser.

14.6 Nothing mentioned in this Inspection and Tests clause shall in any way release the Supplier from any warranty or other obligations under the Agreement.

14.7 Inspection & Rejection of Materials by consignees - When materials are rejected by the consignee, the supplier shall be intimated with the details of such rejected materials, as well as the reasons for their rejection, also giving location where such materials are lying at the risk and cost of the contractor/supplier. The supplier will be called upon either to remove the materials or to give instructions as to their disposal within 14 days and in the case of dangerous, infected and

perishable materials within 48 hours, failing which the consignee will either return the materials to the contractor freight to pay or otherwise dispose them off at the contractor's risk and cost. The Purchaser shall also be entitled to recover handling and storage charges for the period, during which the rejected materials are not removed @ 5% of the value of materials for each month till the rejected materials are finally disposed-off.

15.0 ADDITIONAL TEST

15.1 The Purchaser can also request for additional tests which were not identified and specified in the QAP, but considers necessary to ensure the quality of the raw materials or of the manufacturer.

15.2 In any case, additional tests shall be designed so as to require a minimum of time. Provided further before starting these additional tests, the Supplier defines and justifies, to the Purchaser's satisfaction, the possible effects of the duration of these tests on the contractual time-limits / schedule(s).

15.3 The Supplier places at the disposal of the Purchaser, or of the chosen official or approved organization, the tools and/or items of general use, which belong to him as well as the staff necessary for the additional tests decided by the Purchaser.

15.4 Should these additional tests reveal unacceptable faults, taking into account the features asked for and the Specifications that entail the repair or rejection of the relevant item or components, the Supplier will be responsible of the ensuing delays, inasmuch as these tests have been made in the shortest possible time. He shall bear, in such case, any costs he has had to incur for the carrying out of the tests.

15.5 If, on the other hand, the additional tests do not reveal, in the opinion of the Purchaser, unacceptable faults as indicated above, the cost borne by the supplier for the carrying out of these tests will be invoiced to the Owner, after prior justification, and the Supplier may be entitled to reasonable extension of the time limit.

16.0 PACKING

16.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Agreement. The packing shall be sufficient to withstand, without limitation, rough handling during transit and tropical humid conditions as exposure to extreme temperatures, salinity and precipitation during transit, and open storage. Further the size and weights of the packing cases shall take into consideration,

where appropriate, the remoteness of the Goods' final destination and the absence of heavy handling facilities at all points in transit.

16.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Agreement, including additional requirements, if any, specified in the SCC, and in any subsequent instructions of the Purchaser.

17.0 DISPATCH INSTRUCTIONS

At least fifteen (15) Days before the expected dispatch date, the Supplier shall obtain authorization from the Purchaser / Consultant to go ahead with the dispatching, after ensuring compliance to other requirements of the Agreement.

18.0 DELIVERY AND DOCUMENTS

18.1 Delivery of the Goods shall be made by the Supplier in accordance with the Delivery Schedule specified in the Agreement. The details of shipping and/or other documents are to be furnished by the Supplier.

18.2 The delivery terms are binding and essential and consequently, no delay is allowed without the written approval of Purchaser / Consultant. Any request concerning delay will be void unless accepted by Purchaser / Consultant through a modification to the Contract.

18.3 Delivery time shall include time for submission of drawings for approval, incorporation of comments, if any, and final approval of drawings by Purchaser / Consultant

18.4 In the event of delay in delivery, Price Reduction Schedule shall apply.

18.5 The documentation, in English Language, shall be delivered in due time, in proper form and in the required number of copies as specified in the contract.

18.6 The Seller should comply with the Packing, Marking and Shipping Documentation Specifications enclosed.

19.0 TRANSPORTATION

19.1 Where the Supplier is required under the Scope of the Contract to transport the Goods to a specified place of destination or to Site, the Supplier shall transport to such place of destination or site, as the case may be, including insurance and storage, if required. The Contract Price will include costs of all such transportation.

19.2 The Supplier shall select such carrier which could deliver the Goods in requisite time. In such case, Supplier shall be required to check (i) Age of the carrier; (ii) scheduled and actual maintenance; (iii) payment of relevant fees; (iv) pending claims, if any; (v) past accident records etc., so as to ensure safe and timely transportation of the Goods.

19.3 In case delay occurs for reasons not attributable to Purchaser alone, the Supplier shall, if directed by Purchaser, adapt a specific way of delivery of Goods (air freight or likewise) at destination, the additional cost which will be borne by the Supplier. If such specific way of delivery is required by Purchaser to pre-pone the deliveries, nevertheless, Supplier will arrange the same and difference of justified transportation charges will also be borne by the Purchaser.

19.4 Supplier has to make necessary arrangement to deliver and load/unload the Goods to MNGL designated sites at his own arrangement after intimation of erection, installation, testing and commissioning by the MNGL Engineer-In-charge.

20.0 GUARANTEE/ WARRANTY

20.1 The Supplier warrants that the Goods supplied under the Agreement are new, unused, of the most recent or current models and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract Documents. The Supplier further warrants that all Goods supplied under this Agreement shall have no defect, arising from design, materials, or workmanship (except when the design and / or material is required by the Purchaser's specifications and the Supplier has given his disclaimer of warranty obligations with respect to such requirement) or from any act or omission of the Supplier, that may develop under normal use of the supplied Goods in the conditions prevailing in the place of use / destination.

20.2 This warranty shall remain valid for at least twelve (12) months from the date of successful commissioning of individual equipment or Eighteen (18) Months after the date of last shipment whichever is earlier or as specified under the Special Conditions of Contract. However, if warranty period exceeds due to any defect observed in the equipment at site and the time taken in rectification and commissioning, the warranty will stand extended for at least another 12 months from the date of completion of rectification free of cost.

20.3 Bidder will assume responsibility for obtaining manufacturer's warranty for all bought out items and maintain sufficient stock of spares at each site to meet urgent requirements.

20.4 After the successful completion of Test run, Warranty phase will start and system taking over certificate shall be issued by the Owner.

20.5 The Owner shall promptly notify the Supplier in writing of any claims arising under this warranty.

20.6 Upon receipt of such notice, the Supplier shall, within a reasonable period, repair or replace the defective Goods or parts thereof, free of cost to the Purchaser, deliver at the appropriate destination. The Supplier may take over the replaced parts / Goods at the time of their replacement. No claim whatsoever shall lie on the Purchaser for the replaced parts / goods thereafter. In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected / replaced Goods or item or material shall be extended to a further period of twelve (12) Months from the date of such repair/replacement if put to use immediately or eighteen (18) Months.

20.7 If the Supplier, having been notified, fails to remedy the defect(s) within a reasonable period, the Purchaser may proceed to take such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Agreement.

21.0 LATENT DEFECT

If any latent defect (a defect which could not have manifested itself in the normal course of inspection and testing as per relevant codes, test procedures and contract specifications and normal usage as per industry practice will be referred to as latent defect) surfaces within five years of putting the Goods or parts thereof into operation, the Supplier shall repair or replace such Goods or parts, as the case may be, within technically reasonable period to the satisfaction of the Purchaser and without any additional liability on the Purchaser, whatsoever.

22.0 PAYMENT TERMS

22.1 The Seller's request(s) for payment shall be made to the Purchaser in writing accompanied by an invoice describing, as appropriate, the Goods delivered and services performed, and by shipping documents submitted, and upon fulfilment of other obligations stipulated in the Contract.

22.2 Payment will be made in the currency or currencies in which the Contract Price has been stated in the Seller's bid, as well as in other currencies in which the Seller had indicated in his bid that he intends to incur expenditure in the performance of the Contract and wishes to be paid. If the requirements are stated as a percentage of the bid price along with exchange rates used in such calculations these exchange rates shall be maintained.

22.3 General Notes:

(a) All foreign currency payments to foreign bidder shall be released through an irrevocable Letter of Credit, which shall be opened through Government of India Nationalised Bank and hence shall not be confirmed. In case any bidder insists on confirmation, charges towards confirmation shall be borne by him. L/C shall be established within 30 days after receipt of unconditional acceptance of Fax of Intent together with Performance Guarantee as applicable.

(b) For dispatches on FOT dispatch point (in India) basis, the payment shall be through Purchaser's bank. Payment through Bank, wherever applicable, shall be released as per normal banking procedures.

(c) Payment shall be released within 30 days after receipt of relevant documents complete in all respects.

(d) All bank charges incurred in connection with payments shall be to Seller's account in case of Indian bidders and to respective accounts in case of foreign bidder.

(e) Unless otherwise specifically stated in bid document, all payments shall be made in the currency quoted.

(f) No interest charges for delay in payments, if any, shall be payable by Purchaser.

(g) In case of Indian bidder, variation, if any, on account of customs duty on their built-in-import content, as per terms of tender document, shall be claimed separately by bidder after receipt of goods at site(s). However, any price benefits to the Purchaser, on account of such variation as per terms specified in the tender document, shall be passed on to the Purchaser along with invoicing itself.

(h) Agency commission, if any, to Indian agent for foreign bidders, indicated in prices, shall be paid to the agent in equivalent Indian Rupees on receipt and acceptance of material at site.

23.0 PRICES AND PRICE BASIS

Prices charged by the Supplier for Goods delivered and Services performed under the Agreement shall be on firm price basis and not vary from the prices quoted by the Supplier in its bid, with the exception of any price adjustments authorized in the tender document. 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 as per provisions of the tender document only.

24.0 FALL CLAUSE

24.1 The price charged for the materials supplied under the order by the supplier shall in no event exceed the lowest price at which the supplier or his agent / principal /

dealer, as the case may be, sells the materials of identical description to any Persons / Organizations including the Purchaser or any Department of the Central Govt. or any Department of a State Govt. or any Statutory Undertaking of the Central or State Govt. as the case may be, during the currency of the order.

24.2 If at any time during the said period, the supplier or his agent / principal / dealer, as the case may be, reduces the sale price, sells or offers to sell such materials to any persons / organizations including the Purchaser or any Department Of Central Govt. or State Govt. as the case may be, at a price lower than the price chargeable under the order, he shall forthwith notify such reduction or sale or offer of sale to the Purchase Authority who has issued this order and the price payable under the order for the materials supplied after the date of coming into force of such reduction or sale or offer of sale shall stand correspondingly reduced.

24.3 The above stipulation will, however, not apply to:

(a) Exports by the Contractor / Supplier or

(b) Sale of goods as original equipment at prices lower than the prices charged for normal replacement

(c) Sale of goods such as drugs which have expiry dates.

24.4 The supplier shall furnish the following certificate to the concerned Paying Authority along with each bill for payment for supplies made against this order:
"I/We certify that there has been no reduction in sale price of the items / goods / materials of description identical to those supplied to MNGL under the order herein and such items / goods / materials have not been offered/sold by me/us to any person / organizations including the Purchaser or any Dept. of Central Govt. or any Deptt. of State Govt. or any Statutory Undertaking of the Central or State Govt. as the case may be upto the date of bill / during the currency of the order whichever is later, at a price lower than the price charged to MNGL under the order".

Such a certificate shall be obtained, except for quantity of items / goods / materials categories under exceptions mentioned above, of which details shall be furnished by the supplier.

25.0 ASSIGNMENT

The Supplier shall not assign, in whole or in part, any of its obligations to be performed under this Agreement to any third party, except with the Owner's prior written consent.

26.0 SUB-CONTRACTING

26.1 The Supplier shall notify the Owner in writing of all subcontracts awarded under this Agreement if not already notified in the Supplier's bid and incorporated in the Agreement. Such notification and incorporation shall not relieve the Supplier from any liability or obligation under the Agreement. Such sub-contract shall be limited to certain bought-out items and sub-assemblies, which are not in line of Supplier's manufacturing or proposed manufacturing unit of authorized Supplier.

26.2 Such purchases and subcontracted items shall have to be necessarily in full compliance with the terms and conditions of the Agreement and do not relieve the Supplier of any of his contractual obligations. The Supplier shall be solely responsible for any action, deficiency or negligence of his sub-contractors.

26.3 For any subcontract, the Purchaser is entitled to demand from the Supplier, for approval of the list subcontractors the Supplier intends to involve and of the orders he may entrust to them. The Purchaser may further demand that proposals of competitors be produced for him to examine. Approval by the Owner cannot give rise to any legal bond between the Purchaser and the sub-contractors and leaves full responsibility only to the Supplier.

26.4 In the event where the warranty agreed between the Supplier and his sub-Suppliers exceeds in scope or in period those required under the Agreement, the Supplier undertakes to make the Purchaser the full and direct beneficiary of such warranty.

27.0 TIME SCHEDULE & PROGRESS REPORTING

27.1 Time Schedule Network / Bar Chart

(a) Together with the Contract confirmation, Seller shall submit to Purchaser, his time schedule regarding the documentation, manufacture, testing, supply, erection and commissioning of the Goods.

(b) The time schedule will be in the form of a network or a bar chart clearly indicating all main or key events regarding documentation, supply of raw materials, manufacturing, testing, delivery, erection and commissioning.

(c) The original issue and subsequent revisions of Seller's time schedule shall be sent to Purchaser.

(d) The time schedule network / bar chart shall be updated at least every second month.

27.2 Progress Trend Chart / Monthly Report

(a) Seller shall report monthly to Purchaser, on the progress of the execution of Contract and achievement of targets set out in time bar chart.

(b) The progress will be expressed in percentages as shown in the progress trend chart attached to the Time Schedule specification.

(c) The first issue of the Progress Trend Chart will be forwarded together with the time bar chart along with Contract confirmation.

27.3 Purchaser's / Consultant's representatives shall have the right to inspect Seller's premises with a view to evaluating the actual progress of work on the basis of Seller's time schedule documentation.

27.4 Irrespective of such inspection, Seller shall advise Consultant, with copy to Purchaser, at the earliest possible date of any anticipated delay in the progress.

27.5 Notwithstanding the above, in case progress on the execution of contract at various stages is not as per phased time schedule and is not satisfactory in the opinion of the Purchaser / Consultant which shall be conclusive or Seller shall neglect to execute the Contract with due diligence and expedition or shall contravene the provisions of the Contract, Purchaser / Consultant may give notice of the same in writing to the Seller calling upon him to make good the failure, neglect or contravention complained of. Should Seller fail to comply with such notice within the period considered reasonable by Purchaser / Consultant, the Purchaser / Consultant shall have the option and be at liberty to take the Contract wholly or in part out of the Seller's hand and make alternative arrangements to obtain the requirements and completion of Contract at the Seller's risk and cost and recover from the Seller, all extra cost incurred by the Purchaser on this account. In such event Purchaser / Consultant shall not be responsible for any loss that the Seller may incur and Seller shall not be entitled to any gain. Purchaser / Consultant shall, in addition, have the right to encash Performance Guarantee in full or part.

28.0 DELAYS IN THE SUPPLIER'S PERFORMANCE

28.1 Delivery of the Goods and performance of Services shall be made by the Supplier in accordance with the time schedule prescribed by the Purchaser in the Delivery Schedule.

28.2 If at any time during performance of the Agreement, the Supplier or its subcontractor(s) encounters conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, with or without levy of Price Reduction Schedule, in which case the extension shall be ratified by the parties by amendment of Agreement.

28.3 Except as provided under GCC Clause – "Force Majeure" or for the reasons solely attributable to the Purchaser, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of Price Reduction Schedule (PRS) unless an extension of time is agreed upon pursuant to above sub-clause (ii) without the application of PRS.

29.0 PRICE REDUCTION SCHEDULE (PRS)

29.1 Time is the essence of the Contract. In case the Contractor fails to complete the Work within the Contractual Completion period, then, unless such failure is due to Force Majeure as defined herewith or due to Owner's defaults, the Contractor shall pay to the Owner, by way of compensation for delay and not as penalty, a sum @ ½% (half per cent) per complete week of delay of the value of the "supply portion for the quantity" OR "the work portion" that is delayed per complete week subject to maximum of 5% (Five Per Cent) of the total contract value.

29.2 The parties agree that this is a genuine pre-estimate of the loss/damage which will be suffered on account of delay/breach on the part of the Contractor and the said amount will be payable on demand without there being any proof of the actual loss or damages caused by such delay/breach. The decision of Owner in regard to the actual delay shall be final and binding on the Contractor. All sums payable by way of compensation shall be considered as reasonable compensation without reference to the actual loss or damage which shall have been sustained.

29.3 In case of delay in delivery on the part of Seller, the invoice/document value shall be reduced proportionately for the delay and payment shall be released accordingly. In the event the invoice value is not reduced proportionately for the delay, the Purchaser may deduct the amount so payable by Seller, from any amount falling due to the Seller or by recovery against the Performance Guarantee.

30.0 TERMINATION FOR DEFAULT

30.1 Except for the cases provided for in Clause" Force Majeure", if the Supplier fails to execute the work or any 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 owner at its option by written notice to the supplier

(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 Owner on that behalf, where upon the Contractor shall stop forthwith any of the Contractor's work then in progress, except such Work as the Owner may, in writing, require to be done to safeguard any property or WORK, or installations from damage, and the Owner, 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 Owner for any excess cost occasioned by such work having

to be so taken over and completed by the Owner over and above the cost as worked out in terms of the contract.

(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 and any of his sureties are liable to the Owner for any excess cost over and above the cost as worked out in terms of the contract, occasioned by such works having been taken over and completed by Owner.

30.2 Before determining the Contract, provided in the judgment of the Owner, the default or defaults committed by the Contractor is/are curable and can be cured by the Contractor if an opportunity is given to him, then the Owner may issue notice in writing calling the Contractor to cure the default within such time specified in the notice.

30.3 The Owner shall also have the right to proceed or take action as per above, in the event that the Contractor becomes bankrupt, insolvent, compounds with his creditors, assigns the Contract in favour 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 Owner to give any prior notice to the Contractor.

30.4 Termination of the Contract as provided for above shall not prejudice or affect the rights of the Owner which may have accrued up to the date of such termination.

31.0 OWNER MAY DETERMINE / TERMINATE CONTRACT

31.1 Owner shall, at any time, be entitled to determine and terminate the Contract, in whole or in part for any cause whatsoever. A notice in writing from the Owner to the Contractor shall be issued giving 30 (Thirty) days' time for such determination including the reason thereof.

31.2 The Contractor upon receipt of such notice shall discontinue the Work on the date and to the extent specified in the notice, make all reasonable efforts to obtain cancellation of all orders and contracts to the extent they are related to works terminated and upon terms satisfactory to Owner, stop all further sub-contracting or purchasing activity related to the works terminated and assist the Owner in maintenance, protection and disposition of the works acquired under the Contract by the Owner.

32.0 TERMINATION FOR INSOLVENCY

The Purchaser, may at any time, terminate the Contract by giving written notice to the Seller, without compensation to the Seller, if the Seller becomes bankrupt

or otherwise insolvent, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the Purchaser.

33.0 TERMINATION FOR OWNER'S CONVENIENCE

33.1 The Owner, by written notice sent to the Contractor, may terminate the Agreement, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Owner's convenience, the extent to which performance of the Contractor under the Agreement is terminated, and the date upon which such termination becomes effective.

33.2 The Goods that are complete and ready for shipment / dispatch as on the date of Contractor's receipt of notice of termination shall be accepted by the Owner on the terms and prices mutually agreed at that time.

33.3 For the remaining Goods, the Owner may elect:

(a) To have any portion completed and delivered at the Agreement terms and prices and / or

(b) To cancel the remainder and pay to the Contractor an agreed amount for partially completed Goods and Services and for materials and parts previously procured by the Contractor; and/or

(c) To pay any reasonable and demonstrable otherwise non-recoverable expenses incurred by the Contractor.

33.4 MNGL reserves the right to award the contract for a shorter duration than the specified or foreclose it with adequate advance notice not less than 30 days due to change in its business requirement.

34.0 FORCE MAJEURE

34.1 For purposes of this clause, 'Force Majeure' means an event beyond the control of the Supplier or Purchaser and not involving the Supplier's fault or negligence and not foreseeable, all having impact on the performance of the respective obligations as detailed hereinafter. Such events may include, but are not restricted to:

a) War, whether declared or not, civil war, unrest and revolution, piracy, terrorism, sabotage;

b) Natural disasters such as tornadoes, earthquakes, tidal waves, floods, destruction by lightning, etc.

c) Explosions, fires, destruction of machinery, plant and installations of any nature

d) Arbitrary action, if any of the Government of India or a relevant State;

e) Refusal by government authority of Government of India to grant the necessary permits needed to carry out the Agreement, provided such refusal is not the result of the doing of the parties.

f) Boycotts, strikes and lock-outs of any nature, disruptive, occupation of plant and premises, work stoppages occurring at the premises of the party requesting to be relieved of its liability, so long such cause is not effected by such party's controlled administration or employees.

34.2 Should any one or more of the events referred to in this clause occur, affecting the performance of the obligations of either of the parties, under the Agreement, such party shall notify to the other party the existence of a cause for force majeure as soon as it has knowledge of such event but not later than fifteen (15) Days from such date the event has arisen. The notification shall contain the details regarding the nature, starting date, presumed end date, as well as the estimated effects of the case of force majeure or other cause of force majeure on the obligations of the party which has incurred the event.

34.3 As soon as the cause for exoneration has ended, the party, the performance of which has been affected shall notify, in writing, to the other party the precise date of the end of the cause of force majeure and the extent, with justification, to which it has actually been affected in the performance of its obligations. It adds to this statement the necessary certificates issued by an authorised entity.

34.4 Any case of force majeure suspends the carrying out of the obligations affected. However, the party which claims force majeure shall show every diligence towards reducing as much as feasible the effects thereof. It is exonerated only for the minimum period, which may (in no event exceed the period of existence of the force majeure itself) have actually occurred as a result of the force majeure.

34.5 The parties may request that the Agreement be deemed cancelled if it's carrying out has become totally impossible.

35.0 SETTLEMENT OF DISPUTES

35.1 The rules of procedure for arbitration proceedings shall be as per Indian Arbitration and Conciliation Act 1996 or as amended.

35.2 If any dispute or difference arising between the Parties in respect of or concerning or connected with the interpretation or implementation of this Agreement or otherwise arising out of this Agreement, the parties hereto shall promptly and in good faith negotiate with a view to bring out and amicable resolution and settlement.

35.3 If, after thirty (30) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Owner or the Supplier

may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.

35.4 Maharashtra Natural Gas Limited will nominate three independent persons who can be the Sole Arbitrator and intimate the same to Vendor. The Vendor needs to choose one person from the said nominees as Sole Arbitrator. If Vendor fails to choose the arbitrator within thirty (30) days from receipt of a nomination by Maharashtra Natural Gas Limited, Maharashtra Natural Gas Limited will have right to choose the Sole Arbitrator.

35.5 The Arbitration proceedings shall be held in Pune and shall be conducted in English Language. The decision of such arbitration shall be binding and conclusive upon the Parties. The Parties to the arbitration shall equally share the costs and expenses of any such arbitration.

35.6 It is hereby clarified that the Courts at Pune alone shall have jurisdiction to try and entertain any and all suits or other proceedings in respect of, relating to or otherwise arising out of this Agreement.

35.7 Notwithstanding any reference to arbitration herein, the parties shall continue to perform their respective obligations under the Agreement unless they otherwise agree. The WORK under the CONTRACT shall continue during the Arbitration proceedings and no payment due or payable to the Seller shall be withheld on account of such proceedings.

36.0 LIMITATION OF LIABILITY

36.1 Except in cases of wilful negligence or wilful misconduct, and in the case of infringement, the Supplier shall not be liable to the Purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits provided that this exclusion shall not apply to any obligation of the Supplier to pay Price Reduction to the Purchaser and the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

37.0 PUBLICITY AND ADVERTISMENT

Seller shall not without the written permission of Purchaser / Consultant make a reference to Purchaser / Consultant or any Company affiliated with Purchaser / Consultant or to the destination or the description of goods or services supplied under the contract in any publication, publicity or advertising media.

38.0 GOVERNING LANGUAGE

The agreement shall be written in English language unless specified otherwise in the SCC. All correspondence and other documents pertaining to the agreement which are exchanged by the parties shall be written in the same language. Printed literature in other language shall only be considered, if it is accompanied by an English translation. In case, any document/brochure etc. Is written in any other language then its English translation shall govern.

39.0 APPLICABLE LAW

The Contract shall be governed and interpreted in accordance with laws of India and Courts at Pune shall have exclusive jurisdiction.

40.0 NOTICES

40.1 Any notice given by one party to the other pursuant to this Agreement shall be sent to the other party in writing by registered mail and confirmed in writing to the other party's address specified in the Agreement.

40.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.

41.0 TAXES, DUTIES AND LEVIES

41.1 The Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all Taxes, Duties 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. The Contractor shall be responsible for the compliance with all obligations and restrictions imposed by the Labour Law or any other law affecting employer-employee relationship The Contractor further agrees to comply and to secure 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 Owner harmless from any liability or penalty which may be imposed by the Central, State or Local authorities by reason of any violation by Contractor or Sub-Contractor of such laws, regulations or requirements and also from all claims, suits or proceedings that may be brought against the Owner arising under, growing out of, or by reason of the work provided for by this Contract, by third parties, or by Central or State Government authority or any administrative sub-division thereof.

41.2 Owner shall directly pay the Customs Duty and Tax to concerned Authorities in case of foreign bidders.

41.3 Owner shall make from contractor's bills such tax deductions as are required as per rules and regulations in force from time to time.

41.4 Bidder shall be entirely responsible for scope of work, all taxes, GST, license fees, any other duty on services or any other tax payable and/ or other levies etc. imposed by Central, state, municipal and local law and regulatory agency or authority. The rate in SOR is inclusive of all the above referred taxes/duties.

41.5 Any statutory variation in GST within the contractual period for the SOR items shall be to MNGL's account. However, in case the contractual completion period gets extended for reasons solely attributable to contractor, the statutory variation shall be limited to contractual completion period only.

41.6 Any new taxes & duties, if imposed by the State / Central Govt. of India after due date of bid submission but before the Contractual Delivery Date, shall be paid / reimbursed to the contractor on submission of copy of notification(s) issued from State / Central Govt. Authorities along with submission of documentary evidence for proof of payment of such taxes / duties to State / Central Govt. Authorities and after ascertaining it's applicability with respect to the contract.

41.7 Returns and details required to be filled under GST laws & rules should be timely filed by Supplier of Goods / Service Provider with requisite details to enable the Owner to avail tax credits including input tax credit. Payments to Service Provider claiming GST amount will be made provided the above formalities are fulfilled. Further, MNGL may seek copies of challan and certificate from Chartered Accountant of Supplier / Service Provider for deposit of GST collected from Owner. Any loss or nonavailability of input tax credit by the Owner due to non-compliance of applicable tax laws (including but not limited to GST laws in force or otherwise) or for any reason which is not attributable to MNGL, then MNGL shall not be obligated or liable to pay or reimburse GST charged in the invoice(s) and an amount equivalent to any tax liability accruing to the Owner and/or to the extent of any loss accrued to the Owner together with all penalties, costs, liabilities, dues, fees and interest if any, shall be deducted from the payment due to the Vendor or shall be reimbursed by the Vendor, as the case may be, till such default is either rectified or made good by the Vendor and the Owner is satisfied that it is in a position to claim valid input tax credit within the time-lines as per applicable laws.

41.8 Supplier of Goods / Service Provider providing taxable service shall issue an Invoice / Bill, as the case may be as per rules / regulation of GST. GST, if applicable, shall be paid after verifying GST Registration number. Each item's

cost and GST as applicable shall be provided in all the invoices along with GST registration no. & HSN/SAC codes for the services provided.

41.9 In case of statutory variation in GST, other than due to change in turnover, payable on the contract value during contract period, the Supplier of Goods / Services (Service Provider) shall submit a copy of the 'Government Notification' to evidence the rate as applicable on the Bid due date and on the date of revision. In case GST is not applicable to the vendor at the time of Contract / Order placement, as per turnover criteria, GST due to change in turnover is not payable. If applicable in future, the same shall be borne by vendor.

In case of delay in completion period beyond the contractual date, for reasons attributable to contractor, any increase in these rates or any new taxes and duties introduced during the period beyond the contractual completion date shall be borne by the contractor, whereas any decrease shall be passed on to MNGL.

The base date for the purpose of applying statutory variation shall be the Bid Due Date.

41.10 Claim for payment of GST / Statutory variation, should be raised within two (02) months from the date of issue of 'Government Notification' for payment of differential GST, otherwise claim in respect of above shall not be entertained for payment of arrears.

41.11 Beyond the contract period, in case MNGL is not entitled for input tax credit of GST, then any increase in the rate of GST beyond the contractual delivery period shall be to Service Provider’s account whereas any decrease in the rate GST shall be passed on to the Owner.

41.12 Beyond the contract period, in case MNGL is entitled for input tax credit of GST, then statutory variation in applicable GST on supply and on incidental services, shall be to MNGL’s account.

41.13 MNGL will prefer to deal with registered supplier of goods / services under GST. All Vendors shall have GST registration in the concerned State from where he intends to supply the goods. Therefore, bidders are requested to get themselves registered under GST, it not registered yet.

41.14 In case CBEC (Central Board of Excise and Customs) / any equivalent Central Government agency / State Government agency brings to the notice of MNGL that the Supplier of Goods / Service Provider has not remitted the amount towards GST collected from MNGL to the government exchequer, then MNGL shall have the right to put that Supplier of Goods / Service Provider under Holiday List.

41.15 Bidders are required to strictly consider the following key points while preparing the bid document as the following shall be applicable in all awarded Contracts and Purchase Orders:

(a) If prior to the placement of award, vendor realizes that the actual applicable rates of taxes are higher than the GST rates quoted in the bid against any particular HSN Code, then the vendor shall do reverse calculation and reduce the “basic unit price” of the product / service accordingly to match the “total price inclusive of taxes” of that product / service.

Whereas, in case the vendor realizes that the actual applicable rates of taxes are lower than the GST rates quoted in the bid against any particular HSN Code, then the vendor shall reduce the “GST rate” of the product / service accordingly without changing the “basic unit price” of that product / service and the invoices shall be raised as per the actual applicable GST.

(b) The tax rates shall only be changed under statutory variation if there is a change in the GST rates after the due date of bid submission as per government notification in the applicable HSN code which is quoted in the bid only and not in any other HSN Code. The differential tax amount will be paid / recovered depending upon whether the revised rate notified by government has increased /decreased as compared to the existing rates.

42.0 TIME FOR PERFORMANCE

42.1 The effective date of Contract shall be the date of Notification of Award (Fax of Intent) or as mentioned therein. The completion period specified in the Bid Document shall be reckoned from such date of effectiveness.

42.2 Contractor shall furnish bar charts specifying intermediate milestones to achieve the final completion period as per contract. The bar chart agreed shall be for reference purpose only & shall in no way release the contractor’s responsibility to complete the work within the completion period.

43.0 TRANSFER OF TITLE

43.1 The title of Ownership in respect of equipment, materials etc. supplied by Contractor for incorporation in permanent works for execution of contract shall pass on to Owner on the date of issue of completion certificate.

43.2 However, Owner shall have the lien on all such equipment, materials, etc. at any time during the performance of the contract after the date on which Owner releases any advance payment towards the said equipment, materials, etc. and

contractor shall thereafter be bound to use the same only for the purpose intended under the contract.

43.3 Ownership of goods supplied by domestic / foreign seller will transfer to purchaser on receipt of Goods at MNGL stores.

44.0 CONTRACTOR REMAINS LIABLE TO PAY COMPENSATION IF ACTION NOT TAKEN UNDER CLAUSE ENTITLED TERMINATION FOR DEFAULT

44.1 In any case in which any of the powers conferred upon the Owner by the clause entitled "Termination for Default" hereof shall have become exercisable and the same had not been exercised, the nonexercised 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 Performance guarantee and the liability of the Contractor for past and future Compensation shall remain unaffected.

44.2 In the event of the Owner putting in force the power vested in him under the preceding clause he may, if he so desires, 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 prices or in case of these not being applicable at current market prices to be certified by the Engineer-In-Charge may give notice in writing to the Contractor or his 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 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.

45.0 CHANGE IN CONSTITUTION

The prior approval, in writing, of the Owner shall be obtained before any change is made in the constitution of the contractor. If prior approval is not obtained, the Contract shall be deemed to have been allotted in contravention of Clause entitled "sub-letting of works" hereof and the same action may be taken and the same consequence shall ensure as provided in the said clause.

46.0 MEMBERS OF THE OWNER NOT INDIVIDUALLY LIABLE

No Director, or Official or employee of the Owner shall in any way be personally bound or liable for the acts or obligations of the Owner 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.

47.0 CONTRACTOR TO INDEMNIFY THE OWNER

47.1 The Contractor shall indemnify the Owner and every member, officer and employee of the Owner, also the Engineer-In-Charge and his staff against all actions, proceedings, claims, demands, costs and expenses whatsoever arising out of all actions, proceedings, claims, demands, costs and expenses which may be made against the Owner for or in respect of or arising out of any failure by the Contractor in the performance of his obligations under the Contract. The Owner shall not be liable for or in respect of consequence of any accident or injury to any workmen or other person in the employment of the Contractor or his Sub-Contractor and Contractor shall indemnify and keep indemnified the Owner against all such damages and compensations and against all claims, damages, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereof.

47.2 Should the Owner have to pay any money in respect of such claims or demands as aforesaid the amount so paid and the costs incurred by the Owner 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 Owner to make such payments notwithstanding the same may have been made without the consent or authority or in law or otherwise to the contrary.

48.0 SAFETY REGULATIONS

In respect of all labour, directly or indirectly employed in the Work the Contractor shall at his own expense arrange for all the safety provisions and abide by all labour laws, safety codes, and all fire and statutory regulation and keep owner indemnified in respect thereof.

49.0 OWNER MAY DO PART OF WORK

Upon failure of the Contractor to comply with any instructions given in accordance with the provisions of this Contract the Owner has the alternative right, instead of assuming charge of entire Work, to place additional labour force, tools, equipment's and materials on such parts of the Work, as the Owner may designate or also engage another Contractor to carry out the Work. In such cases, the Owner shall deduct from the amount which otherwise might become due to the Contractor, the cost of such Work and materials with fifteen percent (15%) added to cover all Owners charges and should the total amount thereof

exceed the amount due to the Contractor, the Contractor shall pay the difference to the Owner.

50.0 POSSESSION PRIOR TO COMPLETION

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 sue 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.

51.0 DEFECTS IN WORK

51.1 DEFECTS PRIOR TO TAKING OVER

If at any time, before the Work is taken over, the Engineer-In-Charge shall:

(a) Decide that any work 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 fulfil the requirements of Contract (all such matters being hereinafter, called “Defects” in this clause), and

(b) As soon as notice is given to the Contractor 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 Owner 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 Owner 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 have 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 thereof and have passed the tests on completion, the Engineer-In-Charge shall issue a certificate (hereinafter called Completion Certificate) in which he shall certify the date on which the Work have been so completed and have passed the said tests and the Owner 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 Owner 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, no 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.

51.2 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 Contractor 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 Owner 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 Owner.

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 Owner 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.

52.0 REPLACEMENT OF DEFECTIVE PARTS AND MATERIALS

52.1 If during the progress of the Work, Owner 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 equipment upto the standards of the specifications. In case the Contractor fails to do so, Owner may on giving the Contractor 7 (seven) days' 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 perform all such works or furnish all such equipment's provided that nothing in the clause shall be deemed to deprive the Owner of or affect any rights under the Contract, the Owner may otherwise have in respect of such defects and deficiencies.

52.2 The Contractor's full and extreme liability under this clause shall be satisfied by the payments to the Owner 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 Owner for such replacements and the Contract Price portion for such defective plants and repayments of any sum paid by the Owner to the Contractor in respect of such defective plant. Should the Owner 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 Owner under the Contract for such defective plant.

53.0 DEFENCE OF SUITS:

If any action in court is brought against the Owner or an officer or agent of the Owner, 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 Owner and/or their representatives harmless from all losses, damages, expenses or decrees arising out of such action.

54.0 PACKING, FORWARDING AND SHIPMENT

54.1 The Contractor, wherever applicable, shall, after proper painting, pack and crate all items in such a manner as to protect them from deterioration and damage during rail and road transportation to the Site and storage at the Site till the time of erection. The Contractor shall be held responsible for all damages due to improper packing.

54.2 The Contractor shall notify Owner of the date of each shipment from his works and expected date of arrival at the Site for the information of Owner.

54.3 The Contractor shall also give all shipping information concerning the weight, size and content of each packing including any other information Owner may require.

54.4 Fragile articles shall be packed with special precaution and shall bear the marking like 'Fragile Handle with Care and/or 'this side up' etc. Items shipped in bundle must be securely tied with steel wire or straps at suitable intervals.

54.5 All delicate surfaces on equipment/materials shall be carefully protected and painted with protective paint/compound and wrapped to prevent rusting and damage.

54.6 Attachments and parts of equipment and small pieces shall be packed in wooden cases with adequate protection inside the case and wherever possible should be sent along with the major equipment. Each item shall be tagged so as to identify

it with the main equipment and part number and reference number shall be indicated.

54.7 All protrusions shall be suitably protected and openings shall be blocked by wooden covers.

54.8 Wherever required, equipment/material shall be packed in polythene bags and silica gel or similar dehydrating compound shall be put inside the bags for protecting them.

55.0 DEDUCTIONS FROM THE CONTRACT PRICE

All costs, damages or expenses which Owner may have paid or incurred for which under the provisions of the Contract, the Contractor is liable/will be liable, will be deducted from contractors bills or from any moneys due or becoming due to the Contractor.

56.0 COMPLETION CERTIFICATE

Application for Completion Certificate:

56.1 When the Contractor fulfils his obligation under the contract he shall be eligible to apply for Completion Certificate in respect of the Work by submitting the completion documents along with such application for Completion Certificate.

56.2 The Engineer-In-Charge shall normally issue to the Contractor the Completion Certificate within one month after receiving an application thereof 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.

56.3 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.

56.4 Issue of Completion Certificate:

56.5 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 neither Completion 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. The Work will not be considered as complete and taken over by the Engineer-In-Charge, until all the Temporary Work, labour and staff colonies etc. Constructed are removed and worksite cleared to the satisfaction of the Engineer-In-Charge.

56.6 If the Contractor shall fail 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 of 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 realised by the sale thereof.

57.0 FINAL DECISION AND FINAL CERTIFICATE

Upon the expiration of the Defect Liability Period and subject to the Engineer-In-Charge being satisfied that the WORK has been duly completed by the Contractor and performed all his obligations under the Contract, the Engineer-In-Charge shall (without prejudice to the rights of Owner to retain the provisions of relevant clause thereof) otherwise give a certificate herein referred to as the Final Certificate to that effect and the 'Contractor shall be not considered to have fulfilled the whole of his obligations under the Contract until Final Acceptance 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 Owner.

58.0 CERTIFICATE AND PAYMENTS ON EVIDENCE OF COMPLETION

Except the Final Certificate no other certificates or payment against a certificate or on general account shall be taken to be an admission by Owner of the due performance of the Contract or any part thereof or of occupancy or validity of any claim by the Contractor.

59.0 REPEAT ORDER

Purchaser reserves the right, within 6 months of order to place repeat order up-to 50% of the total order value without any change in unit price or other terms and conditions.

60.0 INSURANCE

Contractor shall at his own expense arrange secure and maintain insurance with reputable insurance companies to the satisfaction of the Owner 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 Owner against all risks as detailed herein. The form and the limit of such insurance, as defined herein together with the under writer works thereof in each case should be as acceptable to the Owner. 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, testing and commissioning till such time the work is taken over by Owner, 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 Owner with a copy of all insurance policies and documents taken out by him in pursuance of the Contract. Such copies of documents shall be submitted to the Owner immediately upon the Contractor having taken such insurance coverage. Contractor shall also inform the Owner 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 clearance, if any, in respect of foreign supply required for the purpose of replacement of equipment lost in transit and/or during Testing & Commissioning, shall be made available by the Owner. 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 equipment, 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 Owner may from 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.

61.0 COMPLIANCE OF LAWS

61.1 The contractor deploying contract labour shall obtain license from appropriate licensing authority as per prevailing rules & regulation and as modified from time to time during contract period.

61.2 The contractor (which shall include the contracting firm / company) shall be solely liable to obtain and to abide by all necessary licenses from the concerned authorities as provided under the various Labour Laws / legislations including labour license from the competent authority under the Contract Labour ("Regulation & Abolition") Act 1970 and Acts made thereafter.

61.3 The Contractor shall also be bound to discharge obligations as provided under various statutory enactments including the Employees Provident Fund and Miscellaneous Provisions Act 1952, ESI Act 1948, Contract Labour ("Regulation & Abolition") Act 1970, Minimum Wages Act 1948, payment of wages Act 1936, Workmen's Compensation Act 1923 and other relevant Acts, Rules & Regulations in force from time to time.

61.4 The Contractor shall be responsible for necessary contributions towards PF, Family Pension, ESIC or any other statutory payments to Government Agencies as applicable under the laws in respect of the contract and of personnel deployed by the contractor for rendering services to Owner and shall deposit the required amount with the concerned statutory authorities on or before due dates. The contractor shall obtain a separate PF number from the concerned Regional Provident Fund Commissioner and submit necessary proof of having deposited the employees as well as the Owner's contribution to the Provident Fund. The contractor shall also be responsible for payment of any administration / inspection charges thereof, wherever applicable, in respect of personnel deployed by him relating to the work of Owner.

61.5 The Contractor shall not engage / deploy any person of less than 18 years under this contract, and the person(s) to be deployed should be physically and mentally fit.

61.6 The installations where job is to be carried out are live and have hydrocarbon environment. Contractor shall comply with all safety and security rules and regulations and other rules laid down by Owner for its operation. Contractor shall follow best Engineering practice and relevant international safety standards. It shall be duty / responsibility of the Contractor to ensure the compliance of fire safety, security and other operational rules and regulations by his personnel. Disregard to these rules by the Contractor's personnel will lead to the termination of the Contract in all respects and shall face penal / legal consequences.

61.7 Personnel protective items like safety helmets, safety shoes, hand gloves, eye protection, cotton working overalls / dresses (not synthetic materials) and other required materials for the safety of the contractor's personnel shall be arranged by the contractor himself. However firefighting equipment shall be arranged by Owner.

61.8 The Contractor shall arrange for life insurance for all his personnel deployed on the job as per the relevant Acts, rules and regulations, etc. In case by virtue of provisions of Workers Compensation Act, 1923 or any other law in force, Owner has to pay compensation for a workman employed by the Contractor due to any cause whatsoever, the amount so paid shall be recovered from the dues payable to the Contractor and/or security deposit with Owner. General third party insurance for CNG Station shall be arranged by Owner.

62.0 THE ENGINEER-IN-CHARGE

62.1 Issue the contractor from time to time during the running of the Contract such further instructions as shall be necessary for the purpose of proper and adequate execution of the Contract and the Contractor shall carry out and bound by the same.

62.2 During the currency of this Contract, Owner can increase and / or decrease the number of the services required & quantity of work /services shown in from the Schedule of Rates.

62.3 Order the Contractor to remove or replace any workmen whom the Owner considers incompetent or unsuitable and opinion of the Owner representative as to the competence of any workman engaged by the contractor shall be final and binding on the Contractor. Key personnel can be deployed at site only after getting approval from the Owner.

63.0 INDEMNITY

Contractor shall exclusively be liable for non-compliance of the provisions of any act, laws rules and regulations having bearing over engagement of workers directly or indirectly for execution of Contract and the Contractor hereby undertake to indemnify the Owner against all actions, suits, proceedings, claims, damages demands, losses, etc. which may arise under Minimum Wages Act 1948, payment of wages Act 1936, Workmen's Compensation Act 1923, Personnel Injury (Compensation Insurance) Act, ESI Act, Fatal accident Act, Industrial Dispute Act, Shops and Establishment Act, Employees Provident Fund Act, Family Pension and deposit Linked Insurance schemes or any other act or statutes not herein specifically mentioned but having direct or indirect application for the persons engaged under this contract.

64.0 LABOUR LAWS

64.1 No labour below the age of 18 (eighteen) years shall be employed on the Work.

64.2 The Contractor shall not pay less than what is provided under law to labourers engaged by him on the Work.

64.3 The Contractor shall at his expense comply with all labour laws and keep the Employer indemnified in respect thereof.

64.4 The Contractor shall pay equal wages for men and women in accordance with applicable labour laws.

64.5 If the Contractor is covered under the Contract labour (Regulation and Abolition) Act, he shall obtain a licence 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.

64.6 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.

64.7 The Contractor shall furnish to the Engineer-In- Charge 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) the number of female workers who have been allowed Maternity Benefit as provided in the Maternity Benefit Act 1961 on Rules made thereunder and the amount paid to them.

64.8 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, Contract Labour Regulation and Abolition Act 1970, Employment of Children Act 1938 and any modifications thereof or any other law relating thereto and rules made thereunder from time to time.

64.9 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- fulfilment 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.

64.10 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

Implementation of Apprentices Act, 1961:

64.11 The contractor shall comply with the provisions of the apprentice's act, 1961 and the rules and orders issued thereunder 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.

Contractor to indemnify the employer:

64.12 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 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.

64.13 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.

64.14 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.

Health and sanitary arrangements for workers:

64.15 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.

64.16 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 – IV

SPECIAL CONDITIONS OF CONTRACT (SCC)

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SPECIAL CONDITIONS OF THE CONTRACT (SCC)

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is an ambiguity, conflict and contradiction between SCC and GCC, the provisions herein shall prevail over those in the General Conditions of the Contract. The corresponding clause number of the GCC is indicated in parentheses.

1.0 DEFINITIONS

Following clauses of GCC are modified as below:

1.1 GCC Clause 1.0.
GCC 1.1 (m) The Purchaser is: Maharashtra Natural Gas Limited, 2nd Floor, Pride Purple Coronet, Baner Road, Baner, Pune – 411045

2.0 INSPECTIONS AND TESTS (GCC Clause 10.0)

In addition to GCC clause no.10, following is added,

Inspection and tests prior to shipment of Goods and at final acceptance shall be as specified in Technical Specifications. However, without prejudice to the provisions of Technical specifications following shall hold good:

2.1 The Purchaser or its representative shall have the right to inspect and/ or to test the material to confirm their conformity to the specifications.

2.2 The inspections and tests may be conducted on the premises of the Seller or his subcontractor (s) at point of Delivery and/or at the final destination. When conducted on the premises of the Seller or his subcontractor(s), all reasonable facilities and assistance including access to the production data shall be furnished to the Purchaser's representatives at no charge to the Purchaser.

2.3 The Purchaser's right to inspect, test and where ever necessary reject the material after the material's arrival in the Purchaser's place shall in no way be limited to or waived by reason of the material having previously been inspected, tested and passed by the Purchaser or their representative prior to the material shipment from the country of origin.

2.4 The Purchaser or appointed Third Party Inspection Agency (TPIA) shall carry out the final inspection at supplier's works as per approved ITP. TPIA charges shall be borne by Purchaser. However, successful bidders shall make necessary arrangement for inspection at their own cost.

3.0 REGISTRATION OF THE CONTRACT WITH STATUTORY AUTHORITIES

3.1 Deleted

4.0 PROJECT SCHEDULING AND MONITORING SYSTEM

4.1 General

The Contractor shall attend Management Level Review Meeting once in a month or as and when required with agenda of progress achieved and major hold-ups at Owner's office. Monthly Review Meeting will be held at OWNER'S OR CONTRACTOR'S office with agenda of progress and holds in engineering, procurement and construction programme for next month.

4.2 Expediting, Inspection and Testing

Contractor shall be responsible for all expediting and inspection. Copies of Contractor's expediting and inspection reports shall be forwarded periodically to Owner for information. Contractor shall ensure the Owner's right of inspection in contractor's shop during the manufacturing or fabrication of equipment and other components. Contractor shall inform Owner promptly of any problems encountered in regards to quality or delivery and of steps taken by the Contractor to overcome such problems. Contractor shall furnish schedule of dates for factory tests of all supply items enabling Owner or its authorised representative to witness the tests.

Immediately after award of work, Contractor shall submit the QAP, Inspection and Test plan, in line with contract requirement, for approval. Owner will bear expenses of their representative for visiting any inspection and expediting.

4.3 In no eventuality, any deviation from the above specified mode of inspection will be acceptable and the equipment(s) shall be tested as a package for their faithful performance at the shop floor as per the ordered parameter and in no circumstances shall be allowed to be tested in pieces or stages or at places during the factory inspection by third party Inspection Agency/the Owner/Consultant.

4.4 **Dispatch of Supply:** In no case, the material shall be dispatched from the supplier's premises unless the inspection done by the third party / consultant on behalf of the owner is duly accepted and acknowledged by the Owner and due "despatch clearance" is issued by the Owner. Owner reserves the right to reject the material if it is not found to be complying to Guaranteed parameters and other technical specifications of the contract.

For obtaining despatch clearance, bidder shall send all documents including IRN to Engineer-in-charge and C&P, MNGL.

5.0 RECORDS OF CONTRACT DOCUMENTS

5.1 The Contractor shall keep on each site at least three copies of each and every drawing, specifications and Contract Document in excess of his own requirement and those copies shall be available at all times for use by the Owner's Representative and by any other person authorised by the Owner's representative.

6.0 INTELLECTUAL PROPERTY – SECRECY

6.1 Neither the Owner nor the Contractor nor their personnel, agents not any sub-contractor shall divulge to any one (other than persons designated by the party disclosing the information) any information designated in writing as confidential and obtained from the disclosing party during the course of execution of the works so long as and to the extent that the information has not become part of the public domain. This obligation does not apply to information furnished or made known to the recipient of the information without restriction as to its use by third parties or which was in recipient's possession at the time of disclosure by the disclosing party. Upon completion of the works or in the event of termination pursuant to the provisions of the Contract, Contractor shall immediately return to the Owner all drawings, plans, specifications and other documents supplied to the contractor by or on behalf of the Owner or prepared by the Contractor solely for the purpose of the performance of the works, including all copies made thereof by the Contractor.

7.0 STATUTORY APPROVALS

7.1 The approval from any authority required as per statutory rules and regulations of Central/State Government shall be the Contractor's responsibility unless otherwise specified in the bid document. The application on behalf of the Owner for submission to relevant authorities along with copies of required certificates complete in all respects shall be prepared and submitted by the Contractor well ahead of time so that the actual construction/commissioning of the work is not delayed for want of the approval/inspection by concerned authorities. The inspection of the works by the authorities shall be arranged by the Contractor and necessary co-ordination and liaison work in this respect shall be the responsibility of the Contractor. However statutory fees paid, if any, for all inspections and approvals by such authorities shall be reimbursed at actual by the Owner to the Contractors on production of documentary evidence.

7.2 Any change/addition required to be made to meet the requirements of the statutory authorities shall be carried out by the Contractor free of charge. The

inspection and acceptance of the work by statutory authorities shall however, not absolve the Contractor from any of his responsibilities under this Contract.

8.0 WATER AND POWER SUPPLY

8.1 Water and Power supply may be provided during testing & commissioning of LNG Equipment by the Owner at Owner's premises, based on the availability of the water and power supply. However, if water and power supply is not available at site, same shall be made available by the vendor at its own cost for commissioning and testing of the package.

9.0 LABOUR LICENCE

9.1 Before starting of work, Contractor shall obtain a license from concerned authorities under the Contract Labour (Abolition and Regulation) Act 1970 and amendment thereof, if any, and furnish copy of the same to Owner. Licence shall be valid till the validity of contract.

10.0 PROVIDENT FUND

10.1 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 each running bill, the challan/receipt for the payment made to the RPFC for the preceding months.

10.2 In case the RPFC's challan/ receipt, as above, is not furnished, Owner shall deduct 16 (Sixteen) % of the payable amount from Contractor's running bill and retain the same as a deposit. Such retained amounts shall be refunded to contractor on production of RPFC challan/receipt for the period covered by the related running bill.

11.0 CO-ORDINATION WITH OTHER AGENCIES

11.1 The Contractor's responsibility covers the co-ordination of all the works involved and the expenses of site mobilization and demobilization including clearing activities. The quoted rates for various items are deemed to have appropriately catered for these and no separate claim whatsoever is admissible.

11.2 Work shall be carried out in such a manner that the work of other agencies operating at the site is not hampered due to any action/inaction of the contractor. Proper co-ordination with other agencies shall be Contractor's responsibility.

12.0 INCOME TAX

12.1 Income Tax along with surcharge of Income Tax as applicable at the prevailing rate on the gross amount billed shall be deducted from the Contractor's bills as per applicable laws in India and Tax Deduction at Source (TDS) certificate shall be issued.

12.2 Any reduction in Taxes and duties at the time of supply shall be passed on to Owner. However, any increase in rate of taxes and duties and imposition of any new levy/ tax at the time of supply after contractual completion period shall be borne by Contractor.

13.0 ADVANCE

13.1 No advance shall be paid under the contract.

14.0 TERMS OF PAYMENTS

14.1 Payment towards Supply (LNG Equipment)

Through direct payment within 30 days from date of receipt of invoice.

i) **60% (Sixty Percent) Payment** shall be released against receipt of materials at site on submission of dispatch documents, manufacturer's certificates, invoice, packing list, insurance policy, guarantee/warranty certificate, inspection release note, Goods Receipt Voucher (GRV) & dispatch clearance issued by the Owner.

ii) **25% (Twenty-Five Percent) Payment** shall be released after successful completion of erection works.

iii) **5% (Five Percent) Payment** shall be released on testing and pre-commissioning.

iv) **10% (Ten Percent) Payment** shall be released on commissioning, submission of final / as built documents and acceptance of complete system.

14.2 Payment towards Installation, Testing & Commissioning of equipment covered in SOR.

i) **90% (Ninety Percent) Payment** shall be released on installation, Testing & Commissioning of equipment.

ii) **10% (Ten Percent) Payment** shall be released on acceptance of the complete system.

14.3 Payment against Operation & Comprehensive Maintenance:
On pro-rata monthly basis, against monthly invoices duly certified by Engineer-in-Charge within 30 (Thirty) working days from the date of submission of bills to the OWNER.

14.4 Payment Methodology

a) The contractor shall raise invoices on monthly basis. Bidder shall enclose all documents as per check list issued by Owner/ Consultant. However, EIC may authorize payments for bills more frequently i.e. periodicity of less than fortnight, depending on site requirements.

b) The payments to the Contractor will be released within a period of 30 days from the date of receipt of the complete invoice as per the terms and conditions of the Contract.

c) Owner will release payment through e-payments only as detailed in the Bidding Document.

d) Further break-up of Lump sum Prices, if deemed necessary for any progressive payment of individual item may be mutually arrived at between Engineer-in-Charge and the Contractor.

e) All payments against running bills are advance against the work and shall not be taken as final acceptance of work / measurement carried out till the final bill.

f) Bills shall be raised by contractor in line with check list attached in Tender document.

15.0 DELIVERY AND DOCUMENTS

15.1 Upon delivery of the Goods to the transporters/carriers, the Supplier shall notify the Purchaser/ Consultant through fax/mail the documents specified in clause 16 below. The bidder will also indicate likely date of arrival to the Purchaser/ Consultant.

15.2 The above documents shall be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses.

15.3 The Bidder to ensure that Purchase order and Letter or Credit No (if applicable) must be appearing in LR/ GR/Bill of Lading/ Airway bill no., Invoices and Packing List. Bidders to also ensure that description of goods in all the despatch documents should be exactly same as per the Purchase Order.

15.4 Original Invoices shall be directed to following address for its further processing. The Suppliers shall send duplicate copy along with consignment.

Chief Manager (C&P)
Maharashtra Natural Gas Ltd.
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

16.0 SHIPMENT

16.1 The Bidder shall make shipment only after obtaining despatch clearance from Purchaser. For getting despatch clearance, bidder has to submit inspection release note issued by Third Party Inspection agency/ Purchaser's authorized representative to the Purchaser (CM – C & P).

17.0 OPERATION & COMPREHNSIVE MAINTENANCE REQUIREMENT

17.1 Sub-Letting

No part of supply portion of this contract nor any share or interest therein in any manner or extent, will be transferred, assigned, or sub-let, directly or indirectly to any person/firm or organization. However, Operation & Comprehensive Maintenance may be sublet after taking the due approval from MNGL.

17.2 Compliance of Laws

The contractor deploying 20 (twenty) or more workmen as contract labour shall have to obtain license from appropriate licensing authority, if required.

The contractor (which shall include the Contracting firm / company) shall be solely liable to obtain and to abide by all necessary licenses from the concerned authorities as provided under the various labour laws legislation's including labour license from the competent authority under the Contract Labour ("Regulation & Abolition") Act 1970 and Acts made thereafter.

The Contractor shall be responsible for necessary contributions towards PF, Family Pension, ESIC or any other statutory payments to Government Agencies as applicable under the laws in respect of the contract and personnel deployed by the contractor for rendering services to OWNER and shall deposit the required

amount with the concerned statutory authorities on or before due dates. The contractor shall obtain a separate PF number from the concerned Regional Provident Fund Commissioner and submit necessary proof of having deposited the employees as well as the employer's contribution to the Provident Fund.

The contractor shall not engage /deploy any person of less than 18 years under this contract and the persons to be deployed should be physically and mentally fit.

The installations where job is to be carried out are live and have hydrocarbon environment. Contractor shall comply with all safety and security rules and regulations and other rules laid down by OWNER. It shall be the duty/responsibility of the contractor to ensure the compliance of fire, safety, security and other operational rules and regulations by his personnel. Disregard to these rules by the contractor's personnel will lead to the termination of the contract in all respects and shall face penal/legal consequences.

The contractor shall arrange for insurance of all this worker engaged on the job as per the relevant Acts, rules and regulations, etc. In case by virtue of provisions of worker's compensation Act, 1923 or any other law in force. OWNER has to pay compensation for a workman employed by the contractor due to any cause whatsoever the amount so paid shall be recovered from the dues payable to the contractor and /or security deposit.

17.3 **The Engineer- In- Charge Shall Have Power To**

a) Issue the contractor from time to time during the running of the contract such further instructions as shall be necessary for the purpose of proper and adequate execution of the contract and the contractor shall carry out and bound by the same.
b) During the concurrency of this contract, OWNER can increase and/or decrease the number of the services / technicians to meet contractual requirements.
c) Order the contractor to remove or replace any workman whom the Owner considers incompetent or unsuitable and opinion of the Owner representative as to the competence of any workman engaged by the contractor shall be final and binding on the contractor.

17.4 **Repatriation and Termination**

OWNER shall reserve the right at any time during the concurrency of the contract, to terminate it by giving 30 days' notice to contractor, and upon expiry of such notice period the contractor shall vacate the site/office occupied by him immediately.

MNGL reserves the right to cancel / terminate the PO, if the bidder is unable to deliver the material within specified timeline (i.e. Delivery schedule for respective lot + 10 weeks i.e. Maximum allowable period) for the undelivered quantities.

17.5 **Indemnity**

Contractor shall exclusively be liable for non-compliance of the provision of any act, laws, rules and regulations having bearing over engagement of workers directly or indirectly for execution of work and the contractor hereby undertake to indemnify the Owner against all actions, suits, proceedings, claims, damages demands, losses, etc. which may arise under minimum wages act, payment of wages act, workman compensation act, personnel injury (compensation insurance) act ESI Act, Fatal Accident Act, Industrial Dispute Act, Shops and Establishment Act, Employees Provident Fund Act, Family Pension and deposit Linked Insurance Scheme or any other act or statutes not herein specifically mentioned but having direct or indirect application for the persons engaged under this contract. (A certificate to this effect shall be submitted by the contractor immediately on receipt of LOA).

17.6 **Loading**

17.6.1 Loading on quoted prices shall be done as per tender Volume II of II.

17.7 **Contractor's Responsibility**

The contractor shall depute his Supervisor for supervision of the services to receive instructions from Engineer-in-Charge or his representative

17.8 **Employment Liability of Contractor**

The contractor shall indemnify OWNER & shall be solely and exclusively responsible for any liability arising due to any difference or dispute between him and his employer for the execution of this contract at any time during/after the contract period is over. All workmen engaged by the contractor shall be on his roll and be paid by him and OWNER shall have no responsibility towards them.

The contractor shall ensure and will be solely responsible for payment of wages and other dues latest by 7th of the following month to the personnel deployed by him in the presence of the Owner's representative.

The contractor shall be directly responsible and indemnify the Owner against all charges, claims, dues etc. arising out of disputes relating to the dues and employment of personnel deployed by him.

The contractor shall indemnify the Owner against all losses or damages caused to it on account of acts of the personnel deployed by the contractor. The contractor shall ensure regular and effective supervision of the personnel deployed by him.

The contractor shall be liable for making good all damages/losses arising out of loss or theft of each handled, leakage, pilferage of any office, furniture equipment fitting and fixtures what-so-ever as may be caused directly or indirectly by the engaged persons through him/work carried out by them.

During the concurrency of the job, if the work progress does not commensurate with the time elapsed in respect of any person/persons engaged by the contractor; the contractor shall be liable to pay the compensation to the Owner as may be considered reasonable by the Owner.

18.0 SPECIAL NOTES

18.1 Warranty Period

The warranty shall remain valid for twelve (12) months from the date of successful commissioning of LNG equipment at site.

OR

Eighteen (18) months from the date of delivery of last package of each lot at MNGL store / site, whichever is earlier.

18.2 Operation & Comprehensive Maintenance Period

Bidder shall provide Operation & Comprehensive Maintenance during warranty period. Warranty period shall be as defined in tender document. Further bidder shall provide operation & comprehensive maintenance during warranty period & further 4 (Four) years from the date of end of warranty period. However, maximum duration of contract for operation & comprehensive maintenance during warranty and post warranty period shall be limited to 66 months from the date of receipt of last LNG Equipments of each lot at MNGL store / site.

In case a LNG Equipment package is commissioned after six months from the receipt of last package of that lot for any reason attributable to Purchaser, the operation & comprehensive maintenance rates for that particular period (year) will be applicable. First year rates of Operation & Comprehensive maintenance will be valid during the warranty period. Rates for second, third, fourth & fifth year will be valid for each year from the date of expiry of warranty period. The total validity of AMC shall however be limited to 66 months from the date of receipt of last LNG Equipment package of each lot at MNGL store / site.

In case a LNG Equipment package is commissioned after six months from the date of receipt of last package of lot for any reason attributable to Purchaser, the operation & comprehensive maintenance rates applicable for that particular period (year) will be applicable.

The comprehensive maintenance period may be extended beyond the above-defined period for another 5 years on sole discretion of MNGL as per tender terms.

- Bidder shall provide preventive maintenance schedule based on running hours/ periodicity of the LNG Equipment package.

- Old spares removed during any type of maintenance activity will be submitted to MNGL by vendor. However, vendor will have to take care for disposal of consumables like waste oil, O Rings, Gaskets, Grease, Waste cloth etc. Waste oil collection and disposal in safe manner shall be done by the vendor only.

18.3 **Delivery Terms and Schedule**

As defined in IFB

18.4 **Contract Cum Equipment Performance Bank Guarantee**

Within thirty (30) Days of receipt of the respective Purchase Order, the successful bidder shall furnish to the Purchaser the Contract-Cum-Equipment Performance Bank Guarantee (CPBG) as follows:

A. **For Supply, installation & commissioning:** equivalent to 3% of respective Purchase Order value inclusive of all taxes, duties and charges towards supply, packing & forwarding, Transportation, Installation, Commissioning.

B. **For Operation and Comprehensive Maintenance Services:**
CPBG equivalent to 3% of total Purchase Order value for operation and comprehensive maintenance inclusive of all taxes, duties and charges on yearly basis (annualized i.e. total order value divided by Operation & maintenance period).

If the material supplied by contractor does not meet the guaranteed parameters and other requirement as per technical specification of contract consistently during operation at site, MNGL will revoke the Contract Cum Equipment Bank Guarantee, at its sole discretion.

The CPBG on a non-judicial stamp paper as per the pro forma enclosed of appropriate value in the form of DD or BG from Nationalized/Scheduled bank shall be valid for 90 days beyond the expiry of contract period. The claim period of CPBG shall be 01 months beyond the expiry date of BG validity. The CPBG shall be refunded after successful completion of the contract and after adjustment of any and all dues of the MNGL which may arise during the execution of the contract and a confirmation that contractor has cleared all its dues pertaining to the contract and all liabilities etc., in addition indemnifying MNGL against any future claims, if any.

The Company shall have the right to forfeit the security deposit in case of non-satisfactory performance of the contract.

19.0 PRICE REDUCTION SCHEDULE

19.1 In case there is delay in delivery of goods / completion of the work/services attributable to the supplier / contractor / service provider, the supplier / contractor / service provider shall pay as compensation for delay and not as penalty in form of price reduction as detailed here under.

19.2 If the supplier / contractor / service provider fails to deliver any or all of goods or performance of the work/service within the time period(s) specified in the Order, MNGL shall without prejudice to any other remedy(s) under the Order, reduce the contract value by a sum calculated as mentioned below:

Supply portion: @ ½ % (Half Per Cent) per week of delay or part thereof of the value of item being supplied of which default in delivery has taken place

Installation, Testing and Commissioning: @½ % (Half Per Cent) per week of delay or part there of the value of work that has been delayed.

Maximum PRS will be 5% of value of each Purchase Order of Supply, Installation, Testing and Commissioning.

The contract value to be considered for application of PRS shall be inclusive of all taxes and duties.
Also, a grace period of 15 days shall be provided in lieu of drawing approvals. PMC/ Owner to approve the drawings in 15 days from date of submission. Any delay beyond 15 days will be added to delivery period of the successful bidder.

Penalties during O&M period: -

In case of stoppage of PNG & CNG supply from LNG regasification unit due to dry out or any other O & M related reason or any reason pertaining the scope of operator then this loss will be recovered from the monthly fixed payment. This

loss will be calculated on pro-rata fixed charges for stoppage period. In addition to this, MNGL will recover Rs.1,00,000 per day for the stoppage of gas supply. Accordingly, Service provider will not raise invoice for the stoppage period and MNGL will not release payment for the stoppage period. Example: - If stoppage of PNG & CNG supply from LNG regasification unit is for 5 days. The penalty will be calculated as follows: (5 days X 1,00,000) = Rs 5,00,000 (Where, Rs 1,00,000 is the stoppage penalty per day) Net penalty will be Rs 5,00,000/- along with deduction of pro-rata fixed charges for stoppage period

19.3 The parties agree that this is a genuine pre-estimate of the loss / damage which will be suffered on account of delay / breach on the part of the Contractor and the said amount will be payable on demand without there being any proof of the actual loss or damages caused by such delay / breach. The decision of Owner in regard to the actual delay shall be final and binding on the Contractor. All sums payable by way of compensation shall be considered as reasonable compensation without reference to the actual loss or damage which shall have been sustained.

19.4 In case of delay in performance / delivery on the part of Contractor, the invoice / document value shall be reduced proportionately for the delay and payment shall be released accordingly. In the event the invoice value is not reduced proportionately for the delay, the Purchaser may deduct the amount so payable by Contractor, from any amount falling due to the Contractor or by recovery against the Performance Guarantee.

20.0 REGISTRATION OF THE CONTRACT WITH STATUTORY AUTHORITIES (FOR FOREIGN BIDDER)

20.1 Deleted.

21.0 REASONABILITY OF RATES

Since the tender is for long term requirement requiring the successful bidder to operate and maintain the supplied equipment comprehensively over a period of 66 months after receipt of last equipment of each lot at site, bidder is advised to quote reasonable rates for all the line items which are workable and sustainable for execution of the contract. Following points must be considered while submitting the offer,

21.1 The requirement under operations is to deploy one semi-skilled person in each shift throughout the year. The bidder to quote rates for operations portion based on their internal working however, should ensure compliance of minimum wage requirement in respective state and all other statutory compliances during tenancy of contract.

21.2 Similarly, cost of comprehensive maintenance should also be quoted keeping in view both the factors i.e. manpower requirement for maintenance system and spares required for comprehensive maintenance as per tender.

21.3 The quotes towards Annual CAMC and Operations charges are required to be quoted in the price bid format.

22.0 PERIOD OF CLAIM ARISING OUT OF CONTRACT

The Supplier/ contractor shall submit to MNGL, any claim arising out of the contract or otherwise within a period of 30 days from the date of cause of action of the said claim. The supplier/ contractor shall be deemed to have waived its rights to claim the same, if not raised within 30 days of cause of action of said claim. The said claim, if not raised within 30 days, cannot be taken up at any forum by the supplier/ contractor including arbitration. This provision shall be incorporated in the bid documents as terms & conditions of contract.

23.0 INSURANCE

23.1 Transit insurance will be in bidder's scope.

24.0 CORRESPONDING ADDRESS

24.1 Purchaser:

Chief Manager (C&P)
Maharashtra Natural Gas Limited,
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045
Telephone : +91 (020) 25611190
Email : gasaid@mngl.in, manan.gupta@mngl.in

25.0 DOCUMENT PRECEDENCE

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 and any other portion of Bidding Document the following shall prevail to the extent of such irreconcilable conflict in order of precedence.

1. Letter of Acceptance
2. Schedule of Rates as enclosures to Letter of Acceptance
3. Special Conditions of Contract
4. Job / Particular Specifications

5. Scope of Work
6. Drawings
7. Technical / Material Specifications
8. General Conditions of Contract
9. Indian Standards
10. Other applicable Standards

26.0 REPEAT ORDER

MNGL reserves the right to place order for 'upto 50% of the original quantity' on the supplier on whom the order was originally placed with the same terms and conditions of the original order within 6 months from the date of order.

27.0 FORCE MAJEURE

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 respective parties.

(i) The term "Force Majeure" as employed herein shall mean acts of God, earthquake, war (declared or undeclared), revolts, riots, fires, unprecedented floods, rebellions, explosions, hurricane, sabotage, civil commotions and acts and regulations of respective Government of the two parties, namely the owner and the contractor, any national / state level strike affecting manufacturing, transportation and imposition of ban affecting supply of goods.

(ii) 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 7 (seven) days of the alleged beginning and ending thereof, giving full particulars and satisfactory evidence in support of its claim.

(iii) Time for performance of the relative obligation suspended by the Force Majeure shall then stand extended by the period for which such cause lasts provided it has adversely affected the overall completion schedule.

(iv) 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 1 (one) month, the parties to the contract shall hold discussions to resolve the situation mutually.

(v) If during the concurrence 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 affects 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 owner shall be entitled, at any time after such outbreak of war to terminate the contract by giving notice in writing to the contractor and upon such notice being given the contractor shall, save as to the rights of the parties under this clause and to the operation of the clauses entitled Settlement of Dispute and Arbitration hereof, be terminated but without prejudice to the right of either party in respect of any antecedent breach thereof.

(vi) 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 remove similar facilities of his sub-contractors.

28.0 TERMINATION AND FAILURE CLAUSE

28.1 Time and date of delivery shall be the essence of the contract.

28.2 If the contractor/ supplier fails to complete the work / deliver the entire quantity of goods ordered or a part thereof within the period agreed to for such part or total quantity as per the delivery / time schedule or at any time repudiates the contract before the expiry of such period, the purchaser may without prejudice to any other right or remedy available to him recover damages for breach of the contract in form of recovering the compensation / Price Reduction Schedule / termination of the contract whichever is in the interest of the company, in accordance with the provision of contract

28.3 Termination of the contract as provided for above shall not prejudice or affect the rights of the owner, which may have accrued up to the date of such termination.

28.4 Termination and failure may also attract provisions of Holiday Listing Policy.

29.0 TERMINATION FOR DEFAULT

29.1 **The following provisions shall be applicable:**

Except for the cases of Force Majeure, if the Contractor fails to execute the work or any 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 owner at its option by written notice to the Contractor:

i. 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 Owner on that behalf, where upon the Contractor shall stop forthwith any of the Contractor's work then in progress, except such Work as the Owner may, in writing, require to be done to safeguard any property or Work, or installations from damage, and the Owner, 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 Owner for any excess cost occasioned by such work having to be so taken over and completed by the Owner over and above the cost as worked out in terms of the contract.

ii. 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 and any of his sureties are liable to the Owner for any excess cost over and above the cost as worked out in terms of the contract, occasioned by such works having been taken over and completed by Owner.

iii. Before determining the Contract, provided in the judgment of the Owner, the default or defaults committed by the Contractor is/are curable and can be cured by the Contractor if an opportunity is given to him, then the Owner may issue notice in writing calling the Contractor to cure the default within such time specified in the notice.

29.2 **The Owner shall also have the right to proceed or take action as per above, in the event that the Contractor becomes bankrupt, insolvent, compounds with his creditors, assigns the Contract in favour 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 Owner to give any prior notice to the Contractor.**

29.3 **Termination of the Contract as provided for above shall not prejudice or affect the rights of the Owner which may have accrued up to the date of such termination.**

29.4 **Failure by Contractor**

Following provisions pertaining to execution of work shall be applicable:

(i) Failure by the contractor to comply with the provisions of the contract: Owner has reserved an option to determine the contract, the security deposit furnished by the contractor is liable to be forfeited as also the

excess cost which may become payable by the owner in getting the work executed, through an alternative agency, may be recovered from the contractor.

(ii) Failure of contractor to execute the work as per contract: If pursuant to award of work, the contractor fails to commence work in a manner described in the contract or if the contractor fails to execute the work in conformity with the documents and if the contractor fails to execute work in accordance with the time schedule or if the contractor substantially suspends work for a period of 14 days without authority of Engineer In-charge or if the contractor fails to carry out and execute the work to the satisfaction of the Engineer In-charge or if contractor fails to supply sufficient or suitable construction plant, temporary works, labour, materials or things or if the contractor commits, suffer or permit any breach of any of the provision of the contract on his part to be performed or observed or persist in any of the above mentioned breaches of the contract for 14 days after notice in writing shall have been given to the contractor by the Engineer In-charge requiring such breach to be remedied or if the contractor shall abandon the work or 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 each of the above mentioned cases the owner shall have the power to enter upon the work and take possession thereof and all materials, temporary works, construction plants 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 work men or to relate the same upon any terms and to such other person, firm or corporation as the owner 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 for the Engineer In charge to be reasonable.

The above provisions expressly provide for owner's right to take possession on site and work in whatever condition the same exists at the time of breach or breaches as listed herein above may have been committed by the contractor. The clause further provides that in getting the job executed any additional payments or extra cost incurred shall be recovered from the dues of the contractor.

(iii) Owner may do part of work: In case the contractor shall fail to comply with any instructions given in accordance with the provisions of contract, owner has the alternative right instead of assuming charge of entire work

to place additional labour force, tools, equipment and materials on such parts of the work as the owner may designate or also engage another contractor to carry out the work. In such a case the owner shall deduct from the amount which otherwise might become due to the contractor the cost of such work and material with 10% added to cover all departmental charges and should the total amount thereof exceed the amount due to the contractor, the contractor is contractually bound to pay the difference to the owner.

(iv) Replacement of defective parts and materials: Owner reserves right to make good, alter, reconstruct or remove such works as may be found to be defective or unsound or imperfect or inferior to the quality specified. The owner is required to give a notice to the contractor for 7 days to remove any defects or deficiencies, pointed out in the said notice and upon failure of the contractor to do so to proceed with the above mentioned remedies. In the event of the owner taking charge of repairs / replacements as aforesaid, the cost incurred thereon becomes recoverable from the contractor.

29.5 The clause under reference further provides for the contractor's full and extreme liability to be satisfied by the payments to the owner of extra costs 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 owner for such replacements and the contract price portion for such defective plants and repayments of any sum payable by the owner to the contractors in respect of such defective plant.

29.6 In terms of the aforementioned provisions of the contract MNGL, in exercise of its rights under the contract, may come across situations, where it may have to take a part of work off from the contractor and get the same done through an alternative agency. However, such off-loading of work can be in part or it can be for the entire work awarded to the contractor and the decision in this regard would rest on various factors having major effect on such decision. Some of the factors are the progress of work at site, poor mobilization of resources, frequent defects in the executed work, financial constraints of the contractor and ill behavior of the representatives of the contractor.

29.7 The contractual conditions amply provide for recovery of any sums spent in excess of contract value for getting the work executed through an alternative agency.

29.8 Inspection and Rejection of goods by Consignee When goods are rejected by consignee, the supplier shall be intimated promptly with the details of such rejected goods with reasons, also giving locations where such goods are lying at the risk and cost of the party. The party will be called upon either to remove the

goods or to give instructions to its disposal within 14 days and in case of dangerous and perishable goods within 48 hours failing which the consignee will return the goods to the party on freight to pay or dispose it at the site on contractor's risk and cost. The purchaser shall be entitled to recover handling and storage charges for the period during which the rejected goods are not removed @ 5% of the value of goods for each month or part of a month till the rejected goods are finally disposed off.

30.0 RESOLUTION OF DISPUTE (ARBITRATION)

Except as otherwise provided in the Contract where decision of Engineer-in-Charge is final and binding on the contractor, in the event of any claims, disputes or differences arising out of or in connection with this Agreement, the same shall be settled through Arbitration as provided hereunder. The disputing Party shall serve a written notice of dispute to the other Party within fifteen (15) days of arising of such claim, dispute or difference.

Pursuant to such notice, the Parties hereto shall promptly and in good faith attempt to resolve such claim or dispute or difference through discussions and negotiations with a view to bring out an amicable resolution and settlement.

If the said claim or dispute or difference is not resolved through discussions and negotiations within thirty (30) days from the written notice of dispute, then either Party may give notice in writing to the other Party of its intention to commence arbitration proceedings, as hereinafter provided, as to the matter in dispute, difference or claim, and no arbitration proceedings in respect of this matter shall commence unless such written notice of arbitration is served upon the other Party.

The Arbitral Tribunal shall comprise of a one (1) Arbitrator. The Arbitrator shall be nominated by Supplier / Contractor / Service Provider from a list provided by MNGL of three (3) persons from its panel of arbitrators. Depending on the nature of the claim or dispute, the list of persons from MNGL shall comprise of persons with the requisite technical expertise and relevant experience.

Supplier / Contractor / Service Provider waives any and all of its objections to the said persons being former employees of MNGL or of any other public sector entity or with regard to such persons holding shares in the Company.

If Supplier / Contractor / Service Provider fails to nominate the Sole Arbitrator within a period of fifteen (15) days from receipt of such list of persons by MNGL, then it shall be construed to be a waiver in respect of the said persons on part of Supplier / Contractor / Service Provider and MNGL shall be free to nominate one (1) of the persons from the said list to be the Sole Arbitrator.

The arbitration proceedings shall be held in accordance with the provisions of the Indian Arbitration and Conciliation Act, 1996, as amended from time to time. The seat of the arbitration proceedings shall be in Pune and shall be conducted in English Language.

The decision of such arbitration proceedings shall be binding and conclusive upon the Parties.

The fees of the Arbitral Tribunal shall be determined as per 4th Schedule of the Arbitration and Conciliation Act, 1996, as amended from time to time, and the Parties to the arbitration proceedings shall equally share the costs and expenses of any such arbitration proceedings.

Notwithstanding any reference to arbitration herein, the Parties shall continue to perform their respective obligations under the Agreement unless they otherwise mutually agree in writing.

31.0 GROUNDS OF TERMINATION

MNGL shall be at liberty to terminate the contracts at its sole discretion on any of the following grounds:

(i) If the contractor has got the contract by fraudulent means or suppression of material fact, which would have bearing on the award of contract.
(ii) The contractor goes insolvent
(iii) If the continuance of the business is stopped by any court of law or any authority of Government.
(iv) In case the contractor is the company and has been wound up by the court.
(v) In case of proprietorships firm, if the firm gets dissolved.
(vi) In case of partnership firm, if the partner goes mentally insane.
(vii) The contractor breaches any of the provision of the contract then MNGL shall have liberty to terminate the contract.

The termination of the contract should be done after following the due process as per provisions of the contract.

32.0 SUBLETTING AND ASSIGNMENT

The contractor shall not, save with previous consent in writing of the owner i.e. MNGL, sublet, transfer or assign the contract or any part thereof or interest therein or benefit or advantage thereof in any manner whatsoever. Provided, nevertheless, that any such consent shall not relieve the contractor from any obligation, duty or responsibility under the contract.

33.0 APPLICABLE LAW

The contract shall be governed and interpreted in accordance with laws of India and court of competent jurisdiction of Pune shall have exclusive jurisdiction to try such suits.

34.0 ISSUE OF ESSENTIALITY CERTIFICATE

No essentiality certificate shall be issued by MNGL.

35.0 WITHHOLDING, ACCOUNTING AND TAX REQUIREMENTS

Contractor/ supplier agrees for withholding from wages and salaries of its agents servants or employees all sums required to be withheld by the laws of Republic of India or any other agency having jurisdiction over the area where Contractor/ supplier is conducting operations and to pay the same promptly and directly when due to the proper authority. Contractor/ supplier further agrees to comply with all accounting and reporting requirements of any Nation having jurisdiction over the subject matter hereof and to conform to such laws and regulations and to pay the cost of such compliance. If requested, Contractor/ supplier will furnish the evidence of payment of applicable taxes, in the country (ies) of the Contractor/ supplier's and his sub-contractor/ supplier(s) and expatriate employees.

36.0 FALL CLAUSE

Fall clause shall be applicable for this tender as per relevant clause in GCC.

37.0 LIEN

Contractor/ supplier shall ensure that the Scope of Supply supplied under the Contract shall be free from any claims of title /liens from any third party. In the event of such claims by any party, Contractor/ supplier shall at his own cost defend, indemnify and hold harmless Owner or its authorized representative from such disputes of title/liens, costs, consequences etc.

38.0 COORDINATION WITH OTHER AGENCIES

Work shall be carried out in such a manner that the work of other agencies operating at the site is not hampered due to any action of the Contractor/ supplier. Proper coordination with other agencies will be Contractor/ suppliers responsibility. In case of any dispute, the decision of Engineer-in-Charge shall be final and binding on the Contractor/ supplier.

39.0 STORAGE AND PRESERVATION

Contractor shall be fully responsible for safe custody, storage and preservation of all the supplies and materials/equipments required for carrying out the work until handing over of the complete facility to the Purchaser at site at no extra cost.

If required, materials /equipments shall be stored in Purchaser's designated store till further handing over the supplies, materials /equipments to contractor for installation, testing, erection of the equipments.

After taking over the equipments/materials from purchaser, contractor shall be fully responsible for safe custody, storage, insurance and preservation of all the supplies and materials/equipments required for carrying out the work until handing over of the complete facility to the Purchaser.

Further, activities like loading/ unloading at store as well as at site, re-transportation of material, equipment, tools & tackles etc. until handing over of the complete facility to the Purchaser shall be arranged by contractor and in case of re-transportation, payment shall be made as per SOR items relevant for the same.

Note: After unloading at site/ store & processing of documents, LNG equipment watch & guard and insurance will be in scope of MNGL. However, preservation will be in scope of vendor including guarantee/ warranty as per clause no. 20.0 of GCC

40.0 LOCAL CONDITION

It will be imperative for each bidder to fully inform himself of all local conditions and factors which may have any effect on the execution of the works covered under these documents and specifications. In their own interest the Bidders are requested to familiarize themselves with the Income Tax Act. 1961, the Companies Act 1956, Custom Act 1962 and other related Acts and Laws prevalent in India. The Owners shall not entertain any request for clarification from the Bidders, regarding such local conditions.

It must be understood and agreed that such factors may have properly been Investigated and considered while submitting the bids. No claim for financial Adjustment to the Contract awarded under these specifications and documents will be entertained by the Owner. Neither any Change in the time schedule of the Contract nor any financial adjustment arising therefore shall be permitted by the Owner which are based on the lack of such clear information to its effect, the cost or time schedule.

The activities listed in the scope of proposal in this document as well as in the price break-up shall be only broad categories and shall in no way absolve the Bidder in executing and completing of the turn keys philosophy of the Owner

within the quoted Lumpsum price. Any item/equipment/services/ activities/ taxes/duties, if not specifically identified in the Bid document or in the offer but is necessary for the completion of work, shall be deemed to be included in the quoted Lumpsum price and no extra charges are payable by the Owner.

The Purchaser/Consultant will not provide any power and water connection and the Contractor/ supplier shall obtain necessary power and water connection from relevant authority and will pay its uses charges. Purchaser will not own the responsibility for providing the land.

Other terms and condition will be applicable as specified elsewhere in **General Condition of Contract and Instruction to bidder.**

41.0 DEDUCTION AT SOURCE

Bidder may note that if any tax is deductible at source as Permanently Indian Income Tax Law, the same will be so deducted before releasing any payment of the bidders. Accordingly, bidder shall have the responsibility to check and include such provisions of taxes in their prices.

Owner will release the payment to the Contractor/ supplier after effecting deductions as per applicable law in force & after offsetting all dues to the Owner payable by the Contractor under the Contract.

42.0 SEPERATE CONTRACTS FOR SUPPLY, INSTALLATION, COMMISSIONING, TESTING AND OPERATIONS & COMPREHENSIVE MAINTENANCE

Two separate contracts shall be issued to successful bidders against this tender as below:

i) Supply, Installation, Commissioning, Testing
ii) Operations & comprehensive maintenance Services

SECTION – V

FORMS & FORMATS

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FORM F-1
BIDDER'S GENERAL INFORMATION
(Information must be provided on bidder's letterhead)

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

1-1 Bidder Name: _____

1-2 Number of Years in Operation: _____

1-3 Address of Registered Office: _____

_____

City_____ District _____

State _____PIN _____

1-4 Operation Address
(If different from above): _____

_____

City_____District _____

State _____PIN _____

1-5 Telephone Number: _____
(Area Code) (Telephone Number)

1-6 Mobile Number, if any _____

1-7 E-mail address: _____

1-8 Website: _____

1-9 Fax Number: _____
(Area Code) (Telephone Number)

1-10 ISO Certification, if any {If yes, please furnish details}_____

_____

1-11 Whether Supplier / Manufacturer / Dealer / Trader / Service Provider _____

1-12 Types of material / service provided _____

1-13 Bank's Name : _____

1-14 Bank's Branch : _____

1-15 Branch Code : _____

1-16 Bank account number : _____

1-17 Account type: _____

1-18 IFSC Code: _____

1-19 MICR Code: _____

1-20 Type of Firm: Proprietary/ Partnership/ PVT/Public Ltd.: _____

1-21 If others, please specify _____

1-22 **Details of Directors/ Proprietors/ Partners** _____

_____

_____

(Kindly attach separate sheets giving details for name of directors / proprietors and their stakes) along with the supporting documents.

1-23 PAN No.: _____

1-24 EPF No.: _____

1-25 MSME category, if applicable (i) Type of Enterprises: _____

(ii) Social Category of Enterprises: _____

(iii) Gender (Male/Female/Transgender/NA: _____

1-26 GST Registration no.

(If registered) _____

1-27 If unregistered (Reason)

a) Turnover threshold

b) Providing exemption goods/services

c) Others (specify)

(SIGNATURE OF BIDDER WITH SEAL)

Note:

1 The above required information is required on the bidder's letterhead.

2 Bidders have to submit supporting documents for the above details including the following:

a. PAN card copy

b. GST certificate copy (of the same state as the office address mentioned above)

c. Cancelled cheque of the bank account mentioned above

FORM F-2

BID BOND PROFORMA / PROFORMA FOR EMD IN THE FORM OF BG

Bank Guarantee No.:

Date:

To
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

TENDER NO. _____ FOR CARRYING OUT _____

WHEREAS…….. (HEREINAFTER CALLED 'THE Bidder') has submitted his Bid dated……. for carrying out of …… (Herein after called 'The Bid') KNOW ALL MEN by these presents that WE ……. (hereinafter called 'The Bank') are bound unto MAHARASHTRA NATURAL GAS LIMITED, 2nd Floor, Pride Purple Coronet, Baner Road, Baner, Pune – 411045 (herein after called 'MNGL') in the sum of ……. for which payment well and truly made to MNGL, the BANK binds itself its successor and assigns by these presents. Sealed with the Common Seal of the said BANK this ……. day of ……2022

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws his Bid during the period of Bid validity specified by the Bidder on the Bid Form; or

2. If the Bidder, having been notified of the acceptance of his bid by MNGL during the period of bid validity

    a) Fails or refuses to execute the Contract Form, if required: or

    b) Fails or refuses to furnish the PERFORMANCE SECURITY in accordance with the Instructions to the Bidder.

We undertake to pay MNGL up to the above amount upon receipt of its first written demand, without MNGL having to substantiate its demand, provided that in its demand MNGL will note the amount claimed by it is due to it owing to the occurrence of one or both of the two conditions specifying the occurred condition or conditions.

The Guarantee will remain in force up to and including 60 days after the period of bid validity and any demand in respect thereof should reach the BANK not later than the above date.

(Signature of the BANK)

(Signature of the Witness)

Name & address of Witness:

Date:

BID BOND PROFORMA / PROFORMA FOR EMD IN THE FORM OF "LETTER OF CREDIT"

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

Sub: Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA

Tender no: MNGL/CP/2022-23/04

Irrevocable and confirmed Letter of Credit No. …… Amount: Rs. ____

Validity of this Irrevocable: …… (in India)
Letter of Credit (2 months beyond validity of Offer)

Dear Sir,

1. You are here by authorized to draw on …….. (Name of Applicant with full address) for a sum not exceeding …… available by your demand letter (draft) on them at sight drawn for Rs.…… accompanied by a certificate by MNGL, with the Tender No. duly incorporated therein, that one or more of the following conditions has/have occurred, specifying the occurred condition(s):

(i) The Bidder withdraws its Bid during the period of Bid validity or any extension thereof duly agreed by the Bidder.

(ii) The Bidder varies or modifies its Bid in a manner not acceptable to MNGL during the period of bid validity or any extension thereof duly agreed by the Bidder.

(iii) The Bidder, having been notified of the acceptance of its Bids,
   (a) Fails or refuses to execute the Supply Order/Contract
   (b) Fails or refuses to furnish the Contract Performance Guarantee within 30 days before expiry of Bid Security.
   (c) Fails to accept arithmetic corrections as per tender conditions.

2. This Irrevocable Letter of Credit has been established towards Bid Security Tender No …… for…….. (Item)

3. We hereby guarantee to protect the Drawers, Endorsers and bonafide holders from any consequences, which may arise in the event of the non-acceptance or non-payment of Demand Letter (draft) in accordance with the terms of this credit.
4. This Credit is issued subject to the Uniform Customs and Practices for Documentary Credits (1993 Revised) International Chamber of Commerce Brochure No. 500.

5. Please obtain reimbursement as under: …….

6. All foreign as well as Indian bank charges will be on the account of M/s. …… (Applicant)

FOR ……..

Authorized Signature
(Original Bank)

Counter Signature

FORM F – 3 A
ANNUAL TURNOVER

Bidder must fill in this form

Annual Turnover data for the last 3 years:

Year	Last three financial year	Amount (in 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 as per audited results.

SEAL AND SIGNATURE OF THE BIDDER

FORM F – 3 B
FINANCIAL STATUS

Bidder must fill this form

FINANCIAL DATA FOR LAST AUDITED FINANCIAL YEAR

Description	Amount (in INR)
1. Current assets	
2. Current Liabilities (including secured and un-secured short-term loans & working capital loans)	
3. Working Capital (Current Assets-Current liabilities)	
4. Net Worth Owners funds (Paid up share capital and Free Reserves & Surplus) (NW)	

1. Attached are copies of the audited balance sheets, including all related notes and income statement and Auditor's report, for the last Audited Financial year, as indicated above, complying with the following conditions.
   - All such documents reflect the financial situation of the bidder
   - 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 periods shall be requested or accepted)

SEAL AND SIGNATURE OF BIDDER

FORM F-4
CHECK LIST FOR AGREED TERMS AND CONDITIONS

Sr. No.	DESCRIPTION	BIDDER'S CONFIRMATION
1.	Price & Delivery Basis	FOT- MNGL Store basis at various Locations
2.	Firm & Fixed Prices (As per Tender document)	Accepted
3.	Supply as per scope defined in the Tender documents	Included
4.	All Taxes, duties, levies, etc. included in price	Included
5.	Packing & Forwarding is Included in unit price	Included
6.	Delivery period (As per Tender document)	Accepted
7.	Guarantee/ Warranty Clause	Accepted
8.	Price Reduction Schedule as per Tender document	Accepted
9.	Term of Payments (As per Tender document)	Accepted
10.	Contract-Cum-Equipment Performance Bank Guarantee to be submitted as per tender document	Accepted
11.	Firm Price - during the entire duration of contact (As per Tender document)	Accepted
12.	Validity of bid & bid security	Accepted
13.	Bid Security (EMD) & Details of EMD	Submitted
14.	Price Quoted as per SOR.	Yes
15.	Deviation / exception Form 5	Yes
16.	Defect Liability Period/ Warranty	Accepted
17.	Goods & Service Tax	Included
18.	General & Special Conditions of Contract & Technical terms and conditions of the Tender	Accepted

Name of the Bidder : M/s

Signature :

Name :

Designation :

Date seal:

FORM F-5
DEVIATION FORM
(On Bidder's letter head)

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

Notes

1) BIDDER may give a consolidated list of deviations / clarifications / comments for all sections of the bid documents which for an appropriate offer are considered unavoidable by him.

2) Deviations / clarifications mentioned elsewhere in the offer shall not be binding on the MNGL and any such deviations if indicated elsewhere other than this form will render the offer non-responsive and shall liable to be rejected.

3) BIDDER shall state the reason for the deviations in the remark column.

4) Only the deviations listed herein, in conjunction with the original Tender shall constitute the contract document for the award of the job to the BIDDER.

5) Any clarification raised by the Purchaser/ Consultant should be resolved within 10 days failing which the bid is liable for rejection.

Sec No./ Cls. No.	Page No.	Requirements as per tender	Deviation by Bidder	Clarification/ Comments by Bidder	Remarks
1)					
2)					
3)					
4)					
5)					
6)					

The bidder confirms that all clauses of the tender document, which are not listed above are fully complied by the bidder.

(Signature of the bidder)

FORM F-6
DECLARATION ON TENDER DOCUMENT DOWNLOADED
(on Bidder's letter head)

No. Date:

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

Subject: **Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA**, **Corrigendum & Reply to bidder's queries etc.**

Sir,

We hereby confirm that we have read each page of the subject tender document along with Corrigendum & Reply to bidder's queries thoroughly and understood the complete Scope of Work and other terms & conditions. We hereby also confirm that tender terms & conditions are acceptable to us and any deviation other than mentioned in deviation Form F-5 is not to be taken into account.

Yours faithfully,

Signature
Name & Designation
For and on behalf of

FORM F-7
PROFORMA FOR LETTER OF AUTHORITY

No. Date:

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

Subject: Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA

Sir,

We _____ hereby authorise following representative (s) to attend the Un-Priced Bid opening and Priced Bid opening against above Bidding Document:

1. Name & Designation _____ Signature _____

2. Name & Designation _____ Signature _____

We confirm that we shall be bound by all and whatsoever our representative(s) shall commit.

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.

FORM F-8
DECLARATION
(on Bidder's letter head)

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

Subject: Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA

We confirm that we are not under any liquidation, court receivership or similar proceedings.

We also confirm that we have not been put on holiday / ban by any Government Organization / Public Sector or their joint ventures/ MNGL for any forgery, Corrupt or Fraudulent Practice or unethical behaviour.

SEAL AND SIGNATURE OF BIDDER

Form F-9
DETAILS OF LITIGATION
(on Bidder's letter head)

Bidder shall furnish details of litigation cases of the bidder during the last 5 years if any, in this Form.

FORM F- 10
COVERING LETTER
(ON LETTER HEAD)

Date:

To,

Subject: Certificate regarding…….

Dear Sir,

We…….(name of the Statutory Auditor/Chartered Accountant) are the Statutory Auditor/Chartered Accountant of M/s…….(name of the bidder).

We hereby confirm that we have issued following certificate:

1.

2.

3.

Thanking You,

Place: (Signature)

Date: Name of Authorised Signatory
Membership No.

Encl.: As above

Note: Submission of this form is Mandatory for all the bidders.

FORM F- 11
FORMAT FOR STATUTORY AUDITOR'S/ CHARTERED ACCOUNTANT

CERTIFICATE FOR FINANCIAL CAPABILITY OF THE BIDDER
(For supply of Goods/Works/Services)

We have verified the Annual Accounts and other relevant records of M/s……. (Name of the bidder) and certify the following

A. ANNUAL TURNOVER OF LAST 3 YEARS:

Year	Amount (Currency)
Year 1:	
Year 2:	
Year 3:	

B. FINANCIAL DATA FOR LAST AUDITED FINANCIAL YEAR:

Description	**Year_____**
	Amount (Currency)
1. Currency Assets	
2. Current liabilities	
3. Working capital (Current assets-current liabilities)	
4. Net worth (Paid up share capital and free reserves & surplus)	

Name of Audit Firm:
Chartered Accountant
Date:

[Signature of Authorized signatory]
Name:
Designation:
Seal:
Membership no.
UDIN No.

Instructions:

1. The financial year would be the same as one normally followed by the bidder for its Annual Report.

2. The bidder shall provide the audited annual financial statements as required for this Tender Document. Failure to do so would result in the personnel being considered as non-responsive.

3. For the purpose of this Tender document (i) Annual Turnover shall be “Sale value/Operating Income” (ii) Working capital shall be “Current Assets less Current Liabilities” and (iii) Net Worth shall be “Paid up share capital and Free reserves & Surplus”

FORM F-12
FORMAT FOR CERTIFICATE FROM STATUTORY AUDITOR FOR DETAILS OF SIMILAR GOODS/ WORK/ SERVICES SUPPLIED/ DONE DURING PAST 10 YEARS

Sr. no.	Description of the goods/works/services	LOA/PO /WO no. & date	Full proposal, address & phone nos. of client Name, designation & address of engineer/officer-in-charge (for cases other than purchase)	Value of Contract/Order (Specify Currency amount)	Date of Commencement of work/services or supply of goods	Scheduled completion time(months) delivery schedule	Date of actual completion/supply	Reasons for delay in execution, if any	Project cost
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Place:
Date:

[Sign. Of authorized signatory of bidder]

Name:
Designation:

Instructions:

1. Copies of letter of awards/order/work orders and completion certificate (in case of works/services) or IRN/Proof of delivery (in case of supplies, if applicable) to be enclosed.
2. The supply/work/services completed earlier than 5 years need not be indicated here.
3. The list of supply/ work/ services not of similar nature need not be indicated here. Failing to comply aforementioned instructions may lead to rejection of bid.
4. Bidders are expected to provide details in respect of each order in this Annex. The orders cited must comply with the bid evaluation criteria specified in Tender Document. Details provided in this section is intended to serve as a backup for information provided in Offer/Quotation. Bidder should also refer to the instructions below.
5. A separate sheet should be filled for each LOA/work order/ purchase order.
6. Certificate from the bidder's statutory auditors must be furnished in the format below for LOA/Work Order/Purchase Order mentioned above (separately for each orders)

7. It may be noted that in the absence above certificates, the details would be considered inadequate and could lead to the bid being considered ineligible for further evaluation.

Certificate from the Statutory Auditor regarding Supply of Goods/Works/Services

Based on its books of accounts and other published information authenticated by it, {this is to certify that LOA/PO/WO no. ……. dated……was awarded to ……(name of the bidder) by……..(name of the client) to execute……((name of the supply/work/service). The Supply/ works/services commenced on ……. (date) was/is likely to be completed on……..(date, if any). It is certified that the total value of contract/order executed by……(name of bidder) was……(specify currency & amount) and executed value was……(specify currency & amount).

Name of Audit Firm:

[Signature of authorized signatory]

Chartered Accountant:

Date:

Name:
Designation:
Seal:
Membership no.:

FORM F-13

FORMAT FOR SUPPLY RECORDS FOR MEETING BEC

Sr. no.	Purchase Order no.	Purchaser Name	Ordered Quantity	Supplied Quantity	IRN no./ DCN/ Taxable Invoice no.	Sr. No. of pages
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Bidder shall submit this form along with relevant document with proper numbering.

For tenders having various items/ parts, bidder to submit separate format for each item/ part quoted.

Form F-14
FORMAT FOR BIDDER'S PRE-BID QUERIES

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

Subject: Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA.

Sr. no.	Section / Tender page no.	Clause no.	Subject	Bidder's Query

NOTE: The Pre-Bid Queries may be sent by e-mail, before pre-bid meeting due date, to MNGL. Editable copy of queries may be enclosed while sending signed pre bid queries.

SEAL AND SIGNATURE OF BIDDER

Form F-15
TECHNO-COMMERCIAL PROPOSAL

(To be filled serial-wise on the e-tendering portal bid floor in the provided format)

Wherever remarks are required, bidders are advised to ensure that sufficient information has been provided and remarks such as “attached”, “enclosed”, “submitted” or other such terms alone should be avoided.

Sr.	Requirement	Response
	General Information	
1	Complete Bidder Organization Name	
2	Date of Registration	
3	Company Address(es) in India	
4	No. of years in business	
5	Type of Firm (Proprietary / Partnership / Private Ltd. / Public Ltd.)	
6	Details of Directors / Proprietors / Partners	
7	Phone no. of contact person	
8	Email ID of contact person	
9	GST registration number	
	Technical BEC	
1	As defined in tender document	Agree
	Details in support of Technical BEC	
1	Any one past reference client (Company Name)	
2	Reference client’s PO / work order / Agreement no. and date of award	
3	Reference client’s Completion certificate with clear mention of PO / work order / Agreement no., awarded value/ qty. & executed value/ qty.	

	Financial BEC	
1	Bidder's turnover for immediate preceding financial year FY _____(as per tender requirement).	
2	Bidder's turnover for second to last preceding financial year FY _____(as per tender requirement).	
3	Bidder's turnover for third to last preceding financial year FY _____(as per tender requirement).	
4	Bidder's net worth for preceding financial year FY _____ (as per tender requirement). Should be positive.	
5	Bidder's working capital for preceding financial year FY _____(as per tender requirement).	
	Commercial Terms and Conditions	
1	Bidder accepts to keep the bid valid for a period of 4 months from the date of opening of techno-commercial bid	Agree
2	Bidder to submit the original copy of EMD / Bid Security (if applicable) required against tender document within the stipulated time.	Agree
3	EMD / Bid Security DD/BG no. / MSME/NSIC certificate no. and date	
4	Bidder accepts to quote the prices as per SOR enclosed with this tender document	Agree
5	Prices quoted by the bidder shall remain firm, fixed and valid for entire contractual period	Agree
6	Prices quoted by the bidder shall be inclusive of all taxes, duties, levies, fees, insurance, etc.	Agree
7	Bidder understands and accepts the complete scope of work as defined in the tender document	Agree
8	Bidder accepts the contractual validity period as per tender	Agree
9	Bidder accepts the terms of payment as per tender	Agree
10	Bidder accepts to submit the Performance Bank Guarantee(s) as per tender provisions	Agree
11	Bidder accepts the Price Reduction Schedule and other penalties as mentioned in the tender document	Agree
12	Bidder accepts the General / Special / Technical Terms & Conditions of the tender	Agree

13	Bidder accepts all statutory compliances against tender	Agree
14	Bidder has read and accepts the tender document in toto	Agree
15	Any deviation from the tender document sought by the bidder is listed separately in Form-5 only	Agree
16	All the bidders must ensure adequacy and sufficiency of their document while submitting bid in all respects. Bid shall include all documents confirming to the tender terms and conditions, BEC and the tender specifications in toto failing which their bids are liable to be rejected.	Agree

DOCUMENTS TO BE UPLOADED ON E-TENDER PORTAL

Sr.	Document Header Name	Document Description
1	Covering Letter/Forwarding Letter	Covering Letter/ Forwarding Letter
2	Bid Signatory PoA / Board Resolution	Power of attorney of the signatory to the bid offer on non-judicial stamp paper / Board resolution of company for authorized signatory.
3	Form-1	Bidder's General Details/ information as per appended format
4	Form-2	Bid Security (EMD) as per format Form F-2
5	Form-3A & 3B	Certificate for financial capability of the bidder as per appended format. In case bidder's working capital is lower than that required as per Tender BEC, letter from bidder's bank showing availability of credit to cover inadequacy of working capital to be attached with this Form-14
6	Form-4	Agreed Terms & Conditions
7	Form-5	Deviation/ Exceptions as per appended format.
8	Form-6	Declaration as per appended format.
9	Form-7	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 as per appended format.
10	Form -8	Declaration for bidder not under Liquidation, etc (on Bidder's letter head)
11	Form-9	Information regarding any current litigation in which the bidder is involved in Form F-9.
12	Form-10,11 & 12 Certificates	Certificates as per appended Form- F- 10, 11 & 12
13	Form 13	Supply Records
14	Form 15	Techno-Commercial Proposal as per form 15
15	Copy of GST	Copy of GST (Goods & Service Tax), ESI, PF, PAN registration Certificates
16	Other Documents for Technical BEC Eligibility	Any other documents to show compliance of Technical BEC
17	Corrigenda and Other Docs	Copy of all addenda / corrigenda, if any, along with required documents as stated therein, duly signed and stamped. (In case no addendum / corrigendum has been issued against this tender document, then the bidder may upload a letter stating that "No addendum / corrigendum

		has been issued against this tender document”).

Note:

1. Bidder may attach any other docs, not in above list but relevant to this tender, at the specified link on the e-tendering portal.

2. Bidder has to upload the file as asked above on e-tender portal in .pdf format by keeping the file name as provide in the column “*Document Header Name*” above only.

3. All pages of the bid offer to be signed and stamped by an authorised representative (as describe in bid document) of the bidder**.**

4. Bidder must ensure numbering of all pages submitted in bid document. Further total number of pages submitted in bid document must be mentioned in the covering letter of bid submitted.

Bidder have to upload the unpriced SOR marked “Quoted/ Unquoted” for each item as per excel (named “*Unpriced SOR*”) provided on the e-tender portal along with applicable GST rate (in percentage only) and HSN code. If there is any discrepancy observed between the HSN code/ GST rate in unpriced SOR and priced bid, then the GST rate as per unpriced SOR or as agreed during technical-commercial queries shall be considered for evaluation. MNGL also may take necessary clarifications from bidders quoting HSN code or GST rate inconsistent with other bidders or previous contract.

Form F-17
CONTRACT PERFORMANCE BANK GUARANTEE
(To be stamped in accordance with Stamp Act)

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

Dear Sir,

M/s_____ have been awarded the work of _____ for Maharashtra Natural Gas Limited, PUNE vide Purchase Order 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 said _____ 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.

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 favor 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.

INSTRUCTIONS FOR FURNISHING PERFORMANCE GUARANTEE

1. The Bank Guarantee by successful bidder(s) will be given on non-judicial stamp paper as per stamp duty applicable. The non-judicial stamp paper should be in name of the issuing bank. In case of foreign bank, the said bank guarantee to be issued by its correspondent bank in India on requisite non-judicial stamp paper and place of bid *to* be considered as Pune.

2. The bank guarantee by bidders will be given from bank as specified in ITB.

3. A letter from the issuing bank of the requisite Bank Guarantee confirming that said bank guarantee and all future communication relating to the Bank Guarantee shall be forwarded to Employer

Form F-18
FORMAT FOR CERTIFICATE FROM BANK
IF BIDDER'S WORKING CAPITAL IS INADEQUATE/NEGATIVE
(To be provided on Bank's letter head)

Date:

To,
M/s MAHARASHTRA NATURAL GAS LIMITED
2nd Floor, Pride Purple Coronet,
Baner Road, Baner,
Pune – 411045

Dear Sir,

This is to certify that M/s …….. (Name of the bidder with address) (Hereinafter referred to as Customer) is an existing customer of our Bank.

The Customer has informed that they wish to bid for MNGL's Tender no. ..... Dated …… for …….. (Name of the supply/work/services/consultancy) and as per the terms of the said Tender they have to furnish a certificate from their Bank confirming the availability of line of credit.

Accordingly M/s …….. (Name of the Bank with address) confirms availability of line of credit to M/s …….. (Name of the bidder) for at least an amount of Rs. _____

It is also confirmed that the net worth of the Bank is more than Rs. 100 Crores (or Equivalent USD) and the undersigned is authorized to issue this certificate.

Yours truly

For …… (Name & address of Bank)

(Authorized signatory)

Name of the signatory :

Designation :

Stamp

Form F-19
E-Banking Mandate Form
(To be issued on vendor's letter head)

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

I/We hereby authorize MNGL 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 MNGL 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)

Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA

SECTION – VI

SCHEDULE OF RATES

(Following are the format of the SORs for reference. The bidders are supposed to fill in the SORs, available on the e-tendering portal in the prescribed format.)

SCHEDULE OF RATES (SOR)

Schedule of Rates (SOR) / Item-wise BOQ is enclosed separately on e-tendering portal. Following to be submitted along with Technical Bid duly filled in quoted / not quoted:

PART No.	Description	Quoted / Not Quoted
1.	LNG-LCNG Station Plan at Dodi in Nashik GA	
2.	LNG-LCNG Station Plan at Malegaon in Nashik GA	

Note:

1. Scope of Supply, Work and other terms and conditions are strictly as per bid document.

2. Bidder to clearly indicate 'Quoted' / 'Not Quoted' against each SOR line item in the price column in the un-priced Schedule of Rates and submit the same in Un-priced part of the bid. Bidder to submit Price part of above Schedule of Rates in their Priced Bid.

3. Bidder must quote the price in Schedule of Rates format only. Bid submitted with changed format / description is liable to be rejected.

4. Bidder to quote price for each SOR line item.

5. Quoted rates are firm and fixed till complete execution of the entire contract.

6. Purchaser reserves the right to decrease/increase the Scope of Work as per provision of Bid document before & after award of contract.

7. Bidder must quote for complete scope as detailed in the bid document, bids submitted for part scope shall be considered as non-responsive and liable to be rejected.

8. Bidder are advised to refer complete item description given in MR while quoting prices.

9. Notes given in Material Requisition must be referred by the bidder prior to filling price in SOR.

VOLUME-II OF II

C O N T E N T

Sl. No.	Description
SECTION-I	Tender for Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA

SECTION – I
TECHNICAL SPECIFICATION

(Design, Datasheets, Term-sheets & Technical Specifications)

Project: **Design, Supply, Installation, Commissioning and 5 years of Operation & Comprehensive Maintenance of LNG Storage & Regasification station along with LCNG & LNG dispensing facilities at Dodi & Malegaon in Nashik GA**

Item: **LNG Equipment & dispensing facilities**

Tender No.: **MNGL/CP/2022-23/04**

DESIGN BASIS

1.1 LNG SATELLITE STATION WITH LNG, LCNG DISPENSING FACILITY

The Bidder shall be required to do system design, develop detailed P&ID and detailed layout as per PESO guidelines. The complete system shall be designed for automatic operation with minimal human interference. However, there shall be human interface available in the PLC based control panel. The system shall be designed for most economic and reliable operations with Zero LNG boil-off even under no consumption condition. The system shall be designed in accordance with latest guidelines and other relevant codes/regulations/ laws applicable in India.

1.2 Major Applicable Codes:

Static and Mobile Pressure Vessel (SMPV) Rules (Unfired)

Gas Cylinder Rules

NFPA 59A

OISD codes

PNGRB regulations

PESO guidelines

ASME BPV Code Sec VIII

EN 13458-1

EN 13458-2

The Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for Retail Outlets dispensing Petroleum, Auto LPG and CNG) Regulations, 2018" including draft Schedule 4

In case of any discrepancies in the requirements of above codes, the most stringent requirement shall govern. Only latest edition of above-mentioned codes shall be followed.

1.3 MAJOR EQUIPMENT

1.3.1 LNG UNLOADING PUMP SKID

Storage facility shall have 1 tanker unloading skid with two nos. of pumps (1working + 1 standby. Note: The standby pump can be common for LNG Unloading & LNG dispensing. Suitable flow controller to be provided. In that case, total 3 pumps will be provided – 1 LNG Unloading, 1 LNG Dispensing & 1 LNG Unloading cum Dispensing) which will unload LNG from road tanker to storage tank with minimum 350 LPM flow and approx. 8-10 bar (g) differential pressure of LNG (or as required). The unloading skid shall have centrifugal pump suitable for LNG service and shall have a return line for tanker. Alternatively, the vendor can provide a submersible type pump with vacuum insulated sump. Suitable type strainer shall be provided at suction of the pump.

The unloading skid shall have automatic PLC based control system. The LNG unloading skid shall be provided with SS-braided LNG transfer hoses. The skid shall have required number of isolation valves, non-return valve, relief valve designed as per applicable codes and standards as required for

safe and reliable operation. Instrumentation such as pressure & temperature gauges, transmitters etc. shall be provided as required for safe operation.

1.3.2 LNG STORAGE TANKS

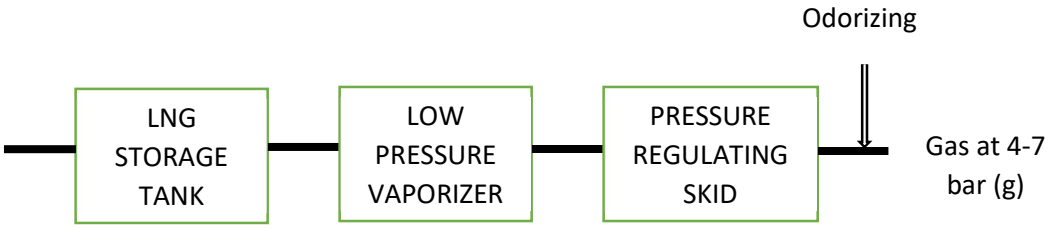
The LNG satellite station shall have (2 Nos. 56 KL for Dodi and 2 Nos. 114 KL for Malegaon) gross capacities each vertical LNG storage tanks. The maximum allowable working pressure of inner storage tank shall be approx. 11 bar (g). The gross capacity of LNG storage tanks can have a negative tolerance of 5%. The LNG storage tank shall be designed for a design temperature of -196°C to +49°C. The LNG storage tank shall have thermosiphon arrangement and shall have temperature sensors, pressure detection, level measurement etc. Two independent type level measuring instruments shall be provided and signal from the same shall be transmitted to the control room. Further, a separate and independent level indicator shall be used for ESD purpose. Suitable safety interlocks shall be provided. The LNG storage tank shall be designed to have minimum boil-off even during no consumption conditions.

LNG storage tank shall be designed, manufactured and designed in accordance with latest version of ASME BPV Code Sec VIII/ EN 13458-2. It shall be fit for LNG service and shall be designed to minimize LNG boil-off even during low/ no consumption.

The LNG storage tank shall be double-walled and insulated with suitable insulation such as perlite insulation under vacuum etc. The inner tank shall be made from X5CrNi1810/ SA 240 type 304 or equivalent/ superior material and shall be 100% radiographed. All internal piping/ fittings shall be seamless type and made from ANSI 304L (or equivalent). The piping shall be 100% radiographed and pressure tested. The outer tank shall be made from carbon steel or equivalent/ superior material. The outer surface of the tank shall be coated with polyurethane based paint of minimum 240µm DFT to avoid rusting/ corrosion.

Provision shall be made for independent as well as simultaneous operation of all the systems from any of the storage tank.

1.3.3 LOW PRESSURE RE-GASIFICATION SYSTEM



Schematic for Low Pressure Re-gasification system

The above figure shows schematic for low pressure re-gasification system wherein LNG from storage tank is directly re-gasified using a low-pressure ambient air vaporizer. The gas pressure is then regulated to 4 – 7 bar (g) pressure using pressure regulating skid with dual stream. Further two flow meters (1W + 1S) shall be provided in this system at downstream of PRS skid.

i. Low Pressure Vaporizer

Low Pressure ambient air vaporizer shall be provided with a 100% standby for continuous duty operations. Each ambient air vaporizer shall be designed to work for 8 hours duty cycle and after that automatic change over to idle vaporizer to run re-gas plant on continuous duty operations. The change-over shall be automated with the help of PLC based control system and shall require no human intervention.

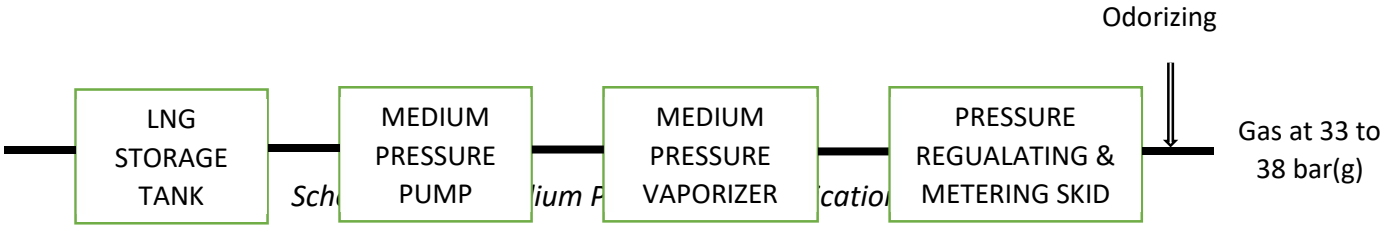
Each low-pressure ambient air vaporizer shall have a capacity of 600 SCMH (each) (for Dodi) & 1200 SCMH each (for Malegaon) at 02-10 bar (g). The desired delivery pressure shall be 4 – 7 bar (g) after pressure control regulator. The inlet design temp for the vaporizer shall be from -196°C to +65°C.

The low-pressure atmospheric vaporizer shall be ambient air heated and shall be designed in accordance with latest version of ASME SEC VIII, DIV I and shall be fit for LNG service.

ii. Pressure Regulating Skid

Re-gasified natural gas shall be passed through pressure regulator skid which is equipped with twin stream pressure regulators to get natural gas at 4 – 7 bar (g) pressure without any interruption.

1.3.4 MEDIUM PRESSURE RE-GASIFICATION SYSTEM



The above figure shows schematic for Medium pressure re-gasification system wherein LNG from storage tank is pumped to the required pressure via suitable pump and re-gasified using a medium-pressure vaporizer. The gas pressure is then regulated to 33 – 38 bar (g) pressure using pressure regulating skid with dual stream. Further two flow meters (1W + 1S) shall be provided in this system at downstream of PRS skid.

i. Medium Pressure Pump

LNG tank is connected with medium pressure pump which can pump LNG liquid up to maximum 100 LPM each at 33 to 38 bar (g). There shall be 2 nos. of medium pressure reciprocating pumps (1 working + 1 standby) for Dodi. There shall be 3 nos. of medium pressure reciprocating pumps (2 working + 1 standby) for Malegaon. The pump shall have a normal suction pressure of 2 bar to max. 10 bar. The delivery pressure of pump shall be 33 to 38 bar (g). Suitable type strainer shall be provided at suction of the pump.

ii. Medium Pressure Vaporizer

Medium Pressure vaporizer shall be provided with a 100% standby for continuous duty operations. Each ambient air vaporizer shall be designed to work for 8 hours duty cycle and after that automatic change over to idle vaporizer to run re-gas plant on continuous duty operations. The change-over shall be automated with the help of PLC based control system and shall require no human intervention. The setup will be (1+1) for Dodi and (2+1) for Malegaon.

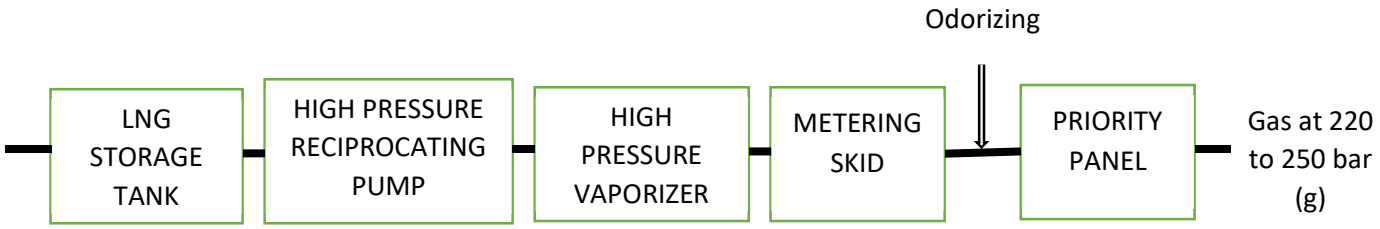
Each medium-pressure ambient air vaporizer shall have a capacity of 3750 SCMH (each). The desired delivery pressure shall be 33 – 38 bar (g) after pressure control regulator. The inlet design temp for the vaporizer shall be from -196°C to +65°C.

The medium-pressure atmospheric vaporizer shall be ambient air heated and shall be designed in accordance with latest version of ASME SEC VIII, DIV I and shall be fit for LNG service.

iii. Pressure Regulating Skid

Re-gasified natural gas shall be passed through pressure regulator skid which is equipped with twin stream pressure regulators and flow meters in each stream to get natural gas at 33 – 38 bar (g) pressure without any interruption.

1.3.5 HIGH PRESSURE LCNG SYSTEM



Schematic for High Pressure LCNG system

The above figure shows schematic for high pressure LCNG system wherein a LNG tank is connected with high pressure reciprocating pump which can pump LNG liquid to high pressure ambient air vaporizer for high pressure re-gasification LCNG application. The system shall be designed for CNG cylinder cascade filling at minimum 220 Bar (g). The CNG shall be odorized with an odorant consisting of 70-80% TBM + 20-30% MES as per requirements of PNGRB codes.

i. High Pressure Reciprocating Pump

LNG tank is connected with high pressure reciprocating pump which can pump LNG liquid at 30 LPM at min. 220 bar (g). There shall be 2 nos. of high pressure reciprocating pumps (1 working + 1 standby) for Dodi. There shall be 3 nos. of high pressure reciprocating pumps (2 working + 1 standby) for Malegaon. The pump shall have a normal suction pressure of 2 bar to max. 10 bar. The delivery pressure of LCNG pump shall be minimum 220 bar (g). Suitable type strainer shall be provided at suction of the pump.

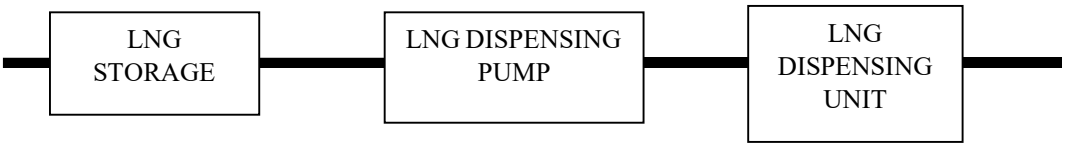
ii. High Pressure Vaporizer

Pressurized LNG is converted to high pressure CNG after passing through high pressure ambient air vaporizer and stored into the cylinder cascade of 3000 WL after odorization process. CNG cascade is further connected to CNG dispenser, through priority panel which will decide sequence of operation. Fixed CNG cascade has additional taping to fill other mobile CNG cascades (2 nos. LCV filling points for Dodi and 3 Nos for Malegaon). The high-pressure vaporizer shall have a maximum operating pressure of approx. 250-275 Bar (g) and shall be suitable for CNG cylinder filling at 250 Bar. It shall be designed for a capacity of approx. 1200 SCMH each.

High Pressure ambient air Vaporizer shall be provided with a 100 % standby for continuous duty operations. Each ambient air vaporizer shall be designed to work for 8 hours duty cycle and after that automatic change over to idle vaporizer to run re-gas plant on continuous duty operations. The change-over shall be automated with the help of PLC based control system and shall require no human intervention. The setup will be (1+1) for Dodi and (2+1) for Malegaon.

The high-pressure vaporizer shall be ambient air heated and shall be designed in accordance with latest version of ASME SEC VIII, DIV I and shall be fit for service of LNG.

1.3.6 LNG DISPENSING SYSTEM



Schematic for LNG Dispensing system

i. LNG DISPENSING PUMP

LNG storage tank is connected with Centrifugal pump which will transfer LNG from Storage Tank to LNG Dispenser unit at 150 -200 LPM flow of LNG. There shall be 2 nos. of centrifugal pumps (1working & 1standby. The standby pump can be common for LNG Unloading and LNG dispensing. Suitable flow controller to be installed if using LNG Unloading pump as standby pump for LNG dispensing). The pump shall have a normal suction pressure of 2 – 10 bar (g). The delivery pressure of LNG dispensing pump shall be minimum 8-10 bar (g) or as required/ as per vendor's recommendation. Suitable type strainer shall be provided at suction of the pump. LNG dispensing system shall be provided with saturation skid and it should be able to handle cold LNG or/and saturated LNG. LNG pumps shall be provided with VFD.

ii. LNG DISPENSER AND MOBILE LNG TANKER FILLING SYSTEM

There shall be 1 no. LNG Dispenser for LNG filling in vehicles along with complete facilities. The system shall be automated in operation with the help of PLC based control system.

1.3.7 CENTRALIZED CONTROL & MONITORING SYSTEM

LNG storage and distribution plant operations should be controlled by centralized PLC and SCADA system for better and safe operations with manual interventions wherever applicable and with the provision for hook-up with controlled SCADA system of client. The offered control system (PLC &

SCADA) should have provision to accommodate data and control for additional 30% of existing system. All solenoid valves should have provision for manual override. The control system should be user friendly, and menu driven.

PLC & SCADA System shall be supplied with licensed software required for accommodation of signals from field instruments / panels. PLC System shall comprise of fully wired free standing panels which include processors, power supply units, I/O cards, relay modules, communication modules, interfacing modules, I/O racks, Ethernet switches (manageable & stackable), serial modules, any kind of signal converters , Terminal Server / Data Concentrator, media converters, MCBs, TBs, fuses, surge protection devices, signal distribution cards, annunciators, lamps, hooter cum strobe, etc. ; HMIs (Engineering Workstation/ Operator Workstation) and licensed software for developing/ modification of logics ; consoles for HMI installation ; A3 color laser printer ; necessary LAN network & accessories ; chairs, etc. The PLC & SCADA system shall be included with independent control system of associated subsystem (i.e. odorizing system, metering system etc.)

In hazardous area applications, electronic/electrical instrumentation equipment shall be suitable for hazardous area classification as per IEC. These equipment shall be intrinsically safe conforming to CENELEC standard and certified by appropriate statutory bodies (ATEX, FM, BASEFA or equivalent). Intrinsically safe systems shall be designed using zener/ IS barriers. Where intrinsically safe design is not feasible, ex-proof equipment/enclosure, certified by statutory bodies like PESO Nagpur shall be supplied. Other acceptable safety procedures (e.g. increased safety procedure, pressurization etc.) shall be used, wherever applicable.

1.3.8 SAFETY SYSTEMS

LNG satellite station shall be equipped with state-of-the-art safety systems and interlocks for safe and reliable operations. LNG satellite station shall be equipped with gas detection and fire/temperature detection sensors with emergency shutdown buttons at strategic locations as a proactive safety measure which is continuously monitored by centralized control system. Interlocks shall be designed for operation of the plant in most safe and reliable manner with minimal human intervention.

The LEL gas detectors shall be provided as required for detection of gas leakages if any. Further the plant shall be provided with fire water network, sufficient number of fire extinguishers and sand buckets.

LNG storage and distribution plant operations should be controlled by centralized PLC based system and SCADA system for better and safe operations with manual interventions wherever applicable

1.3.9 INTERCONNECTING PIPING, FITINGS, VALVES

The interconnecting pipes shall be double-walled vacuum jacketed. Piping, fittings, valves used shall be fit for LNG service.

1.3.10 ODORIZING SYSTEM

The odorizing system shall be provided for the statutory requirement of PNGRB/ OISD to identify the leakage in the associated equipment/ during transportation of piped gas in the city area. Selected system shall meet all the requirements as per the enclosed technical specifications related

to design safety and automatic dosing of odorant uninterrupted (with standby system in case of failure of main system). If common tank for storage and dosing for PNG and LCNG line consider; necessary safety equipments shall be considered as required. The Odorising system shall be designed for Automatic odorant dosing based on the flow rate with provision for standby system for dosing in case of failure of main system. Odorant tank shall be of Stainless Steel with necessary safety and design as per ASME Sec VIII guideline.

1.3.11 Nitrogen Purging System

Nitrogen purging system will be required for the LNG unloading pump, dispensing pump and for the complete LNG network at various condition for the safe operation of the system. Required numbers of nitrogen cylinder with necessary piping/tubing connections at the various points as per P&ID shall be provided. Necessary measuring instruments, valves, fittings shall be provided for the complete nitrogen purging system. Nitrogen requirement for LNG storage tank pre-cooling during commissioning (one time requirement) shall be met by hiring a portable Nitrogen supply system as the quantity requirement will be more and cannot be met by cylinders.

(Detailed Scope of work- Dodi Nashik)	
Sl. No.	**Item Description**
1	Design and supply of LNG vacuum insulated storage tank/s (**Size – 56 KL, MAWP – 12 Barg and Quantity – 2 Nos**) - with isolation valves, instruments and interconnected piping - Level and Pressure transmitter - Emergency shut down Fire safe valves on Filling and delivery/pump lines - Junction box for connecting the instruments and valves on tank - 4 x 100% Safety valves - Common vent stack - PESO approval for the Design and TPI approval
2	LNG Unloading Pump (**Quantity – 1No + 1No standby pump**) with – - Skid mounted With Vacuum jacketed sump - 350 LPM capacity - Related valves and instruments including pressure and temperature sensors - with electrical panel located in the control room - Emergency shut down PB - Local vent stack
3	- Unloading Hose Trolley with Hoses – 1 set for each pump for easy and safe hose handling - Earthing reel for ensuring effective earthing
4	Design and supply of 02 Nos. low pressure Atmospheric vaporisers (divided in 2 banks) to meet required duty cycle tosupply Natural gas with instruments and isolation valves for auto switchover after 8 hours for continuous operations **Flow upto – 1000 SCMH each**
5	Inlet / outlet valve skids for the above vaporisers including - - automatic switchover based on time and outlet temperature - Temperature transmitters at outlet of each vaporiser - interconnecting piping and supports - valves and instruments all mounted on skid complete with cabling , pneumatic tubing and junction boxes
6	1 No of **<u>PNGRB compliant</u>** Pressure reduction system for delivery of PNG up to **2000 SCMH flow and pressure of 4 bar(g)** - 2 x 100% regulation stream with Active monitor combination with isolation valves and pressure gauges - slam shut off valve with isolation valve & pressure gauge - Creep relief valve - All mounted on skid with cabling and junction box
7	Flow metering skid with RPD type flow meter - With pressure and temperature compensation - flow totalizer and indicator - with bypass valve and interconnecting piping duly mounted on skid with required valves and instruments

8	All Interconnecting piping between skids and Equipments till PRS skid outlet within dyke wall including piping supports for PNG supply stream. Downstream piping from PRS skid up to plot boundary.
9	LNG Medium pressure pump/s (**Quantity - 2 Nos and Flow rate – 2400 SCMH each with 33 - 38 bar**) - with electrical control panel in control room - Temperature sensors for pre cooling and dry run protection - LP and HP side safety valves - Medium pressure gauge and switch - other instruments and interconnecting piping mounted on skid
10	Design and supply of 02 Nos of atmospheric Medium pressure vaporizers to meet required duty cycle tosupply PNG at 33 – 38 bar with instruments and isolation valves for auto switchover after 8 hrs for continuous operation. **2400 SCMH flow each**
11	1 No of **PNGRB compliant** Pressure reduction system for delivery of PNG up to **2400 SCMH flow andpressure of 33 -38 bar(g)** - 2 x 100% regulation stream with Active monitor combination with isolation valves and pressure gauges - slam shut off valve with isolation valve & pressure gauge - Creep relief valve All mounted on skid with cabling and junction box
12	Flow metering skid with Turbine type flow meter - With pressure and temperature compensation - flow totalizer and indicator with bypass valve and interconnecting piping duly mounted on skid with required valves andinstruments
13	All Interconnecting piping between skids and Equipment till PRS skid outlet within dyke wall including piping supports for MP PNG supply stream. Downstream piping from PRS skid up to plot boundary.
14	LNG High pressure pump/s (**Quantity - 2 Nos and Flow rate – 1200 SCMH each with 250 bar**) - with electrical control panel in control room - Temperature sensors for pre cooling and dry run protection - LP and HP side safety valves - High pressure gauge and switch - other instruments and interconnecting piping - mounted on skid
15	Design and supply of 02 Nos of atmospheric High pressure vaporizers to meet required duty cycle tosupply CNG with instruments and isolation valves for manual switchover after 8 hrs. for continuous operation ifrequired - **1200 SCMH flow each**
16	PLC controlled Odoriser(for all streams) - with controlling valves - Odorant storage tank with level indicator - Air operated dosing pump - flow sensor - interconnecting piping duly mounted on skid - May be a common system or separate for each stream. (LP, MP & HP)
17	- Sequencing/Priority Panel for sequencing of CNG flow (**Quantity – 1 Nos, 10 Lines**)

18	All Interconnecting piping between Tank to Pump, Pump to HP vaporizer and HP vaporizer to PESO safe area boundary including piping supports.; Interconnecting piping from PESO area limit to priority panel/CNG cascade fill point;
19	Cascade fill point/s **(Quantity – 2 Nos)** - with Manual Valves and instruments - including 1no of Mass flowmeter per point and 1 no of earthing reel per point. - with Parker or equivalent make QC coupling
20	**LNG Dispensing Pump (1 working + 1 Standby)** -150 LPM LNG dispensing pump with the following accessories: a. Related valves and instruments including pressure and temperature sensors b. Variable frequency drive (VFD) c. Ex proof push button station for local operation d. Interlocks for precooling and dry run, safety / vent valves, strainer, Pressure gauge, Soft Starter, Control panel, Gas Detector, Low and High Temperature Sensor, Ex Proof Emergency Push Button etc. e. All associated piping & fittings
21	**LNG Dispenser** 1 no. LNG dispenser with the following accessories: a. Related valves and instruments b. Mass flow meter c. Fill & gas return hoses d. All associated piping & fittings and safety interlocks e. LNG Dispenser shall have one cool down line, Screen with driver instruction, Dead-man pushbutton with a programmable interval, ESD pushbutton, Driver choice of cold or saturated LNG, Earthing connection, Compatible with all truck brands. f. 1 no. Saturation on the fly Vaporizer
22	Total safety system inclusive of Special gas detection devices, low and high temperature sensors, ESS etc.as per PESO guidelines in PESO storage area.
23	Programmable logic controller (PLC) including SCADA with control panel - including software initial programming. - UPS for PLC power backup of 30 minutes Licensed Personal computer for SCADA system
24	- Supply of all Electrical Cables from PLC to field instruments/Valves - Supply of cable trays, Electrical hardware , supports etc. Supply of cable glands and other Electrical hardware
25	Supply of Air compressor (1 No) with Built in reservoir; Air distribution piping to all required componentsin PESO area and dispenser area.
26	Pump for removal of water from dyke with control mechanism
27	Fire extinguishers, sand buckets, warning signs. As required per PESO norms
28	Supply of Earthing lugs on each equipment, Spring loaded earthing reel 10mtr wire (1 No per unloadingpump)

29	Supply of Supporting systems such as Fire water system consisting of 1 set of water tank/pump/hose as per PESO guidelines;
30	Obtaining all statutory approvals including PESO approval for the site and equipment's.

31	- Supply of all required Foundation bolts for tank and vaporizers; Supply of expansion bolts for skid and supports.
32	- Hazop Study, Emergency plan and safety report per MSIHC if required
33	Installation of cables and cable trays between PLC panel and station components inside PESO storage areaincluding all instrumentation
34	Installation and commissioning of system including piping, welding, cabling and pressure testing at site up to our Battery limit
35	Supply of Liquid Nitrogen for tank cooling during commissioning
36	Spares for commissioning
37	Detailed engineering and civil drawing, layouts to be provided by the bidder to MNGL for carrying out the construction as per the requirement. Bidder will have full responsibility of the supervision and project management for civil work.
38	Supervision for unloading of tanks and Supervision of erection and commissioning of entire station.
39	Transport of Equipments to site and transit Insurance, Unloading and Erection, Provision for cranes for unloading, erection and installation for all LNG Station Equipment.
40	Yard Lighting (including Light poles located just outside the SMPV area);its cabling and control panel
41	All Local approvals/ NOC for LNG facility
42	Supply of Utilities such as Electrical power, water, Air etc. and N2 gas for testing during commissioning.
43	Spare parts for normal operation
44	Any other items not mentioned above

(Detailed Scope of work- Malegaon)	
Sl. No.	**Item Description**
1	Design and supply of LNG vacuum insulated storage tank/s (**Size – 114 KL, MAWP – 12 Barg andQuantity – 2 Nos**) - with isolation valves, instruments and interconnected piping - Level and Pressure transmitter - Emergency shut down Fire safe valves on Filling and delivery/pump lines - Junction box for connecting the instruments and valves on tank - 4 x 100% Safety valves - Common vent stack - PESO approval for the Design and TPI approval
2	LNG Unloading Pump (**Quantity – 1No + 1No standby pump**) with – - Skid mounted With Vacuum jacketed sump - 350 LPM capacity - Related valves and instruments including pressure and temperature sensors - with electrical panel located in the control room - Emergency shut down PB - Local vent stack
3	- Unloading Hose Trolley with Hoses – 1 set for each pump for easy and safe hose handling - Earthing reel for ensuring effective earthing
4	Design and supply of 02 Nos. low pressure Atmospheric vaporisers (divided in 2 banks) to meet required duty cycle tosupply Natural gas with instruments and isolation valves for auto switchover after 8 hours for continuous operations **Flow upto – 1200 SCMH each**
5	Inlet / outlet valve skids for the above vaporisers including - - automatic switchover based on time and outlet temperature - Temperature transmitters at outlet of each vaporiser - interconnecting piping and supports - valves and instruments all mounted on skid complete with cabling , pneumatic tubing and junction boxes
6	1 No of **<u>PNGRB compliant</u>** Pressure reduction system for delivery of PNG up to **2000 SCMH flow andpressure of 4 bar(g)** - 2 x 100% regulation stream with Active monitor combination with isolation valves and pressure gauges - slam shut off valve with isolation valve & pressure gauge - Creep relief valve - All mounted on skid with cabling and junction box
7	Flow metering skid with RPD type flow meter - With pressure and temperature compensation - flow totalizer and indicator - with bypass valve and interconnecting piping duly mounted on skid with required valves andinstruments

8	All Interconnecting piping between skids and Equipment till PRS skid outlet within dyke wall including piping supports for PNG supply stream. Downstream piping from PRS skid up to plot boundary.
9	LNG Medium pressure pump/s (**Quantity - 3 Nos (2+1) and Flow rate – 100 LPM each (3750 SCMH each with 33 - 38 bar**) - with electrical control panel in control room - Temperature sensors for pre cooling and dry run protection - LP and HP side safety valves - Medium pressure gauge and switch - other instruments and interconnecting piping mounted on skid
10	Design and supply of 03 (2+1) Nos of atmospheric Medium pressure vaporizers to meet required duty cycle tosupply PNG at 33 – 38 bar with instruments and isolation valves for auto switchover after 8 hrs. for continuous operation. **3750 SCMH flow each**
11	1 No of **PNGRB compliant** Pressure reduction system for delivery of PNG up to **10000 SCMH flow andpressure of 33 -38 bar(g)** - 2 x 100% regulation stream with Active monitor combination with isolation valves and pressure gauges - slam shut off valve with isolation valve & pressure gauge - Creep relief valve All mounted on skid with cabling and junction box
12	Flow metering skid with Turbine type flow meter - With pressure and temperature compensation - flow totalizer and indicator with bypass valve and interconnecting piping duly mounted on skid with required valves and instruments
13	All Interconnecting piping between skids and Equipment till PRS skid outlet within dyke wall including piping supports for MP PNG supply stream. Downstream piping from PRS skid up to plot boundary.
14	LNG High pressure pump/s (**Quantity - 3 Nos (2+1) and Flow rate – 30 LPM each (1200 SCMH each with 250 bar**) - with electrical control panel in control room - Temperature sensors for pre cooling and dry run protection - LP and HP side safety valves - High pressure gauge and switch - other instruments and interconnecting piping - mounted on skid
15	Design and supply of 03 Nos (2+1) of atmospheric High pressure vaporizers to meet required duty cycle tosupply CNG with instruments and isolation valves for manual switchover after 8 hrs. for continuous operation ifrequired - **1200 SCMH flow each**
16	PLC controlled Odorizer (for all streams) - with controlling valves - Odorant storage tank with level indicator - Air operated dosing pump - flow sensor - interconnecting piping duly mounted on skid - May be a common system or separate for each stream. (LP, MP & HP)

17	- Sequencing/Priority Panel for sequencing of CNG flow (**Quantity – 1 Nos, 10 Lines**)
18	All Interconnecting piping between Tank to Pump, Pump to HP vaporizer and HP vaporizer to PESO safe area boundary including piping supports.; Interconnecting piping from PESO area limit to priority panel/CNG cascade fill point;
19	Cascade fill point/s **(Quantity – 3 Nos)** - with Manual Valves and instruments - including 1no of Mass flowmeter per point and 1 no of earthing reel per point. - with Parker or equivalent make QC coupling
20	**LNG Dispensing Pump (1 working + 1 Standby)** -150 LPM LNG dispensing pump with the following accessories: a. Related valves and instruments including pressure and temperature sensors b. Variable frequency drive (VFD) c. Ex proof push button station for local operation d. Interlocks for precooling and dry run, safety / vent valves, strainer, Pressure gauge, Soft Starter, Control panel, Gas Detector, Low and High Temperature Sensor, Ex Proof Emergency Push Button etc. e. All associated piping & fittings
21	**LNG Dispenser** 1 no. LNG dispenser with the following accessories: a. Related valves and instruments b. Mass flow meter c. Fill & gas return hoses d. All associated piping & fittings and safety interlocks e. LNG Dispenser shall have one cool down line, Screen with driver instruction, Dead-man pushbutton with a programmable interval, ESD pushbutton, Driver choice of cold or saturated LNG, Earthing connection, Compatible with all truck brands. f. 1 no. Saturation on the fly Vaporizer
22	Total safety system inclusive of Special gas detection devices, low and high temperature sensors, ESS etc.as per PESO guidelines in PESO storage area.
23	Programmable logic controller (PLC) including SCADA with control panel - including software initial programming. - UPS for PLC power backup of 30 minutes Licensed Personal computer for SCADA system
24	- Supply of all Electrical Cables from PLC to field instruments/Valves - Supply of cable trays, Electrical hardware , supports etc. Supply of cable glands and other Electrical hardware
25	Supply of Air compressor (1 No) with Built in reservoir; Air distribution piping to all required componentsin PESO area and dispenser area.
26	Pump for removal of water from dyke with control mechanism
27	Fire extinguishers, sand buckets, warning signs. As required per PESO norms
28	Supply of Earthing lugs on each equipment, Spring loaded earthing reel 10mtr wire (1 No per unloadingpump)

29	Supply of Supporting systems such as Fire water system consisting of 1 set of water tank/pump/hose asper PESO guidelines;
30	Obtaining all statutory approvals including PESO approval for the site and equipment's.

31	- Supply of all required Foundation bolts for tank and vaporizers; Supply of expansion bolts for skid andsupports.
32	- Hazop Study, Emergency plan and safety report per MSIHC if required
33	Installation of cables and cable trays between PLC panel and station components inside PESO storage areaincluding all instrumentation
34	Installation and commissioning of system including piping, welding, cabling and pressure testing at siteup to our Battery limit
35	Supply of Liquid Nitrogen for tank cooling during commissioning
36	Spares for commissioning
37	Detailed engineering and civil drawing, layouts to be provided by the bidder to MNGL for carrying out the construction as per the requirement. Bidder will have full responsibility of the supervision and project management for civil work.
38	Supervision for unloading of tanks and Supervision of erection and commissioning of entire station.
39	Transport of Equipments to site and transit Insurance, Unloading and Erection, Provision for cranes for unloading, erection and installation for all LNG Station Equipment.
40	Yard Lighting (including Light poles located just outside the SMPV area);its cabling and control panel
41	All Local approvals/ NOC for LNG facility
42	Supply of Utilities such as Electrical power, water, Air etc. and N2 gas for testing during commissioning.
43	Spare parts for normal operation
44	Any other items not mentioned above

DATA SHEETS

DATA SHEET FOR LNG UNLOADING PUMP

Manufacturer Name	
Medium	LNG
Installation	The pump must be suitable for installation with thermosiphon type tank Submerged in a vacuum insulated sump (in case of submerged pump only)
Capacity	350 LPM
Suction pressure (Normal/Max)	Static head of LNG tanker
Differential Pressure	08-10 Bar
Suction Nozzle Size	*
Discharge Nozzle Size	*
Design Temperature	*
Pump Material of Construction	AISI 304/ Equivalent Casting Grade
Pump Type	Vertical submersible/ centrifugal
Motor RPM	*
Voltage	415V 50Hz 3 Phase
Scope of supply	The pump skid shall be supplied complete with motor, base frame, other accessories, interlocks for precooling and dry run, safety /vent valves , strainer , Pressure gauge, VFD etc
CONTROL PANEL	1. All safeties, trips , overloads and control required for safe operation 2. NEMA 4 enclosure 3. Stop and start buttons 4. Protection against single phase 5. Gauges/Instruments for Volt Meter with Selector Switch, Amp. Meter with Selector Switch, Hr. run meter

* Vendor to indicate

DATA SHEET FOR CRYOGENIC LIQUID STORAGE TANK

Equipment Manufacturer		
Equipment	**Inner Vessel**	**Outer Vessel**
Stored fluid	LNG	Vacuum
Installation	Vertical	
Quantity	2 Nos. for each station	
Actual Water Capacity (Gross)	56000 Liters for 56 KL & 114000 for 114 KL (± 2%)	
Actual Water Capacity (Net)	49400 Liters & 108300 (+ 2%)	
Empty Weight	*	
Diameter	*	*
Total Height	*	*
Material of construction	AISI 304	SA 516 Gr. 70
Piping Material	SA 312 TP 304	
Valve Material	AISI 304 body and trim	
Design temperature in deg.C	- 196 ºC to +49ºC	- 20 ºC to + 65 ºC
Design, fabrication, inspection and testing	EN13458-2.	EN13458-2
MAWP	11 bar approx	Vacuum
Insulation (Interspaced) sensitize	PERLITE Under Vacuum	
Surface Treatment (Outer Vessel)	Shot Blast – SA 2 ½ Precoat – Inorganic Zinc Silicate – DFT 70-90 µm InterMediate Coat – Epoxy – DFT 70-90 µm Finish Coat – Polyurethane – DFT 50-60 µm Total Thickness of Paint – 240 µm	

DATA SHEET FOR LOW PRESSURE ATMOSPHERIC VAPORIZER FOR LNG

1)	**GENERAL:**		
	Manufacturer Name	:	
	Type	:	Ambient Air Heated
	Configuration	:	Vertical
	Service	:	Product Vaporizer
	Fluid	:	LNG
	Design Temperature	:	(-) 196°C to + 65°C
	Outlet Temperature	:	*
2)	**DATA**		
	Capacity of each vaporizer	:	600 SCMH or 1200 SCMH as specified
	Qty	:	2
	Manufacturing Code	:	ASME Sec VIII Div I
	Duty Cycle	:	Continuous with change over at every 8 hours
	Maximum Operating Pressure	:	*
	Design Pressure	:	*
	Hydraulic Test Pressure	:	*
	Inlet	:	½" – SS NPT Female Socket
	Outlet	:	½" – SS NPT Female Socket
3)	**DESIGN:**		
	Fin cross section	:	*
	Area Required (calculation to be submitted)	:	*
	Area Provided	:	*
4)	**Material of Construction**		
	Fins	:	Aluminum A 6063 T5
	Pipe, Bends & Headers	:	ASTM A 312 TP 304 Expanded type
	Flanges	:	SS 304
	Structural & Frame	:	SS 304
	Bolts / Supports	:	SS 304
	Nuts	:	SS 304

* Vendor to indicate

DATA SHEET FOR LNG HIGH PRESSURE PUMP

Manufacturer Name	
Medium	LNG
Installation	The pump must be suitable for installation with thermosiphon type tank
Capacity	30 LPM
Quantity	2 Nos. (1 working + 1 stand-by)
Suction pressure (Normal/Max)	2 - 10 Bar
Delivery Pressure	220 Bar Minimum
Suction Nozzle Size	*
Discharge Nozzle Size	*
Design Temperature	*
Pump Material of Construction	AISI 304/ Equivalent Casting Grade
Pump Type	Positive Displacement
Motor RPM	*
Voltage	415V 50Hz 3 Phase
Scope of supply	The pump shall be supplied complete with skid, motor, motor slide rails, control panel, vee belts with guard, interlocks for precooling and dry run, safety /vent valves, strainer , HP gauge etc.
Control Panel	1. All safeties, trips , overloads and control required for safe operation 2. NEMA 4 enclosure 3. Stop and start buttons 4. Protection against single phase 5. Gauges/ Instruments for Volt Meter with Selector Switch, Amp. Meter with Selector Switch, Hr. run meter

* Vendor to indicate

DATA SHEET FOR HIGH PRESSURE ATMOSPHERIC VAPORIZER FOR LNG

1)	**GENERAL:**		
	Manufacturer Name	:	
	Type	:	Ambient Air Heated
	Configuration	:	Vertical
	Service	:	Product Vaporizer
	Fluid	:	LNG
	Design Temperature	:	(-) 196°C to + 65°C
	Outlet Temperature	:	*
2)	**DATA**		
	Capacity of each vaporizer	:	1200 SCMH
	Qty	:	2 Nos
	Manufacturing Code	:	ASME Sec VIII Div I
	Duty Cycle	:	Continuous with change over at every 8 hours
	Maximum Operating Pressure	:	*
	Design Pressure	:	*
	Hydraulic Test Pressure	:	*
	Inlet	:	½" – SS NPT Female Socket
	Outlet	:	½" – SS NPT Female Socket
3)	**DESIGN:**		
	Fin cross section	:	*
	Area Required (Calculation to be provided)	:	*
	Area Provided	:	*
4)	**MATERAL OF CONSTRUCTION:**		
	Fins	:	Aluminum A 6063 T5
	Pipe, Bends & Headers	:	ASTM A 312 TP 304 Expanded type
	Flanges	:	SS 304
	Structural & Frame	:	SS 304
	Bolts / Supports	:	SS 304
	Nuts, bolts	:	SS 304 Nyloc Anti Vibration Nuts

* Vendor to indicate

DATA SHEET FOR LNG DISPENSING PUMP

Manufacturer Name	
Medium	LNG
Installation	The pump must be suitable for installation with thermosiphon type tank.
Capacity	150 - 200 LPM
Suction pressure (Normal/Max)	Static head of LNG Storage Tank
Differential Pressure	8-10 Bar (g)/ or as required/ or as per vendor's recommendation: considering filling of cold LNG and/or saturated LNG
Suction Nozzle Size	*
Discharge Nozzle Size	*
Design Temperature	*
Pump Material of Construction	AISI 304/ Equivalent Casting Grade
Pump Type	Centrifugal Pump
Motor RPM	*
Voltage	415V 50Hz 3 Phase
Scope of supply	The pump skid shall be supplied complete with motor, base frame, other accessories, interlocks for precooling and dry run, safety /vent valves , strainer , Pressure gauge, VFD etc
CONTROL PANEL	1. All safeties, trips , overloads and control required for safe operation 2. NEMA 4 enclosure 3. Stop and start buttons 4. Protection against single phase 5. Gauges/Instruments for Volt Meter with Selector Switch, Amp. Meter with Selector Switch, Hr. run meter

* Vendor to indicate

DATA SHEET FOR LNG MEDIUM PRESSURE PUMP

Manufacturer Name	
Medium	LNG
Installation	The pump must be suitable for installation with thermosiphon type tank
Capacity	100 LPM
Quantity	2 Nos. (1 working + 1 stand-by)
Suction pressure (Normal/Max)	2 - 10 Bar
Delivery Pressure	33 Bar Minimum
Suction Nozzle Size	*
Discharge Nozzle Size	*
Design Temperature	*
Pump Material of Construction	AISI 304/ Equivalent Casting Grade
Pump Type	Positive Displacement/Centrifugal
Motor RPM	*
Voltage	415V 50Hz 3 Phase
Scope of supply	The pump shall be supplied complete with skid, motor, motor slide rails, control panel, vee belts with guard, interlocks for precooling and dry run, safety /vent valves, strainer , MP gauge etc.
Control Panel	1. All safeties, trips , overloads and control required for safe operation 2. NEMA 4 enclosure 3. Stop and start buttons 4. Protection against single phase 5. Gauges/ Instruments for Volt Meter with Selector Switch, Amp. Meter with Selector Switch, Hr. run meter

* Vendor to indicate

DATA SHEET FOR MEDIUM PRESSURE ATMOSPHERIC VAPORIZER FOR LNG

1)	**GENERAL:**		
	Manufacturer Name	:	
	Type	:	Ambient Air Heated
	Configuration	:	Vertical
	Service	:	Product Vaporizer
	Fluid	:	LNG
	Design Temperature	:	(-) 196°C to + 65°C
	Outlet Temperature	:	*
2)	**DATA**		
	Capacity of each vaporizer	:	3750 SCMH
	Qty	:	2 Nos
	Manufacturing Code	:	ASME Sec VIII Div I
	Duty Cycle	:	Continuous with change over at every 8 hours
	Maximum Operating Pressure	:	*
	Design Pressure	:	*
	Hydraulic Test Pressure	:	*
	Inlet	:	½" – SS NPT Female Socket
	Outlet	:	½" – SS NPT Female Socket
3)	**DESIGN:**		
	Fin cross section	:	*
	Area Required (Calculation to be provided)	:	*
	Area Provided	:	*
4)	**MATERAL OF CONSTRUCTION:**		
	Fins	:	Aluminum A 6063 T5
	Pipe, Bends & Headers	:	ASTM A 312 TP 304 Expanded type
	Flanges	:	SS 304
	Structural & Frame	:	SS 304
	Bolts / Supports	:	SS 304
	Nuts, bolts	:	SS 304 Nyloc Anti Vibration Nuts

* Vendor to indicate

TECHNICAL DATASHEET OF LNG DISPENSER				
S. No.	**Description**	**UOM**	**Technical Particulars**	**Remarks**
A	**General Data**			
1	Equipment Manufacturer		*	
2	Tag Number		Z-0401	
3	Quantity	Nos.	One (1 No)	
B	**Design & Constructional Features**			
1	Medium		Cold or Saturated LNG	
2	Installation		Outdoor (Under Shed)	
3	Type		Island Mounted, Double Hose	
4	Model		*	
5	Normal Filling Pressure	Bar(g)	08-10	
6	Operating Temperature	Deg C	(-) 162 to (-)125	
7	Rated Flow	LPM	150	
8	Design Temperature (LNG Wetted parts)	Deg C	(-) 196 to (+) 50	
9	Auto Valve Operation		Through Dry Air / Nitrogen @5 Barg	
10	MAWP	Bar(g)	24	
11	Overall Dimensions		*	
12	Gross Weight		*	
13	Electrical Supply		240 V, 50 Hz, 1 phase, AC (UPS Supply)	
14	Piping		SS 304 designed to ASME B31.3 standard	
15	Valves		SS 304 / Brass / Bronze	
16	Display		LCD (Weight, Unit Price ant Total Price)	
17	Measuring Unit of Flow	kg	kg	
18	Minimum Fuelling	kg	*	
19	Fuelling Selection		By push button on front panel	
20	Emergency Stop Button		Yes	
21	Communication/ Data Extraction		Via Modbus	
a)	No of hoses		2 NOS (1 for LNG fill & 1 FOR GAS RETURN)	
b)	Filling Hose		DN 25 with break away coupling	
c)	Gas return hose		DN 15 with break away coupling	
d)	Maximum Working Pressure	Barg	24	
e)	Test Pressure	Barg	36	
f)	Design Temperature	Deg C	(-) 196 to (+) 55	
g)	Material Braiding and Hose		SS 304	
h)	Braiding Type		Double	

23	LNG Fill Nozzle		Yes	
a)	Size	DN	25	
b)	Min. Length	ft	15	
c)	Type		Quick connect Dry Coupling	
d)	Make		*	
e)	Static Design Pressure	Barg	24	
d)	Design Temperature	Deg C	(-) 196 to 55	
e)	Max. Flow Rate	GPM	50	
h)	Material of Wetted Parts		Stainless Steel & Brass	
24	Gas Vent Nozzle		Yes	
a)	Size	DN	15	
b)	Min. Length	ft	15	
c)	Type		Quick connect Dry Coupling	
d)	Make		*	
e)	Static Design Pressure	Barg	24	
f)	Design Temperature	Deg C	(-) 196 to 55	
g)	Max. Flow Rate	GPM	50	
h)	Material of Wetted Parts		Stainless Steel & Brass	
i)	Spring Guard		Spring guards must be provided at both ends for the hose assembly.	
25	Mass Flow Meter		Yes	
a)	Quantity	Nos.	One	
b)	Metering principle		Coriolis (Weight & Measures approved)	
c)	Make		*	
d)	Model		*	
e)	Mass Flow accuracy for gas meter (inclusive of Linearity, Hysteresis, repeatability error)		± 0.5%	
f)	MOC		SS316	
26	Accessories		Each Dispenser is having one cool down line, Screen with driver instruction, Dead-man pushbutton with a programmable interval, ESD pushbutton, Driver choice of cold or saturated LNG, Earthing connection, Compatible with all truck brand	
27	a) Dimension b) Weight			
	NOTES: 1. For all Electrical/Instrumentation items vendor shall provide certificates issued by statutory Inspection Authority confirming suitability of Design/Construction for specified Hazardous Area Classification. 2. (*) marked information to be provided by Vendor 3. Vendor to furnish the purge requirement.			

PRESSURE GAUGES

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- C **Level/Length**-mm					
1	Type	Direct		Wetted parts material	---
2	Mounting	Local		Element	---
3	Dial size	150 mm		Lower body	---
	Color	White (Nonrusting plastic with black engraving)		Non wetted parts	---
4	Case material	SS 304		Process connection	---
5	Bezel ring	Screwed		Size	---
6	Window material	Shatter proof glass		Rating	---
7	Enclosure	IP 55 / NEMA 4		Facing &Finish	---
8	Pressure element	Bourdon tube		Capillary material	---
9	Element material	SS 316		Capillary length	---
10	Socket material	SS 316		Flushing & Filling	---
11	Accuracy	1% FSD	16	Over range protection	130% of range
12	Zero adjustment	Micrometer pointer (Internal)	17	Blow out protection	Required
			18	Options	
13	Connections	½" NPT (M)		a)	Snubber
	Conn. Location	Bottom		b)	Syphon
14	Movement	SS 304		c)	Gauge saver
15	Diaphragm seal	---		d)	Liquid filled casing
	Type	---		e)	2 valve, 3-Way Manifold
				f)	Dampener
			19	**Make & Model**	*

Tag No.	Range	Pressure		Design Temp.	Fluid	Location	Options#
		Operating	Design				
PG -**	*	**	**	**	**	**	e

NOTES:

1) '*' Information to be supplied by the Vendor / Contractor.
2) '**' As per P& ID
3) Make of the PG shall be from approved vendor list of MNGL
4) Quantities shall be as per P&ID.
5) #Other options (if required) shall be provided by vendor to meet the site requirement.

TEMPERATURE GAUGE

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- C **Level/Length**-mm					
GENERAL			FILLED SYSTEM		
1	Type	FILLED SYSTEM / Bimettalic	15	SAMA Class	V B
2	Well	REQUIRED		Compensation	CASE
3	Mounting	LOCAL	16	Bulb type	ADJUSTABLE UNION
4	Dial size	150 mm		Bulb material	316SS
5	Colour	WHITE (Non rusting plastic with black figs.)	17	Bulb union threaded to	½" NPT(M)
6	Case material	DIE CAST ALUMINIUM (EPOXY PAINTED) / SS	18	Extension type	RIGID
7	Window material	SHATTER PROOF GLASS	19	Bulb dia	8 mm (Min)
8	Conn. Location	BOTTOM	20	Capillary material	
9	Accuracy	1% FSD		Armour Flexible	
10	Enclosure	WEATHER PROOF TO IS2147		Armour material	
	Enclosure class	IP 55 / NEMA 4		Capillary length	
11	Zero adj. Screw	MICROMETER POINTER (Internal)	21	Overrange protection	130% OF RANGE
BIMETAL			THERMOWELL		
12	Stem:		22	Material	SS 316
	Type		23	Construction	DRILLED BAR STOCK
	Material		24	Process connection	1 ½" FLANGED
	Size		25	Gauge connection	½" NPT (F)
13	Stem diameter		26	Thermowell as per drg	Drg enclosed
14			27	Options a)	LIQUID FILLED
			28	**Make & Model**	*

Tag No.	Range	Temperature (C)		Well Dimensions		Flange		Location	Remarks
		Operating	Design	U	T	Material	Rating/Face/ Finish		
TG – ***	*	***	***	*	*	SS 316	***	***	

Note:

1. '*' Information to be supplied by the Vendor / Contractor.
2. Vender shall furnish Make & Model No. with product catalogues.
3. Make of the TG shall be from approved vendor list of MNGL.
4. Qty. shall be as per P&ID.
5. ' *** 'shall be as per P & ID

RESISTANCE TEMPERATURE DETECTOR

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- °C **Level/Length**-mm

GENERAL			13	Cable entry	½" NPT (F)
1	Assembly as per drg.	Drg. enclosed	14	No. of entries	Single
			15	Enclosure type	Dual Chamber Weather proof to IP55 & Ex-proof (CCOE)
2	Type	RTD Class A	THERMOWELL		
ELEMENT					
3	No. of elements	Simplex	16	Material	SS 316
4	Calibration	As per DIN 43760	17	Construction	Drilled bar stock
5	Element material	Platinum (Pt 100)	18	Process connection	1 ½" Flanged
6	Resistance at 0°C	100 ohms	19	Inst. connection	½" NPT (F)
7	Leads	Standard	20	Thermowell as per drg	Drg. Enclosed
8	Sheath				
	O.D.	8 mm		TRANSMITTER	
	Material	SS 316	21	Quantity	
9	Nipple & Union Material	SS 316	22	Input	
10	No. Of wires	4 Wire	23	Output	
HEAD			24	Power Supply	
11	Head Cover type	Screwed cap & SS chain	25	Mounting	
12	Material	Cast Aluminum	26	Enclosure class	
			27	**Make & Model No.**	*

Tag No.	Range	Temperature		Well Dimensions		Flange		Fluid	Qty
		Nor	Design	U	T	Material	Rating/Face / Finish		
TE -**	**	**	**	*	*	SS316	**	**	**

NOTES:

1) '*' Information to be supplied by the Vendor / Contractor.
2) '**' As per P& ID
3) Make of the RTD shall be from approved vendor list of MNGL
4) Qty. shall be as per P&ID.

TEMPERATURE GAUGE (SKIN TYPE)

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- C **Level/Length**-mm					
GENERAL			FILLED SYSTEM		
1	Type	FILLED SYSTEM	15	SAMA Class	V B
2	Well	REQUIRED		Compensation	CASE
3	Mounting	LOCAL	16	Bulb type	ADJUSTABLE UNION
4	Dial size	150 mm		Bulb material	316SS
5	Colour	WHITE (Non rusting plastic with black figs.)	17	Bulb union threaded to	½" NPT(M)
6	Case material	DIE CAST ALUMINIUM (EPOXY PAINTED)	18	Extension type	RIGID
7	Window material	SHATTER PROOF GLASS	19	Bulb dia	8 mm (Min)
8	Conn. Location	BOTTOM	20	Capillary material	
9	Accuracy	1% FSD		Armour Flexible	
10	Enclosure	WEATHER PROOF TO IS2147		Armour material	
	Enclosure class	IP 55 / NEMA 4		Capillary length	
11	Zero adj. Screw	MICROMETER POINTER (Internal)	21	Overrange protection	130% OF RANGE
BIMETAL			THERMOWELL		
12	Stem:		22	Material	-
	Type		23	Construction	-
	Material		24	Process connection	-
	Size		25	Gauge connection	-
13	Stem diameter		26	Thermowell as per drg	-
14			27	Options a)	LIQUID FILLED
			28	**Make & Model**	*

Tag No.	Range	Temperature (C)		Well Dimensions		Flange		Location	Remarks
		Operating	Design	U	T	Material	Rating/Face/ Finish		
TG – ***	*	***	***	-	-	-	-	***	

Note:

1. '*' Information to be supplied by the Vendor / Contractor.
2. Vender shall furnish Make & Model No. with product catalogues along with the offer.
3. Make of the TG shall be from approved vendor list of MNGL
4. Mounting Pad to be provided with TG.
5. ' *** 'shall be as per P & ID

RESISTANCE TEMPERATURE DETECTOR (SKIN TYPE)

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- C **Level/Length**-mm

GENERAL			13	Cable entry	½" NPT (F)
1	Assembly as per drg.	Drg. enclosed	14	No. of entries	Single
			15	Enclosure type	Weather proof to IP55, Ex-proof (CCOE)
ELEMENT			THERMOWELL		
3	No. of elements	Simplex	16	Material	--
4	Calibration	As per DIN 43760	17	Construction	--
5	Element material	Platinum (Pt 100)	18	Process connection	--
6	Resistance at 0 C	100 ohms	19	Inst. connection	--
7	Leads	Standard	20	Thermowell as per drg	--
8	Sheath				
	O.D.	6 mm		TRANSMITTER	
	Material	SS 316	21	Quantity	-
9	Nipple & Union Material	SS 316	22	Input	-
10	No. Of wires	4 Wire	23	Output	--
HEAD			24	Power Supply	--
11	Head Cover type	Screwed cap & SS chain	25	Mounting	--
12	Material	Cast Aluminium	26	Enclosure class	--
			27	**Make & Model No.**	*

Tag No.	Range	Temperature		Well Dimensions		Flange		Service	REMARKS
		Nor	Design	U	T	Material	Rating/Face/ Finish		
TE-**	*	**	**	--	--	--	--	**	

NOTES:

1) '*' Information to be supplied by the Vendor / Contractor
2) '**' as per P& ID
3) Make of the RTD shall be from approved vendor list of MNGL
4) RTD offered shall be of highest accuracy – TYPE – A
5) Mounting Pad alongwith accessories to be provided with RTD.
6) Qty. shall be as per P&ID.

TEMPERATURE TRANSMITTERS

Units:- Flow :Liquid-m3/hr, Gas-MMSCMD, Steam- kg/hr, Pressure-Kg/cm ² (G),Temperature- °C,Level/Length-mm

1	FUNCTION	TRANSMIT ■ INDICATE ■ BLIND □	11	POWER SUPPLY 24 V DC	
2	TYPE	ELECTRONIC (SMART)	12	CONDUIT CONN. 1/2" NP TF	
3	CASE	MFR STD.	13	LINEARISATION UPSCALE ■ DOWNSCALE □	
4	MOUNTING	DIRECT ON RTD/TC □ YOKE ■ OTHER	14	ACCURACY	+ / - 0.1% FSD
5	ENCLOSURE	Dual Chamber ■ EX. PROOF ■ W. PROOF CLASS: IP - 65 INTRINISICALLY SAFE ■	15	RFI / EMI PROTECTION	REQD. ■
			16	LOAD	600 OHMS
				DRIVING CAPABILITY	24 V DC
6	AREA CLASSIFICATION	NEC, CLASS-1, DIVL. -1, GROUP C&D, CCOE	17	MAKE	*
7	INPUT	FROM RTD	18	MODEL NO.	*
8	OUTPUT	4-20 mA	19 a)	OPTIONS Output Meter	WP & INTR SAFE
9	COLD JUNCTION COMPENSATION		b)	Mounting Accessories	for 2" Pipe
10	BURN OUT PROTECTION		c)	SS Tag Plate	

TAG NO.	Temperature	RANGE		Temp.	SERVICE	OPTION#
	Nor.	SPAN	SET	Design		
TT-**	**	*	*	**	RTD (4 wire)	a, b, c

NOTES:

1 '**' As per P & ID & Qty. shall be as per P&ID.
2 '*' INFORMATION TO BE SUPPLIED BY VENDOR/ CONTRACTOR.
3 THE DIGITAL OUTPUT METER SHOULD INDICATE THE TEMPERATURE IN DEG. C.
4 ENVIRONMENTAL COVER TO BE PROVIDED FOR EACH TRANSMITTER (DRAWING ENCLOSED ELSEWHERE IN BID DOC.) & WITH LOCKING ARRANGEMENT FOR METERING TRANSMITTERS.
5 DUAL CHAMBER ENCLOSURE SHALL BE PROVIDED
6 MAKE OF TT SHALL BE AS PER VENDOR LIST.
7 #Other options (if required) shall be provided by vendor to meet the site requirement.

PRESSURE TRANSMITTERS

Units:- **Flow** : Liquid-T/hr **Gas**-MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2 (G) **Temperature**- C **Level/Length**-mm					
GENERAL			MEASURING UNIT		
1	Function	Transmit & Indicate	24	Service	Pressure
2	Type	Electronic Smart P Based	25	Element	Diaphragm
3	Case	Mfg. Std.	26	Body Material	Carbon Steel
4	Mounting	Yoke	27	Element Material	316 SS
5	Enclosure	Weather proof to IS2147 Explosion proof to IS2148, CCOE	28	Process Connections	½" NPT(F)
	Enclosure class	NEMA 4 & NEMA 7		Process Conn. Locn.	
6	Elec. Area Class.	Zone-I, Gr.IIA & IIB, T3	29	Diaphragm Seal:-	
7	Intrinsically safe	Required		Type	
8	Air supply			Wetted Parts Matl.	
9	Power supply	24 VDC		Other Material	
10	Cable entry	½" NPT(F)		Process Conn.: -	
11	Accuracy	± 0.075% of SPAN		Size and Rating	
12	Repeatability	± 0.05%		Facing and Finish	
TRANSMITTER				Capillary Material:-	
13	Output	4 – 20 mA DC, Two wire		Armour Flexible	
14	Trans. Power supply	24 V DC		Armour Flexible Matl.	
CONTROLLER				Capillary length, mm	
15	Output			Flush / Filling Conn. with plug	
16	A/M switch		MISCALLANEOUS		
	No. of positions		30	Over Range Protection	130% of Range
17	Set Point Adj.		31	**Options**	
18	Manual Regulator		a)	Output Meter	W.P. Intr Safe(note 2)
19	Mode		b)	Mounting Accessories	For 2" pipe mounting
RECORDER			c)	3 -Way Manifold	Required
20	Chart		d)	Zero elevn. & suppression	Required
21	Chart Drive				
22	Moving Parts Matl.		32	**Make & Model**	*
23	Chart speed				

Tag No.	Operating Pressure	Design Press.	Design Temp.	Range			Location	Options#
				Span	Set			
PT- ***	**	**	**	*	*		**	a,b,c,d

NOTES:

1) '*' Information to be supplied by the Vendor / Contractor.
2) Over range protection shall be 130% of maximum static pressure.
3) Local Digital Output meter should indicate the line pressure in Kg/cm2g.
4) Environmental cover to be provided for each transmitter
5) Transmitter shall have zero elevation /suppression for the service specified.
6) Make of the PT shall be from approved vendor list of MNGL.
7) '**' As per P&ID.
8) ' *** ' Tag nos. and quantities shall be as per P & ID.
9) #Other options (if required) shall be provided by vendor to meet the site requirement.

DIFFERENTIAL PRESSURE TRANSMITTERS WITH LOCAL DISPLAY

Units:- **Flow** : Liquid-m^3/hr **Gas**- MMSCMD **Steam**- kg/hr **Pressure**- Kg/cm^2(G) **Temperature**- C **Level/Length**-mm

GENERAL			MEASURING UNIT		
1	Function	**Transmit & Indicate with Local Display**	24	Service	Diff. Pressure
2	Type	Electronic Smart P Based	25	Element	Diaphragm
3	Case	Mfg. Std.	26	Body Material	Carbon Steel
4	Mounting	Yoke	27	Element Material	SS 316L
5	Enclosure	Weather proof to IS2147 Explosion proof to IS2148, CCOE	28	Process Connections	½" NPT(F)
	Enclosure class	NEMA 4 & NEMA 7		Process Conn. Locn.	Bottom
6	Elec. Area Class.	Zone-I, Gr.IIA & IIB, T3	29	Diaphragm Seal:-	Not Required
7	Intrinsically safe & Flameproof	Required		Type	---
8	Air supply	N.A		Wetted Parts Matl.	---
9	Power supply	24 VDC		Other Material	---
10	Cable entry	½" NPT(F)		Process Conn.:-	
11	Accuracy	± 0.075% of SPAN		Size and Rating	---
12	Self Diagnostics Facility	Required		Facing and Finish	---
TRANSMITTER				Capillary Material:-	
13	Output	4 – 20 mA DC, Two wire		Armour Flexible	---
14	Trans. Power supply	24 V DC		Armour Flexible Matl.	---
CONTROLLER				Capillary length, mm	---
15	Output			Flush / Filling Conn. with plug	---
16	A/M switch		MISCALLANEOUS		
	No. of positions		30	Over Range Protection	130% of Range
17	Set Point Adj.		31	**Options**	
18	Manual Regulator			a)	Intrinsically safe digital Output meter
19	Mode			b)	5-way manifold-SS316 Body & Trim
RECORDER				c)	Mounting accessories for 2" Pipe Mounting – Material (SS 316)
20	Chart			d)	Local display in Kg/cm2 g
21	Chart Drive			e)	SS Tag Plate
22	Moving Parts Matl.		32	Load Driving Capability	Not less than 600 ohms
23	Chart speed		33	**Make & Model**	*

Tag No.	Diff Range Kg/Cm^2g		Zero Elev. mm H_2O	Zero Supp. mm H_2O	Design Press.	Design Temp.	Control Action	Fluid	Options#
	Span	Set							
DPT-**	*	**	*	*	**	**		**	a, b, c, d, e

NOTES:

1) '*' – Information to be furnished by bidder.
2) '**' As per P& ID
3) Make of DPT shall be as per vendor list.
4) Qty. shall be as per P&ID.
5) Environmental cover to be provided for each transmitter.
6) #Other options (if required) shall be provided by vendor to meet the site requirement.

DATASHEET OF ROTARY POSITIVE DISPLACEMENT METER

1.0 Make: Vendor to Provide

2.0 Meter Type : Rotary Positive Displacement Meter

3.0 Standard : OIML Recommendation (OIML R137: Ch1) / EN 12480

4.0 Service : Ref. P&ID

5.0 Model: Vendor to Provide

6.0 Size & Rating : NOTE-5

7.0 Meter Head : IP65, 8 Digit

8.0 End Connection : Ref. P&ID & Flange confirming to ANSI 125/ASME B16.5 (Refer respective P & Id for details)

9.0 Flange to Flange Dimension : Vendor to Provide

10.0 Flow Range: Vendor to Provide

11.0 Typical Start Flow: Vendor to Provide

12.0 Pulsar : HF Pulses from RPD meter for Flow / Volume

13.0 Differential Pressure at Qmax : Vendor to Provide

14.0 Flow (at actual condition) : Ref. P&ID

15.0 Flow (at standard condition) : Vendor To Provide **(Note-1)**

16.0 Accuracy : +/- 2% from Qmin to 0.2Qmax and +/- 1% from 0.2Qmax to Qmax

17.0 Rangeability / Turndown Ratio : 1:100 (min.)

18.0 Maximum Index Reading (Local Counter) : 99999999

19.0 <u>Material Construction:</u>

19.1 Body & Cover : Cast Aluminum Alloy (Tamper proof & corrosion resistant)

19.2 Impellers : Extruded Aluminum Alloy

19.3 Impeller Shaft : High Grade Alloy Steel

19.4 Bearing : High Carbon Steel

19.5 Gears (Timing & Reduction) : Steel Alloy

19.6 Magnetic Coupling : Hard Ferrite Ceramic Magnet

19.7 O-rings / Gaskets: Synthetic Elastomer

19.8 Plastic Components : Not to be used in Meter

19.9 Meter Internals shall be tested for low noise, frictionless, endurance for minimum 20 years life & external tamper proof.

SERVICE CONDTION:

20.0 Fluid : Ref. P&ID

21.0 Design Pressure : Ref. P&ID

22.0 Working Temperature : Ref. P&ID

23.0 Area Classification: Intrinsically Safe, Class 1, Div.1, Group D

24.0 **Qty :** Ref. P&ID

25.0 Maximum Operating Pressure :Ref. P&ID

26.0 Normal Operating Pressure :Ref. P&ID

27.0 Reverse flow Restrict :Essential (If not in-built non return valve to be supplied)

28.0 Approved To :Measurement Canada, NMI, PTB as per OIML Specifications or equivalent

Note :

1. Flow capacity in SCMH is calculated considering Maximum Operating Pressure.
2. Bidder to provide 5 points Calibration Certificate and Accuracy at atmospheric pressure with air.
3. Make of the Meter shall be from Approved Vendor List of MNGL.
4. The selected meter shall be suitable for Custody Transfer.
5. Size & rating of meter shall be of pipeline size & rating where it is to be installed. In case, max. flowrate (at min. pressure) to bemeasured doesn't fall in the measuring range of pipeline size meter then higher size meter shall be provided.

DATASHEET OF LEL DETECTORS

POINT TYPE INFRA RED GAS DETECTORS :		
Sl No.	Features	Requirements
1	Sensor type	Infrared sensor technology based explosion-proof Gas sensor with transmitter
2	Principle of operation	Multi-beam, dual compensated, non-focusing infrared absorption. Temperature compensation shall be in-built.
3	Function	Shall be able to detect hydrocarbon gases in the range of 0-100% LEL
4	Gas Detection	Configurable library having Methane, propane, propylene, Ethane, Butane, Hexane, Pentane & Benzene/R-LNG, covering Hydrocarbons (from C1-C12)
5	Calibration	Factory calibration at Methane or Propane
6	Range	0 to 100% LEL.
7	Construction	Flameproof, 316SS body with dust/weather protection for outdoor installation. No external terminal box shall be provided for further cabling (flying leads are not acceptable).
8	Optical performance	Correct operation unto 75% obscuration, the same shall be configurable with facility for dirty optics warning. Provision (heated optics) for detectors to be made to avoid condensation.
9	Input Power	24V DC nominal (18-30V DC)
10	Output	4-20mA DC (3-wire) ((isolated/non-isolated) rated at 600 ohms loop resistance at 24V DC) +
		(Optional) HART (shall have intrinsically safe port
11	Overall accuracy	Better than +/- 3% of LEL
12	Repeatability	+/- 2% FSD
13	Zero drift	2 % FSD per year maximum.
14	Response time	90% of gas reading in less than 5 Seconds.
15	Warm-up Time	2 minutes from cold start-up.

16	Visual Status display	Integral Unit Required, LED indication for – Normal, Fault condition & Gas detected condition complete with 4 Digit LCD Display.
17	Self-Check	Continuous self-check for immediate detection of internal failures
18	RFI /EMI protection compliance	EN50270:1999 Type 2 (EMC- electrical apparatus for the detection of combustible gas) /Electromagnetic compatibility directive 89/336/EEC.
19	Operating temperature	-40deg C to + 60 deg C
20	Humidity	0 to 95% RH
21	Cable entry	3/4 " NPT (F)
22	Area classification	FM/ATEX certified for Explosion-proof (EExd) conforming to hazardous area classification to Class-I, Div-I, Gr. C & D (Zone-1, Gr. IIA/B). Temperature Class will be T5.
23	Approval	FM/ ATEX/ CSA/ CENELEC/ UL and PESO
24	Enclosure classification	IP66, NEMA 4 or better
26	Dimensions & Weight	To be provided by vendor.
27	Accessories required	Mounting kits, Canopy, Tag Plates, calibration kit,Rain & Dust protection cover, Splash guard, Ex proof & Weather proof double compression cable glands etc as required.
28	Configuration	Non-Intrusive configuration Required

Note: -

1. Two (high and high –high) common potential free outputs (suitable for 5A, 24 V DC rating & equivalent) for hook up with SCADA. Controller shall have two spare potential free outputs for future use.

2. Set of fully equipped calibration gas kit consisting of at least 2 (two) cylinders / bottles of calibration gas (of known mixture of air and gas), a pressure regulator with gauge, flexible tube / hose, adapter cap (to fit sensing head) shall be supplied to enable online calibration of Gas detectors.

NOTE: -

1. The Bidder shall indicate distance limitation if any between Sensor and Monitor.

2. RS – 485 port shall be provided in monitor / controller for RTU / SCADA.

FIELD MOUNTED FLOW COMPUTER

1	Type	Microprocessor based electronic Flow Computer suitable for mounting in the field location in Hazardous area.
2	Function	The Flow Computer for measuring, monitoring Gas flow from single meters Run with a Gas RPD meter. The FC measure actual gases volume, pressure and temperature and calculates compressibility factors of the gas and based on which calculates standard volume of gas. Computation of Gas Calorific values. The unit shall be complete in all respects to achieve this functionality.
3	Inputs	a) Pulse Input from RPD Flow Meter for flow to integral smart Multi Variable Sensor. All interconnecting cable shall be screened and armoured. The cable and cabling accessories to be supplied by the vendor. b) Temperature signal from RTD (Pt-100 – 3/4 wires) thermal element with an accuracy of + 0.15 % of measured value with thermowell. All interconnecting cable shall be screened and armoured. The cable and cabling accessories to be supplied by the vendor. c) Pressure signal from built-in Pressure Sensor with an accuracy of + 0.1 % of measured value and a Range of 0-30 Kg/cm2 g (*). Pressure sensors to be individually calibrated and characteristics stored within the flow computer. d) Other Standared inputs available.
4	Outputs port	a) RS 232 Serial Port for PC/LAPTOP connectivity b) RS 485 Serial Output port for RTU / SCADA c) RS 232 / 485 Serial Output port for GSM Modem
5	Output Measurement	a) Corrected flow rate: Sm3/hr. b) Corrected Totalised volume : Sm3 c) Pressure : Kg/cm²g d) Temperature : °C e) Alarm output for unit malfunctioning g) Other Standared outputs available
6	Isolation	All Inputs, Outputs and power supply shall be Individually Isolated.
7	Display	Alphanumeric large character LCD with selectable decimal, Displaying all units, messages, alarms etc shall be in English.

8	Units of display	User configurable parameters like a) Corrected flow rate: Sm3/hr. b) Corrected Totalised volume : Sm3 c) Pressure : Kg/cm²g d) Temperature : °C e) Energy (Kcal) f) Yesterday's Flow (SCMD) g) Non resettable total (SCM) h) Days Total (SCMD) i) Co2/N2/Sp.gravity etc. etc.
9	Power supply	24 V DC / 230 V AC
10	Configuration Setup	To be done in factory for all flow computer fully taking into account the process conditions, sensor & flowmeter's characteristics and calibrations for direct on site operations.
11	Calculations standards	a) Volume Flow calculations: AGA7 (Latest). b) Compressibility : AGA 8 (Latest)/ GPA Field selectable Detailed / Gross I / Gross II Methods. c) Relevant standards
12	Features	a) Built in diagnostics to detect proper functioning. b) Data security through password/key-lock facility and volume conversion and configuration to be sealed. c) Parameters and programmed constants shall be stored in EEPROM / non-volatile memory. d) Facility for entry and accessing live and stored data through external Laptop/ PC. e) Shall have to store at least 35 days data (on hourly basis) for flowing pressure, temperature and corrected flow with date and time stamping. f) Shall have to store at least last 35 days cumulative corrected flow on daily basis g) The stored data above shall be retrievable by using Laptops. Suitable dedicated port shall be available on the flow computer for Laptops connection. Software required shall be supplied. h) Shall have addressing facility for identification by its address, for multi-dropping on a single telecom channel i) The Time Function should be real time with accuracy +/- 0.01% for watchdog timer and Year / Month / Day and hour / Minute / Second format. j) Processor should be 32 bit CMOS Micro -processor and access should be password protected k) Flow calculation shall be internal selectable through software
13	Hazardous area	Certified intrinsically safe for area classification IEC Class 1 Division 2, Groups C & D, CCOE.

14	Site conditions	Temperature –20 – 65°C (Design), Hot, humid, tropical, saline environment. Vibration: Tested as per ISA s75-13-1989, Sec. 4.2 & 5.35, ECD susceptibility: Should meet IEC- 801-2, Level 3.
15	Enclosure	Weather Proof to IP 55 / NEMA 4 and Compatible for mounting in Hazardous area as mentioned above.
16	Mounting	Outdoor
17	Accuracy	: 0.5 % or better (Bidder shall categorically indicate the system accuracy i.e. overall accuracy considering RPD meter, PT, RTD etc.)
18	Accessories	a) 5 way Valve manifold –SS(½" NPTF) for process Connection. b) 2 " pipe mounting brackets for Flow Computer (FC)
19	Make	Barton / Daniel / Bristol Babcock (*)
20	Model No.	*
21	Quantity	As per P&ID Requirement.
22	Tag no.	FQI– xxxx (xxxx - As per respective P&Id)

* By Vendor (Vendor must furnish decoding details & catalogue with model no.)

GSM MODEM

a) Dual Band 900/1800 MHz(E 47)
b) Input Current
c) 20mA @ 12V Idle
d) 100 mA @12V Avg.Tx.
e) 560mA @ 12 V Peak Tx
f) Operating Temperature: -25 to 55 Deg C.
g) Input supply voltage: From Battery pack provided along with Flow Computer.
h) Serial RS232 serial communication cable.
i) Data Rates: 19200 bps.
j) Data SIM Card : Mini SIM plug in/ removal
k) Cellular data Service : Radip Link Protocol/ GPRS / Class BB (4+1)
l) Antenna: Unity gain blade Antenna affixed directly to the module.
m) LED indicator to give power and Network status.
n) **Suitable for mounting in the Hazardous area as indicated.**

#GSM Modem shall be compatible with client SCADA.

o) **Notes:**

1. Original licensed software for retrieving the stored data, programming the flow computer using portable PC (Laptop), software based on Windows 2000/ XP shall be supplied in theform of CD's for each skid as per MR.

2. All the Hardwares and softwares to be supplied shall comfirm the Engineering Units as mentioned in these specifications.

3. Flow computer documentation including product literature, software/hardware manual, operating manual, maintenance instructions, Certificates etc. shall be supplied as per vendordata requirement.

4. GSM Modem shall be provided in the flow computer for remote data configuration, remotedata uploading (previous 35 days data) and remote data monitoring.

5. Following features shall be available in Field mounted flow computer:-

i) Energy measurement in functions and display.

ii) Memory allocations shall be as given below:-

a) 512 K x 16 flash memory with non volatile copy of program code.

b) Programmable peripheral chip with EEPROM contains boot ladder code.

c) 256 K of SRAM with copy of program code and data/exact logs.

d) Flash memory preservation shall be achieved by 10 year data unpoweredretention.

e) SRAM memory preservation shall be battery backed by Lithium Cell when mainpower is lost.

6. Field Mounted Flow Computer shall store previous 35 days data on hourly basis andcumulative corrected flow on daily basis.

7. Conduit connection of ½" NPTF with plugs shall be provided for output connection from Flow Computer.

8. Bidder/Supplier shall configure and update records in Flow Computer as per technical requirement and data sheet before Final Inspection call. The process parameter and the required measuring units are already specified in Data sheets/ Tender documents and it shall be made available in Flow computer. All the specified function and features shall be demonstrated during the Final inspection.

9. The communication speed of RS232 (for SCADA) serial communication port for flow computer shall be configurable from 2400 to 19,200 bps.

10. The Modbus communication protocol and message structure details to be used on the RS232 serial communication port (for SCADA) for Field mounted Flow Computer shall besupplied after placement of order shall furnish all details like pin configuration and tag number wise MODBUS address mapping list etc. for smooth interfacing of all communication links with RTU (SCADA in future).

11. Bidder/ Supplier shall provide all necessary hardware, software etc. in vendor's supplied systems and other details required for interfacing of their Flow Computers with Purchaser'sRTU (SCADA). In addition to this, the communication software shall be supplied in CD for testing the communication link.

12. Bidder/ Supplier shall be fully responsible for proper integration of their supplied systems and also integration with purchaser's SCADA (RTU)

systems at site and vendor shall provide all necessary assistance to purchaser's for establishing all the serial links with SCADA RTU fully functional & Operational.

13. The Flow Computers Terminal shall have minimum 1 Nos. of RS-485/RS232C Communication Ports for SCADA as specified in Data sheet, one no. RS-485/232 communication port for GC (Gas Chromatograph) OR for Laptop PC. The communicationprotocol shall be MODBUS and shall support reading & writing as follows:

a) For reading function, CODE-3 or CODE-4 is required.
b) For writing function, GC data into the flow computer function code to be 6 (Single) and 16 (Multiple) are required.
c) As most of CLIENT RTU is 16 Bit registers, two registers are used for accommodating one 32-bit floating point no. Hence the flow computer (irrespective of size of the register) should be configured as 16-bit registers so that no-error is encountered in writing.

TERM SHEET - ANNEXURE I				
Sr. No	Description	Bidder	Gas Supplier	MNGL
1	Gas sourcing & Procurement - MSPA with Gas Suppliers	-	✓	✓
2	Coordination with Gas Supplier (Producers & Terminals)	-	✓	✓
3	On site Civil & structural Construction works for LNG storage & regasification facility	-	-	✓
4	Allocation of Land to set-up facility	-	-	✓
5	Gas Truck Loading Arrangement of logistics at LNG Terminal	-	✓	-
6	Supply of Utilities such as Electrical power & water Electrical power will be provided up to Electrical room Panel.)	-	-	✓
7	Electrical cabling work from MNGL electrical room panel to LNG equipment / dyke wall/ Electrical panel for LNG setup.	✓	-	-
8	Any furniture and accessories such as AC in Control Room, Supply of dedicated lease line for PLC system if required	✓	-	-
9	UPS for PLC power backup or any other purpose	✓	-	-
10	Yard Lighting / poles and cabling, Electrical panel for this lights/ equipments supplied by vendor or any other electrical work within dyke Wall	✓	-	-
11	Earth pits with Earthing system in it at required locations; Earthing connectors/cables between equipment to earthing pits and to the control panel	✓	-	-
12	Supply Basic design of storage & Regasification Facility	✓	-	-
13	Arrange Transit insurance for equipment.	✓	-	-
15	Supply skilled operators 2x 12hrs shift for Re-gas facility	✓	-	-
16	Appoint a dedicated Operations Manager for CGD GA.	✓	-	-
18	Supervision of onsite EPC works	✓	-	-
19	Supply of regasification skid, tanks, Pump etc for LNG setup.	✓	-	-
22	Supply of Fire water system as per PESO guidelines	✓	-	-

23	Supply of Fire extinguishers, sand buckets, warning signs & its periodic refilling & maintenance up to 5 years from date of commissioning.	✓	-	-
24	Personal computer for SCADA system & Software license	✓	-	-
25	Supply & Installation - O & M of Firefighting Equipment's - Co2 flooding system, Gas Detection Fire detector devices etc.	✓	-	-
26	Pump for removal of water from dyke	✓	-	-
27	Supply of Air compressor with inbuilt reservoir	✓	-	-
28	Provision for cranes for unloading, erection and installation for all LNG Station Equipment	✓	-	-
29	Supply skilled plant technicians and manpower for hose handling, testing & start-up as per standard operating procedure.	✓	-	-
30	Supply of Liquid Nitrogen for tank cooling during commissioning	✓	-	-
31	Air and N2 gas for testing during commissioning.	✓	-	-
32	Spare parts for normal operation of 5 years	✓	-	-
33	Hazop Study, Emergency plan and safety report for MSIHC if required, PESO license for use of Facility one time	✓	-	-
34	Obtain PESO approval before start of actual operation.	✓	-	-
35	Supply of all required Foundation bolts for tank and vaporizers	✓	-	-
36	Obtain & supply of PESO approved equipments	✓	-	-
37	Obtaining PESO approval for the site	✓	-	-
38	Appoint short term liaison team - PESO licence	✓	-	-
39	Appoint short term liaison team – OISD, if applicable	✓	-	-
40	Documentation for compliance with PESO/OISD rule wherever required	✓	-	-
41	Appointment of consultants for PESO/OISD / Local Government approval like CP / DM NOC, OISD etc.	✓	-	-
42	Appoint short term liaison team for GA State Government and obtain all NOC (MIDC, PWD, Irrigation, NHAI, MSRTC, NMC, DM, CP, Traffic dept. etc.)	✓	-	-
43	NOC from local authorities in the name of MNGL for operation of the LNG facility	✓	-	-
44	Liaison with CGD GA Local authorities (DM, MIDC, NMC etc.)	✓	-	-

47	Quality test certificates dossier for cryogenic pressure vessel with third party inspection agency certification (for inner vessel)(1 set) in English comprising of the following. a) Certificate form third party inspection agency for inner vessel b) Material Heat chart for inner vessel pressure parts c) Technical properties test report for production test coupon d) History sheet for inner vessel e) Material test report for pressure parts (inner vessel) f) Name plate photo copy g) Certificate of safety valve, pressure gauge, level gauge h) Vacuum report	✓	-	-
48	Standard O&M Manual (1set) in English for Tank, Vaporizer & Pump	✓	-	-
49	The equipment can be offered for pre-dispatch Inspection to customer's representative before shipment from vendor works. Inspection shall be as per vendor standard QAP approved by MNGL.	✓	-	-

LIST OF VENDORS FOR BOUGHT-OUT ITEMS

I) L.E. L DETECTION SYSTEM

1) Crowcon Detection Instruments Ltd
2) Detection Instruments (I) Pvt Ltd
3) Detector Electronics Corporation
4) Drager Safety AG & Co. KGAA
5) MSA – Mines safety appliances.
6) Oldham France S.A.
7) Honeywell

II) CONTROL AND SIGNAL CABLES

1) M/s ASSOCIATED CABLES
2) M/s DELTON Cables Ltd, India
3) M/s KEI Industries Ltd INDIA
4) M/s - Cords Cable Industries Ltd, India
5) M/s Polycab Wires Pvt Ltd, India
6) M/s T. C. Communication Pvt. Ltd., Delhi
7) M/s Suyog
8) M/s Thermo Cables

III) ZENER BARRIERS/ISOLATORS

1) M/s MTL
2) M/s P & F

IV) PRESSURE TRANSMITTERS, TEMPERATURE TRANSMITTERS &DIFFERENTIAL PRESSURE TRANSMITTERS

1) M/s Fisher Rosemount (Emerson)
2) M/s Yokogawa
3) M/s Honeywell

V) SS TUBE, FITTINGS, VALVES, MANIFOLDS

1) M/s Sandvik, Sweden
1) M/s Swagelok (USA)
2) M/s Parker (USA)

VI) JUNCTION BOXES, CABLES GLANDS & ESD PUSHBUTTON

1) M/s EX-PROTECTA
2) M/s FLAMEPROOF CONTROL GEARS

3) M/s BALIGA
4) M/s FLEXPRO ELECTRICALS

VII) PUSH BUTTONS/LAMPS:

1) L&T
2) SIEMENS

VIII) MCB'S:

1) HAVELL'S
2) INDO ASIAN
3) MDS

IX) RELAYS:

1) OEN
2) JYOTI

X) POWER SUPPLY UNIT:

1) ELNOVA
2) APLAB

XI) RPD METER

1) Elster Handel.
2) M/s Itron (Formerly, Actaris / Schlumberger).
3) M/s Instromet.
4) M/s UGI Meter.
5) M/s Smithmeter.
6) M/s Dresser
7) M/s American Meter.
8) M/s Romet, Canada

XII) TURBINE METER

1) Elster Handel.
2) M/s RMG (Germany).
3) M/s Rockwin
4) M/s Vemmtech.
5) M/s Itron (Actaris/Schlumberger).
6) M/s Daniel (USA)
7) M/s Barton Instruments (UK).

XIII) INDICATORS

1) M/s ABB
2) M/s EUROTHERN
4) M/s TATA HONEYWELL
5) M/s MASIBUS

XIV) CONTROL ROOM EQUIPMENT CONTROL PANEL & ACCESSORIES

1) M/s Keltron Controls Ltd., Kerala
2) M/s RITTAL
3) M/s Pyrotech
4) M/s Positronics Pvt. Ltd.

XV) RTDs

1) M/s General Instruments Ltd., Mumbai
2) M/s Nagman Sensors (Pvt.) Ltd.
3) M/s Pyro Electric, Goa

XVI) PRESSURE GAUGES, TEMPERATURE GAUGES

1) M/s AN Instruments Pvt. Ltd., New Delhi
2) M/s General Instruments Ltd., Mumbai
3) M/s WIKA

XVII) PLC

1) Rockwell Automation
2) ABB
3) Honeywell
4) Siemens
5) Ge Fanuc
6) Schneider
7) Modicon

XVIII) HMI

1) Dell
2) Compaq
3) HP
4) IBM
5) Dynalog

XIX) LEVEL/PRESSURE/DIFF. PRESSURE SWITCHES

1) Nivo Controls
2) SB Electro Mechanicals
3) Bells Controls Ltd
4) Chemtrols Engg. Pvt. Ltd
5) Levcon Instruments
6) DK Instruments Pvt. Ltd
7) V. Automat Industries (P) Ltd

XX) PRESSURE REGULATOR AND SLAM SHUT VALVE

1) M/s Pietro Fiorentini S.P.A. (Italy)
2) M/s Emerson Process Management (Singapore)
3) M/s RMG-Regel Messtechnik (Germany)
4) M/s Nirmal Industrial Controls (India)
5) M/s Gorter Controls (Netherlands)
6) M/s Dresser

XXI) SOLENOID VALVE

1) ASCO
2) Rotex
3) Herion Werke
4) ASCO Joucomatic

XXII) ULTRASONIC LEVEL TRANSMITTER

1) E&H
2) Emerson
3) Khrone Marshall
4) Chemtrols

XXIII) LEVEL TRANSMITTER (FLOAT & TAPE)

1) S.B.Electromechanicals
2) Nivo Controls
3) E &H.

Note-1

Bidder to offer all the items as per above list only **subject to submission of Certification and approvals and meeting the technical requirements**.

Note-2

For any other item(s) for which the vendor list is not provided, bidders has to offer those item(s) from reputed vendors/ suppliers who have earlier supplied same item(s) for the intended services in earlier projects and the item(s) offered is in their regular manufacturing/ supply range. Also,

a) The vendor/ supplier should not be in the Holiday list of CLIENT.
b) Should have supplied at least 50% of required quantity or minimum 1 numberwhichever is higher of maximum size and rating of item(s) as required for intended services.

The successful bidder is required to enclose documentary evidences (PO copies along with relevant approved documents, Inspection Certificate, Type approval certificates, Vendor Registration Certificates, performance certificates, statutory certificates, undertaking for not in Holiday list, etc.) within 30 days from date of Placement of Order.

TECHNICAL
SPECIFICATION
FOR

SELF ACTUATED PRESSURE CONTROL VALVES ANDSLAM SHUT VALVES

TECHNICAL
SPECIFICATION
FOR
PRESSURE CONTROL VALVES AND SLAM SHUT VALVES

1. Set point of the Gas pressure regulators/ Monitor (PCVs) and Slam Shut Valves (SDVs) shallbe adjustable. Vendor shall furnish the adjustable range of the Gas pressure regulators and slam shut valves.

2. The Gas pressure regulator and slam shut valves shall be provided in redundant pressure regulation stream as primary pressure regulating stream and secondary pressure regulating stream as per P & IDs. It is intended to provide slam shut valves on upstream of self-actuatedpressure control valves at gas receiving points for tight shut off at increasing pressure beyond a preset limit, to take care of self-actuated pressure control valves failure. The slam shut valveof primary regulating stream shall close at its set pressure in case of failure of primary operating regulator & monitor and the secondary regulating stream shall come in operation. The automatic switchover shall be achieved with appropriate staggered setting of Pressure regulator/monitor and slam shut valves. Vendor shall select the appropriate set points such that the switch-over is smooth without affecting the safety of the system and gas supply to consumers is also not interrupted.

3. Each pressure regulator / monitor shall be designed for maximum gas flow rate at the minimum inlet arrival pressure. Gas pressure regulators shall be with very high range-abilitysince high fluctuations in flow demand are expected and also the inlet pressure may vary considerably.

4. Pressure regulators/ monitors shall be self-actuated pilot operated with regulation accuracy ofbetter than +/- 1% of set point.

5. The construction of the Regulators / monitors shall be such that there will be no continuous gas bleeding.

6. Leakage class for pressure control valve & slum-shut valve shall be class-VI as per ANSI B16.10

7. Vendor to note that the noise level for each Regulator shall be less than 85 dBA at one meteraway from the valves. Vendor shall provide noise treatment to limit the noise level and include silencers or expanders as required in their scope of supply. Vendor to provide Noisecalculation giving full details and standards used and any assumptions considered in calculation (This calculation shall be submitted along with the bid).
8. Slam shut valve shall be self-contained type requiring external control line such

that the linepressure acts directly on the diaphragm.

9. Closing time of slam shut valve shall be less than 2 seconds for all sizes of the valves. Actualclosing time of the valve shall be furnished by vendor along with the bid.
10. Slam shut valves shall be provided with position indicator and shall have separate limit switches for open and close positions. Limit switches shall be with DPDT, snap acting microswitch with contact rating 1 A @ 24 V DC. Limit switch enclosure shall be weather proof toIP 55 and flame proof (Ex'd') suitable and certified for area classification IEC Zone 1, Gr. IIA, IIB, T3. Cable entry shall be ½" NPT without flying leads.

11. Resetting of slam shut valves shall be manual only.

12. Slam shut valves shall be provided with a mechanical indicator to indicate valve open or close position.

13. Slam shut valve shall have a set point accuracy of ±1% over the whole operating range.

14. Any By-pass valve provided for the slam shut valve shall be spring closing type.

15. Velocity at pressure regulating valve may increase beyond 20 meter per second however in the downstream pipe it shall be within 20 meter per second. Actual velocity shall be indicated by vendor.

16. Vendor shall furnish the flow rate versus trim lift curve to justify the valve range-ability andvalve regulation characteristics.

17. The PCV & SDV shall be designed in such a way the noise generated by this equipment shall not interfere with the performance of the meter.

18. The self-actuating Pressure regulating valve shall be designed as per EN334 and Pressure Equipment Directive PED 97/23/EC covering the production quality assurance.

19. The Slam shut valve shall be designed as per EN14382 and Pressure Equipment Directive PED 97/23/EC covering the production quality assurance.

General

- Programmable logic controller (PLC) shall be dual redundant hot standby PLC with dual processors and single I/O for all process I/O as specified.

- The CPU for PLC shall have minimum of 32-bit processor to enhance the processor speed.

- Programmable logic controller (PLC) system shall be programmable, modular microprocessor based safety system, which shall be used for implementation of safety shutdown/interlocks and terminal operation monitoring.

- The system shall be designed "fault avoidant", as a minimum by selecting high-grade components of proven quality and proper design of system electronics. The system shall be highly reliable, high-integrity safety system on both qualitative and quantitative technologies. Redundancy shall be provided as a minimum, as per this specification to improve system availability, reliability and safety. Due consideration shall be given to the environmental conditions particularly for field mounted subsystems.

- The system shall be modular in construction and expandable in future by adding additional modules, which shall be easily accessible for maintenance and repair. The modules shall be suitable for inserting in 19" rack / DIN rail mounting. The types of modules shall be kept to minimum possible in order to have interchangeability and low spares inventory.

- The PLC shall have a very high noise immunity in order to ensure safe and reliable operation when subjected to electrical radio frequency interferenceand electromagnetic disturbances expected in a plant. The design of system electronics shall be in compliance with the electromagnetic compatibility requirements as per 'IEC-801-Electromagnetic compatibility for Industrial Process Measurement and Control Equipment'.

- The system shall have extensive set of self-diagnostics hardware and software for easy and fast maintenance of PLC. Routine checks should run automatically at frequent intervals for identifying any fault in software or hardware. Diagnostics shall be required at local module as well as operator interface console level.

- Operation of the PLC shall be completely unaffected by a momentary power loss of the order of 20 milliseconds.
- The scan time of programmable controller shall be of the order of 100 milliseconds. Scan time of PLC is defined as the cycle time taken by the system to read input, process input executing logic, and update control

output for all the logic configured within the system. Other activities like diagnostic routines, output/dump of data to peripherals, or any other activity, which consume processor time, shall also be accounted while computing scan time.

- On-line replacement of any module shall be possible in such a way that the removal and addition of the module shall be possible without de-energizingthe system. Further, there shall not be any interruption in the system whilereplacing a faulty module except for the inputs/outputs, which are being handled, by that module.

- The process control system shall be based on open system architecture i.e the system shall have inherent capacity to integrate and exchange information with other brand system devices and platforms via industry standard communications, platforms and protocols such as MODBUS, Profibus, Foundation Fieldbus, OLE for Process Control (OPC) or Ethernet TCP/IP.

- The system shall be able to support various types of field buses. As a minimum, profibus DP, Modbus should be available. At least up to 4 lines per controller should be operated simultaneously. Ideally even different types of field busses should be operated simultaneously on the same controller.

Spares philosophy

Following minimum spare shall be considered in the system:

i. A minimum of 25 % spare I/O channels shall be installed and wired.
ii. Wherever relays are used to interface process input/outputs with PLC25% additional relays shall be provided and wired.
iii. A minimum of 25% spare terminals shall be provided with internal wiring.
iv. The processor shall have the capability to execute logic for I/O's includinginstalled spares.
v. 25% of the memory shall be spare.
vi. Minimum 25% spare capacity (after Loading of Software Application) to be provided for primary memory of processor.

System Configuration: The system shall consist of following major subsystems:

Input /Output subsystem

The I/O modules shall be mounted in the I/O racks located in control room

i.e. I/O modules shall be general purpose unless otherwise specified. I/O devices interface with PLC shall be at I/O racks only.

The maximum number of input/outputs per module shall be limited as follows:

SN	Type of Configuration	No. Of I/Os
1	I/O Sub-system	16/32 for Digital inputs08 for Analog inputs 08 for Analog outputs 16/32 for Digital outputs

- Each I/O shall be electrically isolated from external control circuit by suitable means. The minimum isolation level between I/O and logic circuit shall be 1000 VDC. I/O status indication shall be provided for each I/O module.

- Each I/O shall be protected against reversal of polarity of the power supply voltage to I/O .

- Each DI module shall have LED for each I/O channel to indicate the status of each input/output.

- Each input shall be provided with filters to filter out any noise in the input line or noise because of input contact bouncing.

- PLC inputs shall be provided with potential free/dry contacts unless otherwise specified.

- All the inputs shall preferably be double ended i.e. two wires per input and not common return for all inputs.

- The interrogation voltage (24V DC / 230 V AC) to the input/output contact shall preferably be powered from separate redundant power supply units and shall not be a part of PLC

- Output contacts from the PLC shall be potential free/dry contacts with

contact ratings as given below. Wet contracts/ powered contacts/TTL outputs etc., shall not be acceptable. Suppression device for each output contact is to be provided.

- The output contact rating shall be as follows

Sr. No.	Applicable For	VOLT	Current Rating
1.	All output cards for driving 230VDC 0.5ASolenoid valves and alarm annunciator.	24VDC	2.0A
2.	All output cards for driving LT motors/pumps/solenoids	230VAC	5.0A

- Input type shall be intrinsically safe with barriers for analog input modules and explosion proof type for digital input modules. Only Active Barriers shallbe employed for achieving galvanic isolation, wherever applicable.

- Each Input/output shall be short-circuiting proof and protected by fuse. Visualindication of fuse down/blown must be provided for each output as a preferred choice.

- The I/O modules; interface modules shall be of the same make/ manufacturer & same family as the principal manufacturer of processor system.

Processor System

- The offered processor type shall have a minimum reference capacity to handle 2000 real time I/O. Redundancy shall be provided such that in case of failure of the primary processor, the secondary processor shall take over automatically without any time lag. Both processor shall access the inputs simultaneously. The changeover shall be bumpless and the system shall be safe. Redundancy shall be provided for complete processor subsystem including CPU, memory, power supply & host system communication interface.

- Memory shall be non-volatile. However, incase volatile memory is provided,rechargeable battery backup shall be provided for a minimum of one year to keep the stored program intact. A battery drain /pass indication shall beprovided .The size of the memory shall be sufficient for storage of the program instructions required by the logic schemes.

- In case of failure of complete processor system i.e. both processors system, outputs shall take fail-safe automatically.

  It shall be possible to generate the first out alarm output by the PLC in case where a group of parameters are likely to trip the system.

Communication Sub system

The communication subsystem shall be a digital communication bus that provides reliable and high speed data transfer between the processor subsystem & I/O subsystem.

Redundancy in communication subsystem shall be as follows unless otherwise specified.

- Communication Interface between each I/O rack & the dual processor system shall be via separate dedicated dual redundant communication link in multi- drop mode. Daisy chained redundant communication bus to establish interface between I/O racks & processor system shall not be acceptable.

- The communication interface between each processor subsystem and host system shall be dual redundant consisting of two separate communication interface modules located in / from each individual processor rack and two individual communication links, with each one configured in redundant mode. **Use of PLC processor CPU port for establishing host interfaceconnectivity shall not be acceptable.**
- In case of redundant communication subsystem on the failure of the activedevice the redundant device shall take-over automatically without interrupting the system operation.

  Information about the failed device shall be displayed locally as well as the console. It shall be possible to manually switch-over the communication from main bus/device to redundant bus/device without interrupting the PLCfunctions.

  The mechanism used by the system for error checks and control shall be transparent to the application information/program. Error checking shall be done on all data transfers by suitable codes. All communication interfaces shall be galvanically or optically isolated.

Self-diagnostics

The system shall have an extensive set of self-diagnostic routines which shall be able to identify the system failures at least up to module level including redundant components and power supplies through detailed CRT displays report print outs and logic programming.

- At the local level, failure of a module in any subsystem shall be identified byan individual LED.

- Self-diagnostics shall be provided to detect faults (which make the contacts in fail safe mode) in the input and output modules. Each module shall have separate arrangement for self-diagnostic facility. This may be achieved by automatically running the testing software at cyclic intervals.

- Testing software shall be capable of detecting faults in case of normally closed system as well as in normally open system.

- Feedback shall be provided internally from the output voting logic system todetect any latent faults of the system.

Power supply distribution

PLC system shall be powered with 230 V AC +/- 10%. Power pack shall be 100% redundant with safety factor of 1.5. The distribution network for AC power supply shall be designed such that a single power fault in any branch system shall not cause a trip of the entire system. The distribution network for interrogation voltage shall be designed such that a single fault in any branch shall not cause trip of the logic other than where the fault has occurred. Sequential starting of various load centers shall be provided whenever specified.

PLC System Cabinets

All PLC system cabinets shall be completely wired with all modules in place. Inside cabinet wiring shall be done using ribbon type pre-fabricated cables.

All the cabinets shall be free standing, enclosed type and shall be designed for bottom entry of cables through gland plates of preferably 3 mm thickness. Cabinet structure shall be sound and rigid and shall be provided with removable lifting lugs to permit lifting of the cabinets.

Cabinet shall be fabricated from cold rolled steel sheets of minimum 2 mm thickness suitably reinforced to prevent warping and buckling. Doors &

sidepanels shall be fabricated from cold rolled steel sheet of minimum 1.5mm thickness. Cabinets shall be thoroughly debarred and all sharp edges shall be grounded smooth after fabrication. Panel shall be confirming to degree of protection minimum as per IP-31.

Cabinet finish shall include sand blasting, grinding, chemical cleaning, and surface finishing by suitable filter and two coats of red lead primer by spray. After drying, final paint shall be applied. This can either be NC or epoxy depending upon the customer requirements. Outside color shall be light grey as per IS 631/RAL7035. Inside of the panel shall be painted with high gloss white color. Base channel shall be painted black. Non-welded panel shall be powder coated.

Each cabinet shall be approx. 2100 mm high (excluding 100-mm channel base), 800 mm deep, Width shall be suitably decided depending on requirement and considering ease in maintenance Max 800 mm for Single door and Max 1200 mm for Double door in general. Constructionshall be modular preferably to accommodate 19" standard electrical racks.

All cabinets shall be of same height. Maximum swing out for pivoted card racks, doors and drawers shall be limited to 600mm. However, standard design of cabinets from approved PLC manufacturers shall be acceptable.

Cabinets shall be equipped with the front and rear access doors. Doors shall be equipped with lockable handles and concealed hinges with pull pins for easy door removal. Cut-outs shall be properly shaped and devoid of sharp edges. They shall be made by nibbling process or by drilling and filling. Gas cutting under any circumstances shall not be used for making cutouts.

In order to remove dissipated heat effectively from cabinets, vent louvers backed by wire fly screen shall be provided in cabinet doors. Further two ventilation fans shall be provided.

Illumination shall be provided for all cabinets by incandescent lamps, which shall be operated by door switch.

Equipment within the cabinet shall be laid out in an accessible and logically segregated manner. Cable glands shall be provided for incoming and outgoing cables to prevent excessive stress on the individual terminals. All metal parts of the cabinet shall be electrically continuous and shall be provided with a common grounding lug.

The front doors for the PLC cabinet shall have toughened glass / acrylic window for visual ergonomics.

Earthing

Each cabinet, console and other equipment supplied as a part of PLC system shall be provide with an earthing lug. All these lugs shall be properly secured to the AC mains earthing bus.

All circuit grounds, shields and drain wires of control cables shall be connected to the system ground bus which shall be electrically isolated from AC mains earthing bus. This bus shall be typically of 25 mm wide and 6 mm thick of copper.

All barriers, if used, shall be securely grounded. Safety barrier ground wire shall be capable of carrying a maximum fault level current of 0.5 A at 250 V r.m.s per barrier.

Note : all panels shall have earth leakage detection system installed which shall prevent earth leakages current.

SPECIFICATION FOR INSTALLATION OF INSTRUMENTS

INSTALLATION, TESTING AND CALIBRATION OF INSTRUMENTATION AND CONTROL SYSTEM

1.0 SCOPE

1.1 The purpose of this specification is to define the general requirements for the installation, installation materials, testing and calibration of instruments and controlsystem.

1.2 The work shall be carried out in accordance with the codes, standards and recommended practice listed in this specification and in accordance with local
`Statutory regulations'.

1.3 For installation of instruments and control system, of the new material where quality is of the prescribed standards and which is in every way fit for its intended purposeshall be used.

1.4 Unless otherwise specified all the materials shall be indicated in this specificationexcept where it is not compatible with fluids being handled. In such cases the selection of the material shall be approved by Consultant/MNGL.

1.5 Only the best trade practices shall be used. All the work shall be carried out in aneat, workman like manner and to the satisfaction of Consultant/MNGL.

2.0 STANDARDS OF MATERIALS

2.1 Instrument process piping / tubing upto and including the first block valve and
`in-line' instrument equipment shall conform to the line class or vessel rating concerned instrument piping or tubing after the first lock valve may use alternatematerials consistent with service conditions. In general, they shall conform to thefollowing specification as a minimum.

2.1.1 Stainless tubes shall be fully annealed and cold drawn seam less as per ASTM A269 TP316 with size 1/2"OD x 0.65" WT (wall thickness).

2.1.2 Monel tubing shall be fully annealed seamless as per ASTM B165 with size 1/2" ODx 0.35"WT.

2.1.3 Carbon steel pipe shall be 1/2" seamless and shall be as per ASTM A106 Gr B minof sch 80 & dimensions as per ANSI B36.10.

2.1.4 Seamless stainless steel pipes shall be as per ASTM A 312 Gr TP 316L Sch 80S, dimensions as per ANSI B 36.19. Instrument air supply piping from the main instrument air header shall be galvanized heavy class pipes to IS 1239.

2.2 Individual pneumatic signal and air supply tubing shall conform to the following specifications:

2.2.1 Stainless tubes shall be used in general and shall be fully annealed and cold drawn seamless as per ASTM A269 TP 316 with 6mmOD x 1mmWT.

2.2.2 Copper tubing where specified shall be seamless 6mmOD x 1.0mmWT soft annealed as per ASTM 868.74a cd No. 122 (DHP) sheathed with PVC 1.0mm thick coloured Black.

2.3 All fittings shall be as a minimum of 100 rating except for tube fittings. The fittingsshall have threading as per B2.1 and socket weld connections as per B 16.11. These shall conform to the following specifications in general.

2.3.1 Tube fittings shall be flare type compression fittings Swagelok or equivalents makedouble ferrule and pressure seat type.

All tube fittings in impulse lines shall be rated to 5000 PSIG at 38°C.

2.3.2 Carbon steel pipe fittings shall be forged as per ASTM A105 stainless steel pipefittings shall be as per ASTM –182 Grf 316L

2.4 Valve shall have normally Globe body and shall be fabricated out of Bar-stock andrated to min. of 1500. These shall be screwed bonnet type with 13% GSS trim andplug shall be integral with the stem. Face to face dimensions shall be approx. 80mm. End connections shall be socket weld to ANSI 16.11 and threaded to B2.1

2.5 Multibore tubing shall have a maximum 19 single polyethylene tubes, 6mmOD x1mm numbered for easy identification. The bundle shall be marked with inner andouter fire resistance PVC sheath. They shall carry a pair of telephone wire 0.6mmdiameter flexible.

2.6 Single pair and multi pair extension cables for Thermocouples shall be matched andcalibrated in accordance with ISA MC 96.1. Conductor size shall be AWG for singlepair and 20 A for Multipair.

2.7 The cable shall be armoured, each twisted pair shall be individually shielded withaluminium Mylar tape and a tinned copper drain wire. The wires and the

cable shallbe colour coded as per ISA recommended practices.

2.8 Instrument Electrical cables shall conform to the following specifications:

2.8.1 Instrument electronic signal cables single pair/ Multipair shall have copper conductor, twisted in pair and individually shielded with Aluminum Mylar tape withdrain wire. In multipair cables, each pair shall be armoured with inner and cut PVCsheath. Minimum conductor size shall be 1.5 mm^2.

2.8.2 Control Cables for control signal, alarms actuating devices and solenoid valves ofthe interlock and shutdown valves shall generally be 1.5 mm^2 copper conductorsarmoured with inner and cut PVC sheath.

2.8.3 All power supply cables shall have copper/Aluminium conductor depending uponthe conductor size. The cables shall be armoured with inner and cut PVC sheath.The cables shall be sized adequately. Minimum conductor size shall be 2.5 mm^2.

2.8.4 2-core armored cable shall be used for illuminator on level gauges.

2.8.5 The material and construction of all electrical cables shall conform to IS- 1554Part I or appropriate equivalent code and standard.

3.0 INSTALLATION OF INSTRUMENTS

3.1 Instrument Mounting

3.1.1 No instrument shall be installed in such a way that it bends for support on the impulse piping or electrical connection on it.

3.1.2 Pressure gauges and temperature indicator shall normally be mounted directly on line. However direct on line mounting shall be avoided where vibrations are likely to be present.

3.1.3 Local mounted instruments shall be mounted on brackets, panels or placed on asuitable pedestal. Transmitters shall be mounted on 2” pipe supports where practical. Instruments to be mounted on steel columns, masonary structure etc.These shall not be mounted on heating equipments, pipelines and structures.

3.1.4 Blind transmitters shall be mounted at 130mm above graded platform. Local controllers, indicating transmitters and indicating instruments shall be mounted atapproximately 1500 mm.

3.1.5 All the instruments shall be accessible from grade, ladder or platform etc. Pressures gauges and other local indicating instruments shall be readable from grade or operating level and if used for manual control shall be visible from the related valve.

All the instruments shall be located such that they don't impede the processoperation.

3.1.6 Local mounted instruments which are not available in weather proof housing shallbe mounted inside a weather proof case.

3.1.7 Items such as pilot valves, solenoid valves etc. shall be located local to its point ofapplication or near to the device being actuated by them.

3.1.8 For blind transmitters output meters shall be mounted on instrument supports.

3.1.9 Filter regulators shall be mounted on the instrument supports below pneumatictransmitter or on the control valve yoke.

3.1.10 Instruments or instrument lines shall not be supported on hand rails, in general.

3.1.11 The use of process piping to support instrument lines shall be avoided as far aspossible.

3.1.12 The instrument impulse piping shall be kept as short as possible.

3.1.13 Instruments and impulse lines shall be protected against mechanical damage.

3.1.14 In case of capillary tube instruments, capillary tube is to be supported and protectedagainst mechanical damage.

3.1.15 Orifice meters shall not be installed on the top of orifice fittings. On horizontal linesorifice pressure taps shall be located as follows:

a) On top for air and gas service
b) Horizontal for liquid and condensable vapor service.

3.2 <u>Instrument Piping & Tubing</u>.

3.2.1 <u>Impulse Piping/tubing</u>

3.2.1.1 The primary instrument block valves for all instruments shall be as per pipingspecifications.

3.2.1.2 3-Valve manifold in general shall be integral type. For pressure gauges, 2-valve manifolds shall also be acceptable instead of isolation valve, drain valve and pipefittings.

3.2.1.3 Differential or static pressure sensing lines shall not exceed 6 mtrs. (20 feet) in generalfor direct connected or locally mounted instruments.

3.2.1.4 All impulse lines shall be run with a slope not less than 1 in 12 except where otherwise specified. Direction of slope is to be downward from the process for liquid service and upward from the process for gas service.

3.2.1.5 Tubing shall be joined by compression fittings.

3.2.1.6 Piping shall be joined by pipe fittings/flanges as per the piping specifications.

3.2.1.7 All instruments pipes and tubes shall run in horizontal and vertical planes only andshall run with minimum number of changes in direction, consistent with good engineering practices and neat appearance.

3.2.1.8 Tubing shall be bent with correct size tube bender as far as possible to avoid use offittings. Hot bending shall be totally avoided.

Tube cutter shall always be used to cut tubing. The use of short lengths of tubing inlong runs shall be avoided in order to avoid the fittings.

3.2.1.9 All tubing shall run in such a manner as to give the maximum protection against mechanical damage. Tubing runs shall be grouped together and clamped.

3.2.1.10 Tubing shall be arranged so that the unions can be tightened without distorting lines.

3.2.1.11 Instrument tubing or piping shall not run on trays intended for cables and shall notshare the same transit.

3.2.1.12 No pipe or tube shall be left with mechanical strain on them.

3.2.1.13 A mechanical ferrule seater shall be used on tubing for 140 kg/cm^2 (2000 psi) ormore.

3.2.1.14 Pipe bushings shall not be used.

3.2.1.15 Pipe plugs shall be fabricated out of bar stock and shall have hex-head.

3.2.2 Air/Signal Tubing

3.2.2.1 Signal Transmission tubes shall be laid on perforated trays prefabricated out of min
2.5 mm. thick steel plates. The width of the tray shall be selected as per the numberof tubes to be laid.

3.2.2.2 Where tubing is run in permanent enclosures, it should be ensured that entry andexit of such enclosures is clean and smooth.

3.2.2.3 Tubing run in permanent enclosures shall not have joints, except at special junctions' boxes provided for this purpose.

3.2.2.4 Where permanent enclosures are left with space for instrument tubing to be laid atsome later date, a galvanised pull wire of adequate size shall be left in the tray.

3.2.2.5 Where the length of transmission tubing exceeds 60 mtrs (200ft) necessity of installing signal booster relays shall be considered.

3.2.2.6 In case of `Skidded' equipment or vessels with instrumentation, where off-skid alarms shutdown or control functions are provided the signal tubes shall be terminated on the control bulk head near the skid boundary.

3.2.3 All threaded pipe joints shall be joined after applying Teflon tape. It should be applied in a manner to ensure that the tape does not spill over the end of the malefitting. No other pipe joining compound shall be used except on high temperatureservice where graphite sealing compounds shall be used.

3.2.4 All reasonable precautions shall be taken to prevent foreign materials entering pipelines or tubing before and during erection.

3.2.5 Pipes and tubes installed but not connected, shall have the ends clad in approvedfashion to prevent the entry of foreign material. For a period upto one-week adhesive tape may be used, for longer periods, caps or plugs shall be used.

3.2.6 Piping/Tubing supports

3.2.6.1 Piping and tubing shall be adequately supported and fixed at a distance notexceeding that in the following table:

Table

Single tubing/Piping	Max. distance between supports
3/8" OD or less	Continuous
1/2" to 3/4" Nom. size	2 meters (6ft.)
3/4" to 1" Nom. size	3 meters (9ft.)
Multitube bundle	3 meters (9ft)

3.2.6.2 All field mounted instrument air tubing shall be supported with galvanised steel anglesor channels of minimum 1/8" thickness fabricated to present neat appearance.

3.2.6.3 All instruments tubing supports shall be galvanised prior to installation

3.2.6.4 Trays shall be properly supported either from any rigid steel structure or concretemember. In case of non-availability of above, a suitable support shall be fabricated.

3.3 Instrument Air Supply Distribution

3.3.1 Piping material for instrument main and branched air headers upto the isolation valve at each take-off from main or branch header shall conform to piping specification.

3.3.2 The air header size shall be established in accordance with the table below, unlessotherwise specified, for a header pressure of 4 to 8.5 kg/cm^2

Table – 2

Max number of users	Nominal pipe size
upto 5	1/2"
upto 10	3/4"
upto 25	1"
upto 80	1-1/2"
upto 150	2"
upto 500	3"

3.2.3 All take off for branch lines are to be from the top of the main header with block valves equal in size to the branch line. All low point shall have a 1/2" valve installedas a drain and blow down point.

3.3.4 A minimum size of ½" pipe shall be run to the instrument with a ½" valve for eachuser. Tubing from the isolation valve to the instrument shall be 6.0 mm.

3.2.5 Union shall be provided at convenient location in the air header.

3.3.6 Filter regulator shall be provided for individual field mounted consumer and shall becomplete with an output gauge.

3.3.7 In case of skid mounted equipments or vessels which incorporate instrumentationrequiring pneumatic supply, on skid supply piping shall terminate at the skid boundary location and size of the supply connections shall be noted on the vendorapproval drawings.

3.4 <u>Installation of multitude and Multicore cables</u>.

3.4.1 Multicore/ Multitube cables shall generally be installed on trays or ducts and properly clamped. At bends minimum radius shall be maintained as per cable manufacturer's standards.

3.4.2 All cables shall be rigidly supported on structural steel and masonry. Drilling ofsteel member should normally be avoided. However, if the drilling of steel must beresorted to, it must be drilled where minimum of weakening of structure will resultcables shall be support at every 500 mm. At every vertical drop these shall be clamped at more frequent intervals max of 300 mm.

3.4.3 Directly buried cables shall be laid underground in excavated cable trenches. Trenches shall have sufficient depth and width to accommodate all cables correctlyspaced and arranged with a view of heat dissipation and economy of design construction of trenches laying of cables and filling up of trenches shall be as perrelevant standard.

3.4.4 Each underground cable shall be provided with identifying tag of load securely fastened every 30 M of its underground length with at least one tag at each endbefore the cable enters the ground.

Before cables are placed, the trench bottom shall be filled with a layer of sand. Thecables shall be covered with 150 mm of sand on the top of the largest dia. cabletube and sand shall be lightly pressed. A protective covering of 75 mm thick secondclass red bricks shall be laid flat and the balance portion of the trench shall be filledwith soil, compacted and levelled.

3.4.5 At each road crossing and other places where cables enter pipe sleeves, adequatebed of sand shall be given so that the cables don't slack and get damaged by pipeends after back filling.

3.4.6 At the entry into concrete blocks loops shall be provided at either end to prevent anydamage to cable.

3.4.7 The cable entry to control room shall be suitably filled and sealed after laying of cables so as to achieve a positive sealing against the entry of gas/water.

3.4.8 All wiring, tubing, cables, Junctions boxes and auxiliary equivalent shall be suitablyidentified as per applicable codes and practices. All piping and tubing shall be tagged with slip-on or clip on wire marker at both ends.

3.4.9 Jointing of cables is generally not permitted. Cables shall be cut after the exact sitemeasurements at the cable drums shall be so selected before cutting the lengths asto avoid any unnecessary wastage.

3.4.10 Low signal cables like alarms, analyzers cables, special cables for turbine meter,thermocouple compensating cables etc. shall be layed separated from power supply cables in ducts/trenches/trays.

3.4.11 Electric signal lines for electronic transmitters to receive and to final control elementshall be continuously shielded with the shield grounded at the same point as thesignal circuit generally at the control instrument.

3.4.12 Separate junction boxes shall be used for intrinsically sage cables.

3.4.13 Different intrinsically safe system e.g., systems having different rounds shall not berun in the same multicore cable, in general.

Recommended minimum separation distance between twisted pair signal leads andAC Power Lines.

AC Power Cable		Minimum Distance to Signal Lead
Voltage (Volts)	Current (Am)	in (cm)
0 to 125	0 to 10	12" (30)
125 to 250	0 to 50	15" (38)
250 to 440	0 to 200	18" (46)
5KV & Up	200 Amp. & Up	24" (61)

Different intrinsically safe circuits e.g., circuits having different voltage levels, of thesame intrinsically safe system shall not be run in the same cable unless each conductor insulation is at least 0.25mm or no hazard can result from interconnection.

3.4.14 The physical separation of power and signal cables shall be as per API 550 Part ISection VII. Cable in intrinsically safe circuits shall preferably be not run in the same tray where-- on intrinsically safe circuits cables are being run. If these arebeing run in the same tray, a metallic earthed separately shall be provided.

3.4.15 For temperature controllers, single pair thermocouple extension cable or cable forresistance thermometer, shall be layed directly from the element to the transducerin the control room without intermediate terminal blocks.

3.4.16 In case of skid mounted equipment or equipment which incorporate skid instrumentation like alarms, shutdown or control function shall terminate signals orcontrol junction box near skid boundary for connection of off skid equipment.

3.4.17 No wire shall be terminated or left with mechanical strain within any conductor.

3.4.18 Splices shall be made only at terminals, in instruments or approval equipment/ junction boxes using lugs and screwed connections. No intermediate splices shallbe made in cable trays or in conduct. Number of junction boxes in any cable pathshall be limited to only one.

3.5 Installation of Zener barriers

3.5.1 Zener barriers shall be installed in the circuit to make the system intrinsically safeprovided:

a) There is no energy storage system in excess to the minimum permitted bythe barrier design on the hazardous side of the barrier. The same shall be met by taking intrinsically safe transmitters and selecting the cable electricalparameters like inductance L/R ratio & capacitance in accordance with themaximum parameters given in barrier specifications.
b) No power source exceeding the voltage rating of Zener barrier shall be connected on safe side of the Zener barrier.
c) No outside power source including other intrinsically safe circuits shall beconnected to the hazardous side of the barrier.

3.5.2 Zener barriers shall be located as close as possible to the field wiring entry point inthe control room.

3.5.3 Single barrier is bolted directly to copper bus bar and multiple barriers on thebarrier mounting plates. Copper bus or barriers mounting plates shall be isolatedfrom the panel frame.

3.5.4 The signal ground system for intrinsically safe system shall be separate from power ground system and shall be connected to the signal ground reference point. The maximum resistance allocable between the farthest point on intrinsically safe barrier ground bus and signal ground reference point shall be less than 1 ohm.

3.5.5 Field wires shall directly terminate at the barriers and not through intermediateterminals.

3.6 Installation of Analyzer / Gas Chromatograph

3.6.1 Installation of all analyzer shall be in general, as per APIP 550 Part II.

3.6.2 The analyzer housing at its installation shall meet all safety requirements as perclassifications.

3.6.3 Sampled process fluid, if not returned to the process shall be disposed to a safelocation. Piping shall be provided so that vapors can be vented to a safe locationand liquids shall be drained in a clean and orderly fashion to a safe place. Toxic vapors shall not be vented to atmosphere.

3.6.4 Analyzer shall be located as near to the sampling point as possible.

3.6.5 Analyzer equipment must be protected from the following:

a) Hot equipment
b) Severe ambient temperature changes
c) Shock
d) Mechanical damage
e) Vibration

3.6.6 If a separate vent for the analyser is used, the location of that vent shall be in areaof minimum air Turbulence. If the vents of different analysers are vented into acommon vent, a back pressure regulator shall be used.

3.6.7 Vent piping shall be designed to prevent condensate from accumulation in lowpoint and obstruct a free vent flow.

3.7 <u>Ducts, Trays and Supports</u>

3.7.1 Main cable duct shall be of bottom open type with flat/angle --- construction withside sheet and top cover of 3.2 mm thickness.

3.7.2 The ducts and trays shall be properly supported at regular intervals. Whereverinsert plates are not available, support on concrete structure or ceiling shall be fixed with a minimum of 10 mm expansion bolts Angle supports for ducts shall befabricated from minimum of 40 mm angle.

3.7.3 All supports shall be neatly cut with hacksaw only and not with gas cutting. Freeends of angle supports shall not have sharp ends and shall be properly roundedoff.

3.7.4 Ducts and supports shall be painted with one coat of Red oxide Zinc chromateprimer conforming to IS-2074 after cleaning to remove scale and then painted with

2 coats of final enamel paint as given below:

a) Duct - Dark admirately Grey as per IS0632.

b) Supports - Black.

3.6 Instrument Steam Tracing

3.6.1 Steam for Tracking of instruments shall be taken from main steam header take ofvalve through carbon steel pipes supported at regular intervals.

3.6.2 Steam tracing around individual instrument shall be by copper tube of 1/8"diameter.

3.6.3 Piping or tubing for steam tracing shall be installed in such a way as to avoidcondensate pockets.

3.6.4 After steam tracing, the line is connected to drain funnel through steam trap.

3.7 Identification of Lines and Instruments

3.7.1 All site mounted instruments, junction boxes, air headers, tubing and wiring terminations shall be labelled or tagged.

3.7.2 Instruments shall be furnished with stainless steel name tags containing Tag no.,manufacturer's name, and model no. serial number. This tag number shall beapproximately 3"x1" size and shall be attached to the instruments with -- gaugestainless steel wire.

3.7.3 Unused cable entries in junction boxes and field instruments are to be plugged.

4.0 TESTING

4.1 Instrument Impulse piping/Tubing

4.1.1 All process impulse lines shall be disconnected both from the instrument and vessel/piping end and flushed with water.

4.1.2 After thorough flushing the impulse lines shall be isolated from the instruments and pressurised hydraulically to 1.5 times the maximum working pressure corrected for ambient temperature. They shall then be isolated from the pressure source and the pressure reading on a test pressure gauge shall not fall at a rate exceeding one psig/hour.

In case no isolation valve is provided near the instrument, impulse piping/tubing shall be pressurised along with the instrument to the maximum pressure of scale in case of pressure transmitter and max. Operating pressure in case of differential

pressure instrument with equalising valve open

4.1.3 In special conditions where hydro- testing is not permissible due to service requirements, testing shall be carried out by using compressed air/nitrogen.

4.1.4 The external displacer type instruments and cage type level switches shall be tested to 1.5 times the operating pressure using air/nitrogen after thorough flushing.

4.2 Instrument Air lines/signal tubing.

4.2.1 Instrument air lines/signal tubing shall not be hydrostatically tested.

4.2.2 Instrument air tubing shall be disconnected upstream of all filter regulators andblown down to remove water, slag and mill scale, from lines at 7.0 kg/cm^2 G forfifteen minutes.

Air filter shall be taken in line and tubing shall be disconnected at instrument end,and blown for 3 minutes to remove traces of dirt.

4.2.3 Testing of instrument air shall be carried out with instrument air at 7 kg/cm^{2}G uptothe upstream of the filter regulator after thorough flushing. All lines shall be checked with soap solution and bubbler unit for possible leak at joints.

4.2.4 All signal tubing shall be checked with 1.5 kg/cm^2 after proper flushing. After pressuring, source shall be cut off and rate of fall in pressure shall be less thanIPSL for each 100 feet of tubing for a test period of 2 minutes as per instrument society of American RP 7.1 `Pneumatic Control Circuit Pressure Test'

4.3 Cables

4.3.1 All wiring shall be checked to ensure that it is correctly connected and properlygrounded.

4.3.2 All cables shall be checked for continuity proper connection and insulation testing.

Insulation test shall be carried out on all wiring with a certified magger afterdisconnecting the cables at both ends.

4.4 All the results of the above mentioned testing shall be recorded and submitted forcheck.

4.5 All the in line instruments like orifice plates, turbine meters, Rotameters, Targetmeters, vortex meters, control valves, safety valves etc. shall be removed and

spool pieces shall be provided prior to the flushing of the lines.

5.0 CALIBRATION OF INSTRUMENTS

5.1 All instruments shall be calibrated strictly as per manufacturer's instructions priorto the installation. In addition to calibration of instruments, setting of safety devices like process switches, safety valves etc. and simulation testing of all interlock and shutdown system shall be carried out.

5.2 In general, all tests shall simulate, as closely as possible, design process condition by the use of manometers, potentiometers, deadweight testers, test pressure gauges etc. Pour point calibration shall refer to the input signal to aninstrument equivalent to 0, 25, 50, 75,100% of instrument range upscale (rising) and 75, 50, 25, 0% of instrument (downscale) (falling). All instruments unless otherwise noted shall be calibrated in upscale and downscale direction and if necessary, adjusted until their accuracies conform tothose limits state by the manufacturer.
Upon completion of these tests, the instruments shall be drained, completely.

5.3 <u>Temperature Instruments</u>

5.3.1 Temperature Gauges Filled type and Bi metallic dial type Thermometers shall befour-point bench checked for proper operation and calibration using a temperature bath prior to installation.

5.3.2 Temperature Elements and Temperature Transmitters.
Temperature Elements and Transmitter shall be four-point bench calibrated using a temperature bath precision meter or precision gauge prior to installation.

5.4 <u>Pressure Instruments</u>

5.4.1 <u>Pressure Gauges</u>

5.4.1.1 Direct connected bourdon type pressure gauges shall be dead weight tested or testedagainst a test gauges prior to installation.

5.4.1.2 Receiver type pressure gauges shall be four points calibrated using a precisiongauge and precision air regulator.

5.4.1.3 Pressure and Differential Pressure Transmitters.

Pressure and differential pressure transmitters shall be four points calibrated usinga hydraulic or dead weight tester or a precision pneumatic calibrator prior to theinstallation. A precision output meter or gauge shall be used to monitor the output.

5.5.1 Orifice plates shall be checked visually for the name plate and for an upstream sharp edge. Bore dia. shall be checked for compliance with the specification.

5.5.2 Differential pressure type of flow instruments shall be four points calibrated using precision pneumatic calibrator or a manometer and precision regulator. Aprecision output meter or gauge shall be used to monitor the output of the transmitter.

5.5.3 a) Rotameters shall be installed as received. A check shall be made to confirm that shipping stops have been removed and float has been installed.

b) Where rotameters have transmitting mechanism, the float shall be raised and lowered mechanically and output shall be checked. Vendor calibrationdata/ curve shall be checked.

C) A check shall be conducted with plumb for a vertical installation.

5.5.4 Turbine meters, Annubar, positive displacement meters, vortex meter, ultrasonicflow meter, etc. shall be installed as received.

5.5.5 Target meters shall be checked for calibration using calibration weights. Outputshall be monitored using precision output meter.

5.6 <u>Level Instruments</u>

5.6.1 <u>Level Gauge Glasses</u>

Gauge glasses shall be installed as received installation of illuminators, frostprotectors and other accessories shall be checked.

5.6.2 Displacer Type, Level Transmitter

- Displacer type level transmitter shall be checked by raising and lowering mechanically the displacement and checking the pilot or transmitter action. Check transmitter without put gauge or meter for smooth and full output change.

- A check shall be conducted with plumb for a vertical installation.

5.6.3 Differential pressure type level transmitter Differential pressure type level transmitter shall be calibrated with pneumatic calibrator at four

points prior to installation. A precision meter or gauge shall be used to monitor the output of thetransmitter.

5.6.4 Tank level gauges

a) Tank level gauges shall be checked by raising and lowering mechanically thedisplacer and checking the indicator on the gauge board.

b) Check for proper liquid seal prior to installation in case of liquid seal tankgauges.

c) In case of servo type gauges, the displacer is hoisted from the tank into thecalibration chamber.

5.7 Control Valves, shutdown valves and self-actuated valves

5.7.1 All diaphragm and piston operated control valve shall be stroked pneumaticallyusing a pressure regulator and pressure gauge against the spring range specified on the name plate of the valve.

5.7.2 Mechanical seating and travel of the valve stem shall be checked against the sideindicator and the name plate

5.7.3 Valve positioner shall be calibrated with the control valve in accordance with the name plate data and specifications with the help of pneumatic calibrator or gauge with precision regulator. Zero position or fully close position of the valve shall bea live zero i.e., the plug shall be just off the seat at the minimum setting.

5.7.4 Volume bottles, where used shall be checked for proper filling. The signal lineshall be bled to zero pressure and failure action shall be confirmed.

5.7.5 Control valve accessories such as handwheels, boosters, relays etc. shall be checked operationally. Declutch able handwheel shall be operable both with andwithout an air signal to the diaphragm.

5.7.6 Self-actuated control valves shall be installed as received, checking inlet and outlet points and name plate data. Regulators with external pressure connectionsshall be inspected for proper installation.

5.7.7 Butterfly shall be checked carefully to see that the vane moves freely into the upstream and downstream piping. Proper vane movement to stroke shall be confirmed.

5.7.8 All control valves and regulators shall be removed from the line prior to flushingand during hydro testing.

5.8 Safety Relief Valves

5.8.1 Safety relief valves shall be installed as received after carefully checking the nameplate data. Pilots, if used, shall be checked carefully for installation on the propersafety valve.

5.8.2 Valves, which are installed in such a manner as to permit on line testing, shall bepressure tested after installation to determine proper operation and setting. Compressed air or nitrogen shall be used for testing of safety relief valves.

5.9 Switches

5.9.1 Level Switches shall be actuated mechanically for switch operation but shall notbe calibrated for level setting.

5.9.2 Pressure switches shall be calibrated using hydorlic or dead weight tester or precision air regulator and gauge. The setting/trip point shall be checked using acontinuity tester.

5.9.3 Temperature switches shall be calibrated using a temperature both prior to installation and set to the required alarm/ trip point using a continuity tester.

5.10 Receiver Instruments

5.10.1 Receiver Indicator/Recorders

5.10.1.1 Pneumatic indicators/ Recorders shall be calibrated using pneumatic calibrator/precision pressure regulator and gauge.

5.10.1.2 Electronics indicators/ Recorders shall be calibrated using a current generator anda precision meter.

5.10.1.3 Chart drive assembly shall be checked for proper operation.

5.10.2 Controllers

5.10.2.1 Proper balancing of the controller shall be checked as per the manufacturerscatalogues.

5.10.2.2 Controllers shall be checked for manual and Auto operation and Transfer. The transfer from manual to Auto and vice versa shall be bumpless and smooth.

5.10.3.1 Manual loader station Output of the manual loader shall be checked with aprecision meter.

5.10.4.1 Multipoint Temperature Recorders

Each point shall be calibrated using a temperature simulator/ decade box for RTD
/ voltage generator and precision meter for the thermocouples.

5.10.4.2 Point synchronization shall be checked.

5.10.5 Pneumatic receiver switches shall be calibrated using precision air regulator and gauge. The setting/alarm/trip point shall be checked using continuity tester.

5.10.6 Trip Amplifiers Trip amplifiers shall be calibrated using a temperature simulators orvoltage generator and precision meter for thermocouple or Resistance box forRTD's. The required setting/ alarm point/ trip point shall be checked using a continuity tester.

5.10.7 Receiver Switch module Receiver switch modules shall be calibrated using a current source and a precision meter. The required setting/alarm/trip point shall bechecked using a continuity tester.

5.10.8 <u>Alarm and Annunciator system</u>

5.10.8.1 Alarm and annunciator system shall be checked for visual and audio alarm operation using dummy signals. Full alarm sequence of each alarm point shall bechecked.

5.10.8.2 Each point shall be checked for proper engraving.

5.10.9 <u>Shutdown System</u>

5.10.9.1 Operation of final actuating elements shall be checked for proper operation usingdummy signals.

5.10.9.2 All timers, push buttons and switches shall also be checked for their properoperation.

5.11 <u>Analytical Instruments</u>

5.11.1 Check the full analyzer system including sample handling system for leakage.

5.11.2 Check the full sample handling system for its proper operation. Calibrate and check completely all analyzers using zero and span samples as per vendor catalogues.

5.12 Flow computer / Volume corrector

5.12.1 Corrected flow values shall be checked for various D.C. inputs and pressure and temperature variations for upscale and downscale ranges.

5.13 The list of test and calibration instruments with traceability certificates shall be submitted to Consultant/MNGL for approval before carrying out the tests / calibration of instruments at site.

5.14 The formats / description of tests / calibration of all instruments shall be submitted to Consultant/MNGL for approval.

5.15 Daily / weekly reports shall be submitted during execution of work at site.

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SPECIFICATIONS FOR INSTRUMENT VALVES & MANIFOLDS

1.0 GENERAL

1.1 Scope

1.1.1 This standard specifications, together with the data sheets attached herewith, covers the requirements for the design, materials, testing and shipping of Instrument Valves & Manifolds which includes the following types: -

a) Miniature instrument valves
b) Instrument valve manifolds
c) Instrument air valves

1.1.2 The related standards referred to herein and mentioned below shall be of the latest edition prior to the date of Purchaser's enquiry:

ANSI B 2.1 - Pipe threads
ANSI B 16.11 - Forged steel fittings-socket welding and threaded.

1.1.3 In the event of any conflict between these specifications, data sheets, related standards, codes etc, the vendor shall refer the matter to the purchaser for clarifications and only after obtaining the same shall proceed with the manufacture of the items in question.

1.2 Bids

1.2.1 Vendor's quotation shall include a detailed specification sheet for each type of Valves & Manifolds which shall provide the following information:

a) All the details regarding the type, construction, materials etc. of the items.
b) Overall dimensions in mm.

1.2.2 All the units of measurement and material specifications for various parts in the vendor's specification sheets shall be to same standards as in purchaser's data sheets.

1.2.3 Vendor shall attach a list of items, typewise, summing up all the deviations from this specification and purchaser's data sheets if there are any. Also vendor shall provide reasons for these in the bid.

1.2.5 Vendor's quotation, catalogues, drawings etc. shall be in English language.

1.3 Drawings, Data and Certification

Detailed drawings, data, catalogues and manual etc. required from the vendorare indicated by the purchaser in vendor data requirement sheets. The requirednumber of reproducible and prints shall be despatched to the address mentioned, adhering to the time limits indicated.

2.0 CONSTRUCTION

2.1 Instrument Valves (Miniature)

2.1.1 The instrument valves shall be globe pattern-needle valves forged/ barstock with inside screwed bonnet.

2.1.2 Body and trim material shall be 316 SS unless otherwise specified.

2.1.3 The valve body rating shall be 3000 lbs unless specified in piping material specification which shall govern in case it is specified.

2.1.4 The end connection shall be 1/2" NPTF to ANSI B2.1.

2.1.5 The packing material shall be teflon unless otherwise specified.

2.1.6 The hand wheel material shall be carbon steel zinc plated.

2.1.7 Flow direction shall be marked on the body.

2.1.8 The valve dimension shall be as follows:

a) End to end dimensions 76 mm (approximately).
b) Height in fully open condition - 135mm maximum.

2.2 VALVE MANIFOLDS

2.2.1 3-Valve & 5-Valve manifolds:

2.2.1.13 Valve manifold shall be designed for direct coupling to differential pressure transmitters having 2 bolt flanges with 54 mm (2-1/8") centre to centre connections and 41.3 mm (1-5/8") bolt to bolt distance. The manifold shall contain two main block valves and an equalizing by-pass valve. The valves shall be needle valves. They shall use self aligning 316SS ball seats.

2.2.1.25 Valve manifold shall contain two main line block valves and a combination doubleblock and bleed for the bypass line.

2.2.1.3 The manifold shall be suitably for mounting directly on the stanchion (2" pipe).

2.2.1.4 All bonnets shall have teflon packing unless otherwise specified.

2.2.1.5The material of construction shall be 316 SS unless otherwise specified.

2.2.1.5The material of construction shall be 316SS unless otherwise specified.

2.2.1.6 The flanges shall be integral part of the block.

2.2.1.7 The process connection shall be 1/2" NPTF to ANSI B2.1.

2.2.1.8 The manifolds shall be supplied alongwith mounting accessories. The bolts and nuts shall be alloy steel as per ASTM A 193 Gr B ASTM A 194 GR 2H respectively.Rings shall be teflon and other accessories shall be cadmium plated.

2.2.1.9 Vendor shall furnish the material certificate for body.

2.2.2 3 Way 2 Valve Manifold for pressure gauges.

2.2.2.1 The manifold shall be designed for use with pressure gauges.

2.2.2.2 The valve shall be a ball valve.

2.2.2.3 The body shall be either straight or angle as specified in data sheets.

2.2.2.4 The body and trim material shall be 316SS, packing material shall be teflon unlessotherwise specified.

2.2.2.5 The inlet connection shall be 3/4" plain end (female) for socket weld as per ANSIB 16.11.

2.2.2.6 The gauge connections shall be with union nut & tail piece threaded 1/2" NPT (F).

2.2.2.7 The drain connection shall 1/2"NPTF.

2.3 Instrument Air Isolation Valves

2.3.1 The valves shall be full bore ball valves.

2.3.2 Body material shall be Nickel or Cadmium plated carbon steel.

2.3.3 Trim material shall be 316SS.

2.3.4 The end connection shall be 1/2" NPTF to ANSI B2.1 unless otherwise specified.

2.3.5 The packing material shall be teflon.

2.3.6 The handle/wrench material shall be cadmium or nickel plated carbon steel.

2.3.7 The valve body rating shall be ANSI 800 lb.

2.3.8 End to end dimensions shall be 70mm (approximately).

3.0 TESTING

3.1 The instrument valves (miniature) shall be hydrostatically tested at 200kg/cm^2 gat 38°C.

3.2 All manifolds (3 valves, 5 valves and 3 ways, 2 valves) shall be hydrostatically

tested at 200 kg/cm2 at 38C.

3.3 The instrument air valves shall be hydrostatically tested at 15.0 kg/cm^{2}g at 38°C and at 10.5 kg/cm^{2}g with dry air.

4.0 SHIPPING

4.1 All threads/ends shall be protected with plastic caps to prevent damage/entry of foreign matter.

5.0 REJECTION

Vendor shall make his offer in detail, with respect to every item of the purchaser's specifications. Any offer not conforming to this shall be summarilyrejected.

SPECIFICATION FOR JUNCTION BOXES & CABLE GLANDS

1.0 General

1.1 Scope

1.1.1 This standard specifications, together with the data sheets attached herewith, covers the requirements for the design, materials, nameplate marking, testingand shifting of junction boxes & cable glands which include the following types:

a) Electrical junction boxes.
b) Pneumatic junction boxes
c) Cable glands (whenever specified)

1.1.2 The related standards referred to herein and mentioned below shall be of the latest editions prior to the date of the purchaser's enquiry:

ANSI B 2.1	:	Pipe threads
IS-5	:	Colours for ready mixed paints and enamels
IS-2147	:	Degrees of protection provided by enclosures for Lowvoltage switchgear and control gear.
IS-2148	:	Flame proof enclosure of electrical apparatus.

1.1.3 In the event of any conflict between specifications, data sheets, related standards, codes etc., the vendor shall refer the matter to the purchaser for clarifications and only after obtaining the same should proceed with the manufacture of the items in questions.

1.2 Bids

1.2.1 Vendor's quotation shall include a detailed specification sheet for each type of junction box and cable gland which shall provide the following information:

a) All the details regarding the type, construction, materials, housing, entries, etc.
b) All dimensions in millimetre.
c) Sketch for each type of JB with dimensional details showing the terminal and entries arrangement.
d) Mounting details.
e) Vendor shall furnish certificate from statutory body for explosion proofenclosure, indicating the gas group and temperature class.

1.2.2 All the material specifications for various parts in the vendor's specification sheets shall be to the same standards as those in purchaser's data sheets (e.g.BS IS, etc.)

1.2.3 Vendor shall attach a list of items, tag number wise, summing up all the deviations from the purchaser's data sheets, if there are any. Also vendor shall furnish reasons for these deviations.

1.2.4 Vendor shall enclose catalogues giving detailed technical specifications and other information for each type of JB/cable glands and its accessories covered inthe bid.

1.2.5 Vendor's quotation, catalogues, drawings, etc. shall be in English language.

1.3 Drawings, Data and Certification

1.3.1 Detailed drawings, data, catalogues required from the vendor are indicated in vendor data requirements sheets. The required number of reproducible andprints shall be despatched to the address mentioned, adhering to the time limitsindicated.

1.3.2 After placement of purchaser order, vendor shall submit certified drawings and specifications sheets for each type of JB/cable gland which shall include the following:

a) Detailed dimensional drawings
b) Weight of each in grams/Kg.
c) Certificate from statutory body suitable for installation in specifiedhazardous area.

2.1 Junction Boxes

2.0 Junction boxes shall be either of the following type as specified in data sheets.

I. Weather proof junction boxes.
II. Weather proof & Explosion proof junction boxes.

2.2 The enclosure shall be as per IS-2147 for weather proof junction boxes and for Explosion proof it shall be as per IS-2148 suitable for the area classification specified.

2.3 Number of entries and locations shall be as per data sheets.

2.4 Junction boxes shall be provided with telephone sockets and plugs for connection of hand powered telephone set.

2.5 Electrical Junction boxes

2.5.1 Material shall be die-cast aluminium of minimum 5 mm thick (LM-6 alloy)

2.5.2 Explosion proof junction boxes shall have detachable cover which is fixed to the box by means of cadmium plated triangular head/hexagonal head screws.

2.5.3 Weather proof junction boxes shall have doors which shall be hinged type and these shall be fixed with cadmium plated countersunk screws.

2.5.4 Explosion proof junction boxes shall have a warning engraved/integrally cast on the cover as given below:

"Isolate power supply elsewhere before opening"

2.5.5 Terminals shall be spring loaded, vibration proof, clip-on type, mounted on nickel plated steel rails complete with end cover and clamps for each row.

2.5.6 All terminals shall be suitable for accepting minimum 2.5 sq. mm copper conductor, in general. However, for power supply distribution boxes, terminal detail shall be as per job specification/Data sheets.

2.5.7 Sizing shall be done with due consideration for accessibility and maintenance in accordance with the following guidelines.

i) 50 to 60 mm between terminals and sides of box parallel to terminal strip for upto 50 terminals and additional 25mm for each additional 25 terminals.
ii) 100 to 120mm between terminals for upto 50 terminals and additional 25mm for each additional 25 terminals.
iii) Bottom/top of terminal shall not be less than 100 mm from bottom/top of the junction box.

2.5.8 Terminals shall be marked as per the various types indicated in data sheets.

2.5.9 Shall be provided with external earthing lugs.

2.6 Pneumatic junction boxes

2.6.1 Pneumatic junction boxes shall be made of 3mm thick hot rolled steel. They shall have necessary neoprene gasket between door and body. Door shall beflush with the box and shall be hinged type and provided with wing nuts.

2.6.2 Single tube entries shall be suitable for 6mm O.D. copper tube with bulk head fittings. Multi tube bundle entry shall be suitable for the data furnished in data sheets.

2.7 Painting

2.7.1 Surface shall be prepared for painting. It shall be smooth and devoid of rust and scale.

2.7.2 Two coats of lead-free base primer and two final coats of lead free epoxy basedpaint shall be applied both for interior and exterior surfaces.

2.7.3 The colour shall be as specified in data sheets.

3.0 Cable glands & plugs, Reducers/Adaptors

3.1 Cable glands shall be supplied by vendor whenever specified.

3.2 Cable glands shall be double compression type for use with armoured cables.

3.3 The cable glands shall be of Nickel plated brass.

3.4 The cable gland shall be weather proof. Whenever specified they shall be explosion proof and certificate from statutory body shall be furnished.

3.5 Cable glands shall be supplied to suit the cable dimensions indicated along with

tolerance indicated in data sheets. Various components like rubber ring, metallic ring, metallic cone and the outer/inner nuts etc. shall be capable of adjusting tothe above tolerances of cable dimensions.

3.6 Reducers/Adaptors shall be supplied as per details indicated in data sheets.They shall be nickel plated brass. These shall be weather proof in general. These shall also be explosion proof wherever specified and certificate from statutory body for explosion shall be furnished.

3.7 Plugs shall be provided wherever specified. They shall be of Nickel plated brass.

3.8 Plugs shall be certified explosion proof when used with explosion and junction boxes.

4.0 Name Plate

4.1 Each junction box shall have an anodised aluminium name plate permanently fixed to it at a visible place bearing the tag no. & enclosure. The name plateshall also bear the stamp of certifying agency with certificate number.

4.2 Shipping

4.3 All threaded openings shall be suitably protected to prevent entry of foreign material.

4.4 All threaded components shall be protected with plastic caps to prevent damageof threads.

6.0 Rejection

Vendor shall furnish his offer in detail, with respect to every item of the purchaser's specifications. Any offer not conforming to this shall be summarily rejected.

SPECIFICATION FOR SIGNAL CABLES

1.0 GENERAL

1.1 Scope:

This specification together with the job Specifications attached herewith formsthe requirements for design, materials manufacturing, testing and shipping ofPVC insulated signal cables.

1.2 Standards:

The cables shall conform to the latest editions of the various standards mentioned in the specification.

In case of any conflict between any standard and this - specifications the matter shall be referred to the purchaser before proceeding with the manufacture of thecables.

1.3 Bids:

1.3.1 Vendor's quotation shall include the following as a minimum.

Completed job spec. Pair identification method, type test certificates, technical literatures, various testing methods and cross sectional dimensional drawings.All information/data shall be in English language.

1.3.2 Vendor's quotation shall include a list of deviations if any from purchaser's specifications and shall also indicate the reasons for such deviations for consideration to arrive at mutually agreed deviations. However, vendor shall note that no deviation shall be accepted in respect of the permissible limits of resistance capacitance and L/R ratio of cables.

1.3.3 Vendor shall quote unit price per meter for each type of cable.

1.4 Instructions to Bidder:

1.4.1 The quantity indicated against each type of cable in the job specification may vary by± 25% at the time of placement of order. Vendor shall confirm that there shall be no price implication on this account in unit prices type wise.

1.4.2 Drum length for each type of cable shall be 500 to 1000 meters. Vendor shall indicate the maximum drum length possible for each type of cable in his bid. Exact requirements of drum length will be specified after purchase order during detailed engineering and vendor shall confirm that the same shall not affect the price or delivery schedule. The actual produced drum length shall not vary by more than± 5% from the value indicated in the purchase order.

1.4.3 Tolerance over the total ordered length shall be as follows:
± 5% for total length less than 5 km
± 2% for total length 5 km or more

1.4.4 Cable dimensions furnished by vendor in his bid shall be firm. Vendor shall comply with all the values during execution.

1.5 All cables shall be suitable for laying in open air, corrosive hydrocarbon plant atmosphere, direct sun and in trenches. The cable shall also be designed for prolonged use in tropical atmosphere.

1.6 On demand vendor shall furnish documents such as invoice and test certificatesto prove the quality and composition of the materials used for manufacturing thecable to the satisfaction of client/ consultant or authorised representative duringvarious stages of expediting and inspection.

2.0 Construction:

2.1 Type 1

(Single pair/triad shielded cable)

2.1.1 Each core shall be 1.5 sq. mm made of 7 stranded annealed electrolytic copper conductors. Each strand shall be 0.53 mm dia.

2.1.2 Primary insulation shall be 85ºC polyvinyl chloride (PVC) as per IS-5831 Type C. Thickness shall be 0.5 mm minimum.

2.1.3 Each wire shall have twisted cores and No. of twists shall be not less than 10 per metre. Colour of cores insulation shall be black blue in a pair and black, blue and brown in a triad.

2.1.4 Individual pair and triad shall be shielded. Shield shall be Aluminium backed by Mylar/polyester tape bonded together with the metallic side down helically applied with either side - 25% overlap and 100% coverage. Minimum shielded thickness shall be 0.05mm. Drain wire shall be 0.5 sq.mm multistrand bare tinned annealed copy conductor. The drain wire shall be in continuous contact with Aluminium side of the shield.

2.1.5 Inner and outer jacket shall be made of extruded flame retardant 90ºC PVC to IS 5831-Type ST2 Oxygen index of PVC shall be 30. Temp. Index shall be over 250º C.

Inner jacket color shall be black. Outer jacket color shall be black except forcable to be used in intrinsically safe systems it shall be light blue.

2.1.6 Armour over inner jacket shall be of galvanized steel wire/flat as per IS-1554 part-I.

2.1.7 A pair or triad identification shall be with numbers at interval of not more than 250 mm as per vendor's standard.

2.1.8 Tolerance in overall diameter of cable shall be within +_ 2mm over offered value for cables with OD less than 30mm and+3mm for cables with OD more than 30mm.

2.2 Type-II

(Multipair / Multitraid cable with individual pair shield and overall shield)

The cable shall be same as single pair shielded cable except conductor sizeshall be 0.5 sq.mm made of 16 strands of annealed electrolytic copper conductor. Each strand shall be of 0.2mm dia.

Additional feature shall be as follows:

2.2.1 Overall shield shall be of Aluminium backed up by Mylar/polyester tape helically applied with the metallic side down either side - 25% overlap and 100% coverage. Minimum shield thickness shall be 0.075mm Drain wire shall be similar to individual pair drain wire and shall be in continuous contact with the Aluminium side of the overall shield.

2.2.2 Overall twist of all pair/triads shall be as per vendor's standard.

2.2.3 A pair of communication wire shall be provided for multipair/multitriad cables. Each wire shall be 0.5 sq. mm of plain annealed single or multistrand copper conductor with 0.4 mm thick 85°C PVC insulation. Insulation shall be green and red colour coded.

2.3 Type-III

(Multipair/Multitriad cable with only overall shield)

These cables shall be same as type-II cables except that the individual pair/triadshall not have shielding.

2.4 Type-IV

(Multipair/ multitriad cable with individual pair shield and overall shield)

The cable shall be same as Type II except conductor size shall be 1.5 sq.mmmade of 7 stranded annealed electrolytic copper conductor. Each strand shallbe 0.53 mm dia.

2.5 Type-V

(Multipair/ Multitriad cable with overall shield only)

The cable shall be same as type IV except that the individual pair/triad shall nothave the shielding.

3.0 Electrical Characteristics

3.1 Maximum d.c. resistance of the conductor of the completed cable shall not exceed 12.3 ohms/km at 20° C for cables with 1.5 sq.mm conductor and 39.7 ohms/km at 20°C for cables with 0.5 sq.mm conductor.

3.2 Capacitance

3.2.1 Mutual Capacitance

The mutual capacitance of the pairs or adjacent cores shall not exceed amaximum of 250 pF/Meter at a concequency of 1 KHz.

3.2.2 Capacitance between any core or screen.

The capacitance between any core or screen shall not exceed a maximum ofPF/Meter at a frequency of 1KHz.

3.3 L/R ratio of adjacent core shall not exceed 40 micro henry/ohm for cables with 0.5 sq. mm conductor.

3.4 The drain wire resistance including shield shall not exceed 30 ohms/km.

3.5 Electrostatic noise rejection ratio shall be over 76 dB.

4.0 Testing

4.1 Type test: Cable shall be flame retardant to IEC 332 Part III Cat. A. For qualification certificates from third party or client /consultants authorised representative for this test shall be furnished by vendor for cables similar to those being offered.

4.2 Routine tests: (To be carried out by vendor during various stages of manufacture. Purchaser shall review the related documentation).

4.2.1 Insulation and jackets: All tests as per IS-5831 except insulation resistance, voltage and spark test shall be as per BS-5308. Part-II(1986)

4.2.2 Armour test as per IS-3975.

4.2.3 Conductor resistance.

4.2.4 Cable capacitance and L/R ratio.

SPECIFICATION FOR INSTRUMENTATION

1.0 GENERAL

1.1 INTRODUCTION

1.1.1 This part of the technical specifications covers in general, definitions, standards, scope of works, specifications of work, documentation, scope of supply of materials and scrap and excess materials and different requirements to be adhered to during the course of execution of instrumentation works.

1.1.2 Instrumentation works shall be performed in accordance with this technical specification and various other drawings and schedules supplied during the execution and time to time instructions from Engineer-in-Charge or his authorised representative(s) during the progress of the work.

2.0 DEFINITIONS

2.1 MANIFOLDS

2.1.1 For close coupled instruments "Manifold" shall mean complete piping of instruments from first block valve upto the instruments, if the distance of the Instrument is within 2 feet (0.6m), from the Instrument tapping. If the distance of instrument is more than 2 feet (0.6m) from primary tapping such as orifice, thenthe installation is to be considered under remote installation.

2.1.2 For remote mounted instrument, "Manifold" shall mean the assembly of nipples, valves and fittings around the instrument to form a block and bleed or by pass manifold or drain manifold as the case may be. These shall be generally according to the hook up drawings enclosed with tender. Wherever the instruments are with 3--way-valve manifold, this definition shall not be applicable as 3-way manifold forms part of instrument.

2.2 FIRST BLOCK VALVE

First block valve shall mean the valve/valves that are mounted directly on equipment, columns, pipe, standpipe etc. and shall be operated to isolate the instrument and connected instrument piping from the above items.

2.3 SUPPORTS

Supports shall mean the MS angles, flats, channels that are generally providedto support the main cable ways, cable ducts, junction boxes, angle trays, perforated trays, instrument piping, signal tubing, instrument air supply lines etc.,at specified intervals from the structures, concrete columns etc. to keep all itemsfirmly secured against vibration, warping, bending etc.

2.4 SCRAP

2.4.1 Salvageable scraps

Salvage scrap shall mean lengths of tubes, pipes, multicables, other cables etc.that can be used one time or other at later date and normally they are recoveredfrom the cut-pieces of tubes, pipes, multicables, cables, etc.

2.4.2 Non Salvageable Scrap

Non salvageable scrap shall mean the lengths of tubes, pipes, multicables,cables, etc. that cannot be used at all one time or other.

2.5 Standards

The instrumentation erection and calibration works shall be carried out generallyin accordance with various international and Indian standards in instrumentationlisted below but not limited to the following:

2.5.1 API -RP-550 Manual on Practices for instrumentation.

2.5.2 ISA standards and Practices for instrumentation

2.5.3 Instrumentation hook-up standards enclosed.

2.5.4 Instrumentation supports standard enclosed.

2.5.5 Manufacturer's standards and Practices.

3.0 SCOPE OF WORK

3.1.0 The Scope of work shall consist of supply of instrument items (as per scheduleof quantities/rates and SCC), instruments, their erection, testing, calibration and commissioning and making it ready for commercial operation. The scope covers various jobs listed under the schedule of quantities/rates. However to ensure proper execution and completeness of instrument--work any or all of the following shall also form the part of the scope and shall be covered in the quoted rates.

3.1.1 Fabrication of pipe nipples, including threading whenever required.

3.1.2 Fabrication of seal pot/syphon/drain pot as per standards. Filling of seal pots with filling liquids as per instructions from Engineer-in-charge.

3.1.3 Back/seal welding of screwed fittings as required by standards.

3.1.4 Laying of cable underground including excavation, sand filling, brick laying and back filling.

3.1.5 Connection of purging devices for instruments to the systems provide as per drawings.

3.1.6 Civil works including the casting of foundation as per requirements for

instruments supports where paved surface do not exist.

3.1.7 Minor civil works like chipping of pavement and grouting on the pavements the instrument panels/supports/stanchions, and chipping and refilling of the pavement for conduits.

3.1.8 Sealing of cables/ tube entries into the control room after laying and testing of all tubes, cables etc.

3.1.9 Degreasing of handwheels of control valves, stud bolts, nuts of side and bottom flange of control valves, orifice plates, other primary elements flanges, oxygen service impulse lines, instruments as per manufacturers instructions and other items as required by Engineer- in-charge.

3.1.10 Rotation of control valve bonnet wherever required.

3.1.11 Reversing the action of control valves either the replacement of springs, accessories or in positioner wherever required.

3.1.12 Minor modification/repairs required to be done on the instruments namely, changing the dial, glasses for pressure gauges, temperature gauges and other instruments, replacement of rotameter tubes, level gauge glasses, replacementof damaged signal tubes, threads, couplings etc.

3.1.13 Painting of all structural supports for trays, pipes, junction boxes, instruments, etc, as per painting specification.

3.1.14 Identification with approved colour of paint the instruments/impulse, lines manifold connected with alarm/trap circuit. Also, punching of tag numbers on items shall be carried out as per instructions of Engineer-in-charge.

3.1.15 Coordination with mechanical and other sub-contractors for proper installation of line/ vessels/ equipment mounted instruments like control valves, orifice assemblies, turbine meters, PD meters, level transmitters, level gauges, level switches etc. which involves removal of instruments, disconnection of tubes/cables, reconnection for alignment proper installation etc.

3.1.16 Drilling holes on all panels, shut down cabinets, power supply cabinets, control panels pneumatic enclosures etc., for cables/ multitubes/ glands/ groomats.

3.1.17 Grounding of shield of all shielded cables to respective instruments earth bus provided in the control room/local panel/thermocouple head.

3.1.18 Laying and termination at both ends between instrument earth buses provided in control room/ local panel to instrument earth pit provided by others.

3.1.19 Supply of all types of consumables required for the execution of the job.

3.1.20 Submission of monthly material appropriation statements for cables, piping materials fittings, including the quantity issued and expended in standard proforma.

3.1.21 Completion of owners drawings/documents, as per the execution of work at site.

3.1.22 Preparation and submission of as built drawings as required.

3.1.23 Start-up and commissioning.

3.1.24 Submission of final material appropriation statements for all the materials issuedby the owner.

3.1.25 Any other work not mentioned above, but required for the proper execution of the works.

3.1.26 Where requested by owner/Engineer-in-charge or his authorised representatives, all or any of the works detailed above and schedule quantitiesshall also be performed on package units, local panels/cabinets/gauge boardinstalled by owner or by others.

3.1.27 Sealing of safety valves/switches with standard lead seals after final setting inthe presence of Engineer- in-charge.

4.0 DESCRIPTION OF WORK

4.1.0 INSTRUMENT PIPING

4.1.1 All primary piping shall be installed in the best workman like manner and shall follow installation standards in each case. Where there is no installation standard, the instruction of the Engineer-in-charge shall be followed.

4.1.2.1 Horizontal and vertical lines shall be installed using levels and plumo bobs.

4.1.3 Unless otherwise specified in the drawings pipelines shall have a slope of 8%on the horizontal runs.

4.1.4 All welding shall be carried out as per welding procedures and codes with electrodes approved by Engineer-in-charge. Only qualified welders approved by Engineer-in-charge shall carry out welding. Charges for non-destructive testing like radiography, Dye penetration tests, post heat treatment tests and stress relieving shall be carried out on the basis of actual man hours spent towards these works and man-hour charges with cost of all materials, test equipments,etc. shall be used. However, any materials like electrode, equipments, testingcharges for various tests, etc., required for the initial qualification of the welder/welders shall be or the scope of the contractor.

4.1.3.1Pipe shall be bent using pipe benders only and any bending will be totally rejected.

Pipes shall be cut using pipe cutting device. Hot cutting will not be allowed.

4.1.6 Piping for steam tracing shall be installed according to the standards and avoiding condensate pockets.

4.1.7 All threaded joints shall be jointed with Teflon tape and no other pipe jointing

compound shall be used except on high temperature service where graphited sealing compounds shall be used.

4.1.8 All primary piping shall be properly supported at regular intervals of 1.0 meters. Angle supports shall be fabricated from 40mmx40mmx5mm MS angles as minimum.

4.2.0 PVC COVERED/BARE TUBE (COPPER/SS/ALUMINIUM)

4.2.1 Single copper/SS/Aluminium tubes shall be laid as per standards on trays. Fabricated out of 2.5 mm thick perforated steel plate. The width of the trays shall be selected as per the number of tubes laid. Tubes shall be clamped to thetrays at every 300 mm using clamps made of galvanized steel/Aluminium strips.The practice of flattening tubes for clamping purposes shall be avoided. In case of PVC covered tubes, any exposed portion at ends and connection shall beneatly taped to appropriate thickness.

4.2.2 Trays shall be properly supported either from any rigid steel structure or concrete member as detailed under trays and supports below.

4.2.3 All male/female tube connectors shall be installed with Teflon tape only. Identification tag plates/ferrules shall be provided on either side of copper tubingas per tubing/junction box schedules. Ferrules shall be single sleeve type withletters and numbers neatly printed.

4.3.0 INSTALLATION OF MULTITUBES AND MULTICORE CABLES

4.3.1 Multiple cables/ multitubes shall always be installed on ducts/trays and properly clamped. At every vertical drop to junction boxes, they shall be clamped at more frequency intervals (Maximum of 300mm). They shall be connected inside junction boxes strictly according to the number system as mentioned in cable schedule. At bends minimum radius shall be maintained as per manufacturer's standard. The angle tray supports shall be fabricated from 40mmx40mmx5mm angles minimum size.

4.3.2 Identification tags shall be provided on either end of multitubes, multicore cablesas per cable/tubing/cable schedules. Engraved tag plates or PVC ferrules shallbe used for identification of tubes/cables.

4.3.3 All Multitubes and Multicables shall be cut after the exact site measurements are taken between ends and the cable/tube drums shall be selected before cuttingthe lengths so as to avoid any wastage.

4.3.4 In the field, the cables shall be laid in perforated trays as per layout drawings. Cables shall also be buried or laid in concrete trenches. Inside control room, these shall be laid in concrete trenches or under false floorings.

4.3.5 In the field, the cables shall be laid in perforated trays as per layout drawings.

Cables shall also be buried or laid in concrete trenches. Inside control room, these shall be laid in concrete trenches or under false floorings.

4.4.0 INSTALLATION OF INSTRUMENTS

4.4.1 All instruments shall be generally installed on supports as per installation standards in each case, and shall be accessible.

4.4.2 Receiver gauges shall be mounted on instrument support itself as per tubing hook up standards.

4.4.3 Filter regulators shall be mounted on the instruments support itself below the instruments or on the control yoke.

4.5.0 INSTRUMENT AIR SUPPLY

4.5.1 The main instrument air header in each area is laid by other contractor. Air supply from the main air header take off valve to individual instrument shall be through either galvanized steel pipe or 1/4" OD PVC covered copper tube or SS tubes.

Individual takes off valves shall always be located on top of the main air header.Unions shall be provided at convenient locations. There shall be one isolation valve at each instrument end. The galvanised pipe shall be supported at a minimum interval of 1000 mm with 40mmx40mmx5mm MS angles. Final connection to be instrument shall be copper/SS tubing as per tubing hookupstandards.

4.5.2 Teflon tapes shall be used on all threaded joints.

4.6.0 INSTRUMENT STEAM TRACING

4.6.1 The mainsteam header in each area is laid by the other contractor. From themain steam header take off valve, steam to individual instrument shall be taken through carbon steel pipes supported at regular intervals. Steam tracing around individual instruments shall be to copper tubes. After steam tracing, the line is connected to the drain funnel through individual steam trap/condensate return header/tapper point as the case may be.

4.6.2 Electrical tracing shall be done by others.

4.7.0 PERFORATED TRAYS AND SUPPORTS

4.7.1 The perforated trays / angle trays shall be properly supported at a regular interval of max. 1000mm from insert plates or steel structures. Wherever insertplates are not available supports on concrete structures on ceiling shall be fixed with a minimum 10mm diameter expansion bolts. Angle supports for perforated trays/angle trays shall be fabricated from 40mmx40mmx5mm M.S. angles minimum size.

4.7.2 All supports shall be cut with hacksaw and any work executed by gas cutting for cutting and drilling holes will be totally rejected. Free ends of angle support shall not have sharp edges and shall be properly rounded off.

4.7.3 Perforated trays/angle trays shall be used for branching cables and tubes frommain trays. Perforated trays shall be used for branching cables and tubes frommain trays. Perforated trays shall be fabricated out of 2.5 mm perforated steelsheet. Width of trays shall be selected according to number of tubes and cables.Trays shall be laid generally as per site conditions with the approval of Engineer-in-charge.

4.8.0 LAYING OF CABLES

4.8.1 All cables shall be laid in accordance with installation drawings and cable schedules. Before laying, cable/multicable on drums shall be meggered and tested to ascertain the transit damages.

All cables routes shall be carefully measured and cables cut to the required lengths, leaving sufficient amount for the final connection of the cable to the terminals on either end. The various cable lengths cut from the cable reels shallbe carefully selected to prevent undue wastage of cables. Sufficient extra length of cable shall be kept at the terminal on points.

4.8.2 Cables shall have complete uncut lengths from one terminal to the other.

4.8.3 All cables shall be identified close to their termination point by cables number as per cable schedules/junction boxes schedules. PVC ferrule/tag plate shall beused and these identification tags shall be securely fastened to the cables.

4.8.4 All cores of electrical cables shall be identified by their wire numbers by meansof the PVC ferrules. Wire numbers shall be as per schedules. All temporaryends of cables shall be protected against dirt and moisture. For this purpose,ends of all PVC insulation cables shall be taped with an approved PVC or rubberinsulating tape. Use of function type or other fabric type is not permitted.

4.8.5 The cable shall be bent in a large radius. Cables installed above ground shallbe run exposed on walls, ceilings, structures and shall run parallel or at rightangles with beams, walls or columns.

4.8.6 Cables shall be rigidly supported on structural steel and masonary individually orin groups as required using galvanised clips, multiple cable supports or cabletrays. If drilling of steel must be resorted to, approval must be obtained and steelmust be drilled where the minimum of weakening of the structure will result. Cable shall be supported at every 500 mm.

4.8.7 All special cables and power supply cables will be laid directly to the field instrument without any junction boxes, unless otherwise specified.

4.8.8 While laying cable in trenches or burying them care shall be taken to ensure thatlow signal cables like alarm, analyser cables, special cables, special cables fromturbine meters, compensating cable etc. are separated from other power supplycables.

4.8.9 Each underground cable (either in concrete trenches or burried) shall be

provided with identifying tag of lead securely fastened every 30m of its underground length with atleast one tag at each end before the cable leaves/enters the ground.

Directly buried cables shall be laid underground in excavated cable trench wherever specified in layout drawings. Trenches shall have sufficient depth andwidth to accommodate all cables correctly spaced. Before cables are placed thetrench bottom shall be filled with 100 mm layer of sand and leveled. Each layerof cables shall be covered with 150 mm of sand on top and sand shall be lightlypressed. A protective covering of 75 mm thick second-class red bricks shall beplaced flat on the final layer of sand and cable. The remaining portion of thetrench shall be then back filled with soil compacted and leveled. On complete ofevery group of cable laying and before sand filling, every cable shall be giveninsulation test in the presence of Engineer-in-charge. Any cable proved to bedefective should be replaced before the next groups of cables are laid. Cableroute markers indicating number of cables, depth and direction will be placed enroute, on crossovers/turnings, etc. to mark the cable route.

4.8.10 At each road crossings 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 after pack filling.

4.8.11 At the entry into concrete blocks at road crossings cable loops shall be providedat either end to prevent any damage to cables. Each cable shall have one tag ateach end before the cable enters/leaves conduct pipes

4.8.12 After laying of all the cables and multitubings, cables, the cable entry to control room shall be suitably filled and sealed so as to achieve a positive seal againstthe entry of gas/water.

4.8.13 All cables and tubes shall be laid in accordance with the layout drawings with sand and precast concrete slabs shall be placed on the trench.

4.8.14 On completion of cable laying in concrete trenches, the trenches shall be filled with sand and precast.

4.9.0 EARTHING

4.9.1 Earthing of junction boxes, local cabinets as per the documents and instruction from Engineer-in-charge.

4.10.0 PAINTING

4.10.1 This part of the specification is applicable to cable ducts, MS cable ways, angle trays, instrument supports, perforated trays, all structural supports for the above items, etc.

4.10.2 The surface to be painted shall be thoroughly cleaned with wire brush, sand paper to remove all scales. After cleaning, the surface is painted with one coatof red oxide zinc chromate primer conforming to IS- 207 and allowed to dry completely.

4.10.3 Primer coated surface is painted with one coat of paint to the colour nearest tothe final paint and allowed to dry. The colour number shall be specified fromIS-5.

4.10.4 Final second coating shall be with the paint of desired colours and shall be selected from IS-5.

4.10.5 It shall be noted that final second coating of external surfaces not covered by cables, copper tubes etc. shall be applied just before handling over the plant or commissioning of the plant whichever is earlier.

The name of manufacturer, colour and quality of all types of primer paint shall be subject to approval of Engineer-in-charge.

4.11.0 TESTING

4.11.1 Electrical cables for signal power supply alarms, and compensating cables for thermocouples; resistance thermometer cables shall be checked for megger values and continuity before proper termination and ferruling.

4.11.2 Testing shall be carried out after the installation of instrument with primary piping complete in all respects and approved by Engineer-in-charge.

4.11.3 Primary piping shall be tested hydraulically pneumatically to 1.5 times the operating pressure after isolating the instruments. Flushing of piping shall be carried out as per instructions of Engineer-in-charge. Lines shall be blown after hydro-testing. All external displacement /float type level instrument level gauges shall also be tested as per instructions of Engineer- in-charge.

4.11.4 Tubes and air line shall be tested with compressed air to 7 kg/cm^2 upto the filter regulator. The down steam side of the filter regulator shall be tested for 1.5kg/cm^2. The lines shall be blown with the instrument air upto the regulator for15 minutes to remove any traces of oil, dust & moisture. All lines shall be checked with soap solution and bubbler unit for possible leak at joints. After pressurizing, source shall be cut off and rate of fall in pressure shall be less than1 p.s.i. for each 100 ft. of copper tubing for a test period of 2 minutes as per I.S.A.R.P.7-1 "Pneumatic control circuit pressure test".

4.11.5 All test results shall be recorded in the approved format.

4.12.0 CALIBRATION

4.12.1 All instruments shall be calibrated strictly as per manufacturer's instructions priorto installation. The scope of calibration includes all field and control rooms of alltypes namely, pneumatic, electronic, electrical etc.

4.12.2 Contractor shall use his own oil free instruments, air compressor for calibration purposes.

4.12.3 The level switches (external cage type) shall be set by filling the cage with water to the desired alarm/trip level, while setting the switches, it shall be ensured that the micro switches do not reset for full rated travel of the float.

4.12.4 Control valves and positioners shall be checked for hysterisis and linearity and calibration for rated strokes. Prior to calibration, valves shall be cleaned externally. The stem is then lubricated if required, and stroked few times to extreme positions of plug to ensure that movement is free from friction. The valve shall then be calibrated for rated stroke and linearity also. Subsequently the valves shall be checked for hysterisis to the accuracy of 1% FS with positioners and 5% FS without positioners.

Stroke speed has to be evaluated for all trip/shutdown valves.

4.12.5 All calibrations reading shall be recorded in the enclosed format and submittedto Engineer-in-Charge for approval. Where significant deviations from specifications are obtained, the matter shall be brought to the immediate noticeof the Engineer-in- Charge for corrective actions.

4.12.6 Furnished hereunder is a list of recommended calibration and test equipments required as a minimum for calibration work. The contractor shall clearly state in his offers the complete list of calibration and test equipments along with the range, accuracy and quantity, which he proposes to use for this job. Contractor should also ensure that any equipment not listed below but required at the timeof calibration shall be made available at his own cost.

4.12.7 All test equipments/kits shall be approved by NPL authorities.

4.12.7.1 Controller test stands Mft. Standard

4.12.7.2 Indicator/recorder test stands -do-

4.12.7.3 Squeeze bulb (Flow calibrator -Range: 0-770, 10,000 mm wg.

4.12.7.4 Dead weight testers (Budenberg or equivalent)- +/- 0.1%For ranges upto 350 kg/cm^2

4.12.7.5 Gauge comparator for pressure gauges -Rating : upto 350 kg/cm^2

4.12.7.6 Oil bath for temperature calibrations
Mfr's Stdmax. Temp 350°C.

4.12.8.7 Standard Mercury in glass thermometers- Range : -50 to + 50°C. 0 to 100°C
± 0.25% (NPL certified) 0-250°C, 0-350°C

4.12.7.8 Standard gauges for Ranges upto 350kg/cm^2 ±0.25%

U-tube differential manometers/inclined tube manometer Static pr. rating : 7 kg/cm^2 +_ 1mm

4.12.7.9	Single leg manometers +_ 1mmScale: -1500 mm water and 1500 mm hg. Static pr. rating : 7 kg/cm^2.	
4.12.7.10	Decade resistance box	MFR' std.
4.12.7.11	Millimeters	±0.05Mv
4.12.7.12	Potentiometer (Cable of generating and measuring mV)	-
4.12.7.13	Meggers 500V/1000V	-
4.12.7.14	Air hydro pump/hydraulic pump	-
4.12.7.15	Vacuum pump	-
4.12.7.16	Instrument air compressor with filters and and deoilers.	-Regulators
4.12.7.17	Current generator (instrument checker) dc(YEW make or equivalent)	-4-20mA

4.13.0 LOOP TEST

4.13.1 Loop test shall be performed after calibration of all instruments and leak test of signal lines. Loop tests are conducted to check the functional performance of all elements comprising the loop, thereby ensuring proper connections and operations.

4.13.2 Before proceeding for loop tests the calibration results of individual elements shall be recorded on the enclosed proforma and shall get it approved by Engineer-in-Charge for correctness of installation, measurements and calibration results.

Loop testing for all control loops shall be generally by simulation of process conditions and shall fix points namely 0%, 25%, 50%, 75% and 100% of full-scale inputs. Detailed procedure shall be submitted to Engineer-in-charge forapproval before proceeding with the loop testing.

In case of shutdown system field/receiver pressure switches are simulated for abnormality by disconnecting the wires at terminal and function of all associatedsystems are checked.

4.13.5 Performance of individual loops may be accepted for an overall accuracy of ± 1.5% where deviations exist, contractor shall recalibrate the instruments, which form part of loop testing wherever required, at no extra cost.

4.13.5.1 After the loop test is complete, the contractor shall connect back any

terminations and connections removed for loop test.

4.13.7 A loop shall be considered as handed over only after measurements in that particular loop are complete and certified by Engineer-in-Charge, in addition to loop sheets being duly filled in all respects and approved and accepted by Engineer-in-Charge and client.

4.13.8 In case of loops in which certain instruments of the loops are calibrated by other agency, loop testing shall be performed in coordination with the agency involved. Any defect in the calibration of the instrument in contractor's scope is observed,it shall be rectified to the satisfaction of the Engineer-in- Charge. However, defect in calibration of the instruments in the scope of other agency, same shallbe rectified by the agency involved. After the calibration has been rechecked bythe other agency/agencies the loop checking would be performed to the satisfaction of Engineer-in-Charge, and this part covers under the scope of thecontract.

4.13.9 Final certified loop sheets shall be submitted in 4 copies and one transparency.

DRAWINGS AND DOCUMENTS TO BE PROVIDED BY CONTRACTOR

5.1.1 Piping ad Instrumentation diagrams.

5.1.2 General layout plan for all units, showing all information like position of field instruments junction boxes indicative routes of cables, main ducts/cable trays.

5.1.3 Cable schedules for alarm, signal, shutdown, power supply and pneumatic cables, earthing guide lines.

5.1.4 Termination details/drawings for connecting at control room end.

5.1.5 Individual Instrument specifications

5.1.6 Bill of materials

5.1.7 Installation standards/ Hook-up

5.1.8 Manufacturers hand book with instructions for installation and calibration wherever necessary for reference.

5.1.9 The drawings for materials that are included on their supply and erection scope namely local control panel, junction boxes and local cabinets.

5.1.10 The detailed engineering drawing wherever such drawing is assigned.

5.1.11 Two sets of layout drawings, standards bill of materials cable schedules etc., duly incorporating the changes/modification carried out during the course of execution of works.

5.1.12 Final material appropriation statement for all free issue materials indicating shortages of any in the proforma duly approved by Engineer-in-Charge.

STANDARD SPECIFICATIONS FOR CABLING

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 withthis 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 systems shall be of 1100 Volts grade, aluminiumstranded conductor, PVC insulated, PVC sheathed, armoured and overall PVCsheathed. Power cables for 3.3 KV 6.6 KV and 11 KV system shall be aluminium conductor, XLPL insulated, screened, PVC bedded galvanized steelflat armoured and PVC sheathed cable. All L.T. Cables conform to standardspecification and relevant sections of IS: 1554 Part-I and H.T. Cables shall conform to IS: 7098 (Part II). Unarmoured cables will be used wherever specified on the cable schedule.

3.2 Control Cables:

Control cables shall be 1100 Volt Grade, 2.5 mm^2 copper conductor PVC insulated PVC sheathed, single wire armoured with an overall PVC sheath, asper IS: 1554 Pt. Unarmoured cables shall be used wherever specified on thecable schedule.

3.3 Communication cables:

Communication cables shall comprise 1 pair unarmoured, 2-pair, 5-pair and multipair armoured cables of sizes as specified in the cable schedule. Minimumconductor 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 aluminium / tinned copper crimped typesolder less lugs of M/s. Dowell's make or approved equivalent for all aluminiumconductors and stud type terminals.

4.2 Cable Identification

Cable tags shall be of 2 mm thick, 20 mm wide aluminium strap of suitablelength to contain cable number, equipment no., etc.

4.3 Ferrules

Ferrules shall be of approved type size to suit core size mentioned and shall beemployed 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 becertified by CMRS.

4.5 Multi Cable transit

Multi Cable Transit shall be used for cable entry to all type of control room walls, Decks, Firewall etc. The MCT Block system should have only few components for facilitating simple, easy and quick assembly. The Multidiameter based cable transits shall be repeatedly re-openable and re- usable without the need of special tools and discarding the modules in normaloperation.

Frame shall be G type galvanized or stainless steel. Block should be multi diameter blocks with center core in all the blocks / add blocks with plug / galvanized or stainless steel stay-plates / single piece compression wedge with galvanized or stainless steel bolts. Solid blocks and insert blocks shouldnot be used. MCT should have 100% spare for each cable size / O.D. Spare blocks should be available on the frame as usable Multidiameter blocks / addblocks with center plug, so that these spare blocks in future can be used for wide range of cables also, solid blocks should not be used at all on frame. Apart form spare if there is any additional uncovered space left on frame then this uncovered space should also be filled only with usable Multidiameter blocks with center plug only.

The Multi Cable & Pipe Transit penetrations should have been tested for GasTightness / water tightness & fire tests.

4.6 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 largerthan 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 than2000 mm respectively. Cross support shall be 32 x 6 mm flat/ 25x25x6 angle forwidth upto 500 mm/ more than 500 mm respectively.

Vertical supports for both the above type of trays shall be fabricated outof ISMC 100 and horizontal supports with 75 x 50 x 6 angle iron/ ISMC 75 asapproved by Engineer-in-Charge.
If unit rate is not included in schedule of rates, then cable trays if required, shallbe fabricated and installed at site as per tone rate for electrical structural supports etc.

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 onthe 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 fromeach other by adequate spacing or running through independent pipes, trenchesor 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 shallbe taken in a separate trench with a minimum clearance of 300 mm away fromelectrical trench as per the direction of Engineer-in-Charge and 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 reelsshall 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 atsite and avoiding interference with structure, foundation, pipelines or any otherworks. Before the start of cable lying, cable drum schedule; shall be prepared be electrician contractor and get that approved by Engineer-in-Charge to minimize/avoid straight through joints required. Contractor shall work out theactual 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 thatcriss-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 belaid 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 beprovided for ease of drawing of cable or for replacement. In places where it isnot 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 cabletags shall be circular in construction to which cable numbers can be conveniently punched.

Each underground cable shall be provided with identity tags of lead securelyfastened every 30 m of its underground length with at least one tag at each endbefore the cable enters the ground. In unpaved areas, cable trenches shall beidentified by means of markers as per standard drawing. These posts shall beplaced at location of changes in the direction of cables and at intervals of notmore 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 sheathed cablesshall be plumbed with lead alloy.

5.8 RCC cable trenches shall be with removable covers. Cables shall be laid in 3 or4 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. The electrical Contractor at no extracost shall do removal of concrete covers for purpose of cable laying and reinstating them in their proper positions after the cables are laid.

Cables shall be handled carefully during installation to prevent mechanical injuryto the cables. Ends of cables leaving trenches shall be coiled and provided witha protective pipe or cover, until such times the final termination to the equipmentis 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 viewof heat dissipation and economy of design.

Minimum depth of buried cable trench shall be 750 mm for low voltage and 900mm for H.V. Cables, the depth and the width of the trench shall vary

dependingupon the number of layers of cables.

Cables shall be laid in trenches at depth as shown in the drawing. Before cablesare placed, the trenches bottom shall be filled with a layer of sand. This sandshall be levelled and cables laid over it. These cables shall be covered with 150mm 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 thenbe laid flat. The remainder of the trench shall then be back-filled with soil, rammed and levelled.

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 ofcables is laid.

All wall openings / pipe sleeves shall be effectively sealed after installation ofcables 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 tothe 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 cablesspecified by the manufacturer.

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 forsealing purposes. The cost for the same shall be deemed to have been includedin 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 orstructures, 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 adequatebed

of sand shall be given so that the cables do not slack and get damaged bypipe 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 adjacenthot 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 installationof cables and no separate payment shall be made on this account. Alternativelysmall 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 ingroups 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 structurewill result.

Cables shall be supported so as to prevent unsightly sagging. In general distance between supports shall be approximately 300 mm for cables up to 25mm diameter and maximum 450 mm for cables larger than 25 mm dia.

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 thatthe 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 beundertaken well before paving is completed and necessary co-ordination withpaving agency shall be the responsibility of Electrical Contractor. The open endsof pipes shall be suitably plugged with G.I. Plugs after they are laid in final position. The Contractor at no extra cost shall supply G.I. Plugs.

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 up to 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 aremade 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 aluminium connections is made, necessary bimetallic washers shall be used. For trip circuit identification additional red ferrules shall be used only in the particular cores of control cablesat 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 startingthe work. All unused spare cores of control cables shall be neatly bunched andferruled 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 approved type,at no extra cost. All switchgear and control panels shall have undrilled glandplate.

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 maybe 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 bottomplate for all the cables in one line, then bottom plate should be split in two partsalong 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 theopen armouring to connect it to earth bus.

6.6 Cable leads shall be terminated at the equipment terminals, by means of crimped type solder less connector 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 shouldbe removed immediately before the crimping. Conductor surface shall be cleaned and shall not be left open.

6.7 <u>Cable accessories for H.V. Systems</u>

6.7.1 The 11, skilled and experienced jointers duly approved by the Engineer-in-Charge shall do 6.6 and 3.3 KV cables terminations joints. Termination

including supplying of jointing kit shall be threaded in Contractorscope unless specified otherwise.

6.7.2 The termination and straight thro' joint kit. For use on high voltage system shallbe 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 consumablesitems. An installation instruction shall be included in each sheet.

6.7.3 The termination kits shall be suitable for termination of the cables to 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 fortress grading.

b) `PUSH-ON' type of CCI make using factory - moulded silicone rubber insulators.

c) `TROPOLINK' type of CCI makes.

d) Heat-shrinkable sleeve type of M/s. Raychem.

For outdoor installations, weather shields/sealing ends and any otheraccessories required shall also form part of the kit.

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, along with 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 small 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 up to 1.1 KV grade, 1KV Megger and for H.V. Cables 2.5 KV/5 KV,
2.4 KV/4.9 KV Megger 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 leakagecurrent versus time.

The D.C. High Voltage test shall be performed as detailed below in the presenceof the Engineer-in- Charge or his authorized representative only.

Cables shall be installed in final position with the entire straight through jointscomplete. 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.

TECHNICAL SPECIFICATION FOR ODORIZING SYSTEM

1.0 ODORIZING SYSTEM DESCRIPTION

1.1 *General*

The Odorising System is required to mix the odorant in the natural gas for identifying the leakage in the associated equipment or during transportation of piped gas in the city area.

The intent of this Technical Specification is to outline minimum requirement for Design, Engineering, Manufacturing, Supply, Erection & Commissioning of equipment along with Supply and Erection of associated electrical and mechanical works for Odorising System complete with all auxiliaries & features required for efficient & safe operation.

2.0 **PROCESS PARAMETER AND SPECIFICATION:**

2.1 *Gas Composition & Gas Pressure and Temperature condition:*

The expected gas composition is given in the Job specification enclosed with the Tender. The Odorizing System should be designed to meet the changes in the gas compositions fromgas fields, India. The inlet gas pressure & temperature to the Odorizing System also define in the MR/Job specification

2.3 *Operations & Control Philosophy*

The Odorizing System should be designed with minimum operator intervention. Any system requirement at site for proper operation shall be consider in the Scope of supply and design. The maintenance frequency of the system shall be 18 month or better.

2.4 *Design Philosophy*

It is anticipated that the natural gas feed composition, flow rate and pressure will be fluctuating. Hence, Supplier should design the Odorizing System with optimum degree of flexibility, reliability, and operatability to accommodate the varying composition of feed, other unexpected contaminants, flow rate and pressure.

The Odorizing System facilities should consist of standardised modules, which are assembled into a complete system. Each system should be designed in packaged frame, housing, etc. The design life of the Odorizing System should be minimum 30 years.

2.5 *Design Basis*

The Supplier should prepare the design basis required to meet the demands mentioned in the Data sheet and Scope of work and liaise with Client or Consultant to obtain necessary confirmation and approval.

2.6 *Applicable Standards and Codes*

The design, construction, manufacture, supply, testing and other general requirements of the Odorizing System should be strictly in accordance with the data sheets, applicable codes, and should comply fully with relevant National/International standards, Indian Electricity Act, Indian Electricity Rules, regulations of Insurance Association of India and Factories Act while carrying out work asper this specification.

The Vendor without any additional cost and delivery implications should carry out any modification suggested by the statutory bodies either during drawing approval or during inspection, if any.

The following codes and standards (versions/ revisions valid on the date of order) are referencedto & made part of specification:

1. IS 5572 Classification of hazardous areas (other than mines) for electrical Installations.
2. IS 5571 Guide for selection of electrical equipments for hazardous area
3. OISD 113 Classification of areas for electrical installations at hydrocarbonprocessing and handling facilities
4. OISD-STD-220 (DRAFT III): For restricted circulation.
5. ASME & PNGRB Technical standards
6. ANSI, ASTM, NEC, NEMA, Indian Electricity Rules, Indian Explosives Act.

3.0 ODORIZING SYSTEM SPECIFICATIONS (Main Odorizing Units)

The brief requirements specified are applicable for main big odorizing system as well as Mini odorizing system (except power & field control unit pneumatic / electronic; refer Particular Job specifications for more details related to scope of work).

3.1 ELECTRONIC CONTROL UNIT (Main Odorizing Units)

The Supply of Electronic Control Unit of the Odorizing System will be by an external power source. Powers supply Single Phase AC, 230V±10%, 50Hz±3% through UPS and to be providedby Client.

Bidder has to provide Surge protection device of Make MTL/ Pheoenix in 230 V AC UPS Supply provided by the client. This should be installed at the JB where incoming power supply will be terminated). Any problem in the input supply, the equipment should be protected. The surge protection devise shall be pluggable and testable with thermal disconnection and indication facility. It should be for input power supply as per IEC standard IEC-61643-12

Note: Vendor to confirm that the supplied Electronic Control Unit are suitable with the above power supply and indicate the maximum and minium tolerable values of voltage for safe operation of Odorizing System. **Vendors must include suitable voltage conditioning system (Voltage Stabiliser) in their scope to prevent failure from voltage fluctuations if supplied equipments need the same.**

Electronic Control Unit should have the following specifications as minimum:

3.1.1. Electronic Control Unit should be provided with a Liquid Crystal Display (LCD) / L E D for ongoing Flow Monitoring, Operation Modes etc. It should be easy to read lighted display. Displays must remain active for at least 15 minutes after power failure. Necessary battery backup shall be provided in the system. Electronic unit shall have the external keypad for entering the data and provide password protection for unauthorised use.

3.1.2. Client will provide dedicated UPS supply for Odoriser Control Unit in Control room. The Power Supply cable has to be provided by the client however the terminations of power supply cable at Odoriser control Unit is in the Vendor's scope.

3.1.3. For the Odorizer auto Mode operation flow signal shall be provided in the form of analogue 4-

20 mA / serial communication data inputs / pulse from Flow Computers/ metering device. The offered Electronic Control Unit is able to accept two nos. of 4-20 mA signal/ serial inputs corresponding to instantaneous standard flow rates from each flow computer of dual steam metering system. Refer the respective job specifications for specific provisions considered for signals. For serial communication the protocal will be Modbus and all the necessary register addressing has to be done by the vendor.

3.1.4. Physical design should be of steel body with doors/panels with suitable paint to minimize corrosion and on-going wear and tear. The Electronic Control Unit should have locking arrangement. The panel/cabinet should be suitably designed to accommodate all required electronic equipment.

3.1.5. Mounting of Electronic Control Unit shall be wall mounted. Necessary provision for proper mounting shall be provided. Cable entry shall be from bottom, therefore necessary removable Gland plate with matching hole as per supplied Cable glands shall be provided.

3.1.6. The Protection Class of Electronic Control Unit shall be weatherproof to IP55 / NEMA4.

3.1.7. Odorizing System should not be shut off in case of:

i) Power failure
ii) Failure of throttling valve/regulator iii) Low flow
iv) Failure of any field instruments (Transmitters, temp. element, etc.)

3.1.8. The Electronic Control Unit should be capable of storing odorizing data and such data should be downloaded frequently into another portable computer to store the data. In order to meet the above requirement, 2 Nos. of RS232 Serial Communication ports shall be included in the Electronic Control Unit. One Port will be utilized for Portable Computer and another port will be utilized for future SCADA application. For this application, Vendor shall include in the scope all relevant software, together with the license, compatible to Microsoft Windows XP/2000 software.

The data of odorising unit shall be hook-up by the client in future by providing SCADA system and RTU. **The odoriser electronics shall have facility to read & write the data remotely through SCADA**. The electronics should have provision and dedicated communication card & port for connection to RTU for monitoring and control the transaction parameter. The detail requirements of SCADA will be communicated to the successful vendor during detail engineering. For selection of equipments compatibility for SCADA system vender shall considered the **MODBUS** RTU protocals, FCC-68, RJ 45 connection type, RS 232 D communication standard, Baud rate upto 19.2K, with configurable software.

3.1.9. All the cabling (Signal, Control, Power, Communication), Ex. proof JB, termination and mounting accessories from field to Control unit, Cable gland (Double Compression Type) shallbe provided. All the cable and tubing shall be mounted and dressed on the cable tray.

3.1.10. All the cabling (Signal, Control, Power) shall be armored FRLS type.

3.2 STORAGE CONTAINER

The capacity of each storage containers for Odorant shall be as specified in the MR specification.. The quantity of container will be indicated in respective Particular Job specification / MR. If more then one storage containers are used then the entire storage containers shall be interconnected. The containers should have positive pressure of Inert Gas if

required. Vent should be only for Inert gas. No odorant shall be vented in any case. Vent should have neutraliser container in case if there is a possibility of odorant to be vented out.

The odorant tank shall be constructed as per ASME section VIII specifications and other relevant section requirement. The tank shall have all valves necessary for proper filling, as well as volume indication, pressure relief, and pressure gauges.

The Container shall be made of Stainless steel (min SS 304) and suitable & certified for the Odorant handling. The Container shall have Inlet, Outlet, Drain Valve, Level Indication, Low level alarm switch with hooters, Y type strainer at outlet, pressure regulating valves with safety alarm, pressure relief valve with manual gas vent valve. Warning & Safety Instruction stickers shall be provided for each container.

3.3 PNEUMATIC PANEL

All transmitters & temperature element should be intrinsic safe "exia" as per IEC 79-11 and solenoid valves; switches and related junction boxes should be flame proof “Exd" as per IEC 79-1. Other special equipment's/instruments, where intrinsic safety is not feasible or available, should be flame proof as per IEC 79-1. Flying leads from any of the instrumentation items are not acceptable.

The Odorizing System shall be shipped in fully assembled condition. Only gas supply connection and power supply connection shall be made on site.

The pneumatic panel shall have cabinet and it will be installed in the Hazardous area. The Enclosure of pneumatic panel shall be weather proof.

The field unit (pneumatic panel with container assembly) shall be located in the hazardous area and may be more then 100 Meters away from the Main Gas pipe line. The Electronic unit will be in control room and may be more then 100 meter away from the field unit. The supplier shall indicate the distance limitation if any for the installation clearly during bid stage. Client/Consultant will not entertain any dispute during detail engineering and vendor has to supply the system to meet the tender requirements.

Vendor cannot use the Gas actuated operation of Solenoid valve, as it is not recommended.

For Mini odorising system; Gas actuation / operation is permitted due to non availability of power and the space.

3.4 ODORANT LOADING / UNLOADING SYSTEM:

Vendor shall provide Odorant Loading / unloading System for the filling of Odorant in to the Storage Containers. Manual pump (portable type) with proper safety features and with necessary connecting Hose & connector / coupler should be provided and shall be suitable for uses in Hazardous area. If refilling through Milkman concept then filling system shall have Nitrogen Blanketing System to avoid leakages of Odorant to Atmosphere during loading / Unloading. Necessary Nitrogen Cylinder shall be provided for blanketing during refilling.

Vendor shall provide detailed procedure and the arrangement for filling the Container with Odorant. It is the responsibility of the Vendor to fill the odorant (to be supplied by Owner) in Container/ tanks at site during final commissioning

Vendor shall Supply "Active Carbon Saw Dust" & "Sodium Hydrochloride" for Odorant 10 Kg each in Container for Odor and neutraliser for spillage handling of Odorant. The container shall be suitable for handling and Storing of these Chemicals for uses.

3.5 PIPE WORK, VALVES AND FITTINGS

Pipe work should be designed, tested and installed to ensure its safe operation at the worst conceivable conditions of flow, pressure and temperature.

All tubing work should be of SS fully annealed (Bright annealed) seamless conforming to ASTM A269- SS316. All tubing shall be minimum of ½" size shall be clamped and routed in GI tray up to pipeline. For any different end connection necessary adopter is in vendor's scope. The piping/tubing, valves, fittings shall be of Parker, Sandvik, Swagelok. The system should be "go-no- go" gaugeable to demonstrate that fittings are properly tightened. Wherever possible; valves and control devices should be of same end connector. The number of fittings used should be minimized. The Supplier should ensure that personnel assembling the pipe work should be competent in the system employed.

The preferred valve types for isolation are ½" quarter turn ball valves. Such valves have similar material to the tube they are attached to. Ball valves must be from Swagelok, Parker and be appropriately selected frequency of use. Ball seats/ Peek seats must be suitable for natural gas operation of the gas composition indicated.

Valves and fittings subject to corrosion must be either inherently resistant, or be coated with a corrosion inhibiting paint or surface treatment.

End connections including fittings & Valves to be supplied with the unit. Details required if any , to be conformed at the time of detail engineering.

Any accessories required for Odoriser Control Unit and the field unit & interconnection is inthe
Vendor's scope. Minimum tapping size shall be provided of ¾" only. Gas Inlet tapping willbe one number of ¾", more tapping as per the requirements of Vendor can be provided. The necessary Isolation Valves and weld –o- let in vendor's Scope.

Injector Probe Tapping will be Two no ¾", necessary Isolation Valves and weld –o- let suitable for the Injector probe is in vendor's Scope. **For any different size, Vendor should considered necessary adopter.**

4. 0 HAZARDOUS AREA

The Supplier should specify the hazardous area in accordance with the IS 5572.All electrical equipment cabling and earthing should be appropriate for the zone in which it is fitted, and all cables passing from the hazardous to safe area should be equipped with appropriate barriers where necessary.

All Instruments should be suitable for an area classification of "Class 1, Division 1, Group Das per
NEC" OR "Zone 1, Group IIA /IIB as per IS/ IEC".

All Odorizing Unit mounted transmitters & temperature element should be intrinsic safe "exia" as per IEC 79-11 and solenoid valves, switches and related junction boxes should be flame proof

"Exd" as per IEC 79-1. Other special equipment's/instruments, where intrinsic safety is not feasible or available, should be flame proof as per IEC 79-1. Flying leads from any of the instrumentation items are not acceptable. The Electronics of the Odorizing Unit shall not be open and shall be provided within a suitable enclosure

5.0 *INSPECTIONS AND TESTING: At Vendor's works:*

The following activities shall be covered under inspection:

a. Review of Q.A documents.
b. Review of Calibration certificates for Odorizing Unit, transmitters, gauges and all instruments.
c. Review of all statutory certificates.
d. Review of Area classification compatibility of all the items including bought out items. e.Review of NDT reports.
f. Review of bought out sub-assemblies/major components, test/inspection certificates. g.Dimensional checks as per approved drawing and data sheets.
h. All the Odorizing Units shall be tested to demonstrate the functioning of all thecomponents and controls.

Before bringing any items of equipment to site, factory testing should be carried out to demonstrate the function of all equipment trips and control system.
The Client / Consultant should be given 2 weeks prior notice for inspection of the equipment.

After Commissioning at Site:

Upon delivery to the site, all the equipment should be assembled in a complete system. All the Odorizing Units shall be tested by vendor for their function & performance in presence of Client / Consultant representative. Any part or component, which is not functioning to the satisfaction of Client / Consultant, shall be repaired or replaced by the vendor without cost & time implication to purchaser and performance test again carried out.

All pipelines should be pneumatically tested to 1.5 times the design working pressure. Suchpressure should be held for 8 hours and be witnessed by Client/ Consultant.

6.0 WARRANTY

The supplier's should provide a warranty from the date of final site acceptance of odorizing system by the Client as define in the respective Job specification or tender documents.

7.0 DRAWING & DOCUMENTS

The bidder shall furnish the drawings and Documents as specified in Job specification. In addition to this bidder shall provide following:

Along with the Technical bid the following information is to be provided:

1. Process and instrument diagram along with Bill of Material. The Bill of Material should indicate all items, quantity of all items installed per Odorizing Unit, their part nos and make.

2. General arrangement drawing of the Odorizing Unit indicating overall dimensions and erection / shipping weight.
3. Technical data sheet of all the major equipments and instruments of Odorizing Unit.

4. Literature to fully describe the details of all major components such as valves, regulator,Instruments, tube, fittings etc.

5. List of spares required for 2 years normal operation & maintenance per Odorizing Unit (itemized rate to be given in price bid). List of commissioning spares for Odorizing Unit.

6. List of special tools & tackles required for installation & maintenance per Odorizing Unit.

7. Shop test procedure.

8. Cable schedules & Complete wiring diagram.

9. A complete electrical dossier and zone drawings of the Odorizing Unit, all certification for allcomponents used within the hazardous areas should be provided

Within one month from date P.O.

1. General arrangement drawing of the Odorizing Unit giving overall dimension & shipping weight.

2. Detailed foundation drawing of the Odorizing Unit for casting foundation giving load pattern etc.

3. Details of inlet gas termination including X, Y, Z co-ordinates with respect to centre of Odorizing Unit or any reference. The minimum / maximum distance limitation for the installationof system.

ALONG WITH SUPPLY

1. Operation and maintenance manuals – 3 sets all in original for each Odorizing Unit along with 1 set of soft copy in CD-ROM. The instruction manual should describe in details the construction and recommended procedure for maintaining, operating and troubleshooting of the Odorizing Unit should also include cross-sectional drawings, exploded views of all spare parts along with part nos., quantity installed per Odorizing Unit. The manual should provide detailed catalogues of all bought out items.

2. 3 sets of hard copies & 1set of soft copy in CD-ROM for all the approved drawings and documents shall be included along with supply.

3. Mechanical and electrical installation drawing including interconnection. Complete wiring diagram of Odorizing Unit

4. Test certificates and catalogues of all major components like valves, Instruments, tubing etc.
5. Calibration certificates for all measuring and protection devices (eg. pressure transducer, pressure gauges, other instruments etc.,).

6. Test records of mechanical running, performance test.
7. One set of relevant Software with licence including application program (compatible to Microsoft windows XP/2000 software) and all logic diagrams of Odorizing Units on CD-ROM with suitable communication hardware with Odorizing Unit in order to download or change Odorizing Unit parameters if required by client through Laptop. Necessary adaptor for direct downloading into laptop if required has to be supplied by the vendor.

8. Certificates from statutory authorities confirming suitability of design / construction of all electrical and electronic items for use in hazardous area classification. In case of foreign supply, the Vendor should get all certificates endorsed by the concerned statutory authorities, Govt. of India within one month of delivery of Odorizing Units at site.

Sl.	Technical	Minimum Requirement
	Process data such as Flow Rate, Operating pressure at dozing point, design pressure at dozing point Line Size & Design Pipe class Operating Temperature - As Define in the Particular Job specification	
2.	Operating Principle	Microprocessor based programmable, Pressure Injection System / Automatic dozing system with Solenoid operated pump (Electrical / pneumatic system; not to be actuated by Natural Gas)
3.	Quantity of Odorant injection	Adjusted automatically proportional to flow rate through 4 - 20 mA or Pulse signal or serial communication (Modbus protocal) data from Metering Device/ Flow computers / EVC.
4.	Temperature	System should be suitable for installation in open atmospheric Conditions at ambient temp. of 0-50°C; Design 65 °C
5.	Odorant Injection Rate	Actual mg /Sm3 – The use of odorant to be monitored using On-line dosing / monitoring system.
6.	Gas Odorant	(Ethyl Mercaptane / TBM+THT blends / THT/ TBM+IPM blends / 75-80 % TBM (Tert-Butyl Mercaptan) + 20-25 % MES (Methyl Ethyl Sulphide) - Refer PJS / MR / SOR
7.	Power Supply	230 VAC +-10 %, 50Hz±3% UPS at one point in electrical feeder
8.	Pneumatic Panel with Cabinet	Suitable to be installed in hazardous area, WP IP 54 with safe Venting system, safety protection and Warning Instructions.
9.	Electrical components, JBs in Hazardous Area	Eexd IIC T4 Explosion Proof / Intrisically Safe
10	No. of Injection units	2 (one working & one stand by)
11.	Electronic Control Unit	Installed in safe area, with two RS 232 communication port, Printer port & provision for remote connectivity & must be lockable. Software to configure the odorizing system. Battery back up to retained configuration data due to power failure.
	Protection class	IP 54 (Min) / NEMA4
	Display	Back lit Alphanumeric LCD display / LED dispaly
	Operating Modes	Manual / Automatic / Washing / Off
12	Storage Tank (Min SS304)	(*capacity & qty as per PJS/MR) The container with safe venting system, Level Transmitter with gauge / level Switch and SS flame arresters and Warning & safety Instructions.
13	Emergency Provision	To be provided to automatically continue odorization if main odorizing system stops due to power / control unit failure.
14	Maintenance Frequency	Yearly or better
15	System Features	In case of power /control unit failure, system to continue dozing at constant flow rate, till the power supply resumes.