BHAGYANAGAR GAS LIMITED

(A JOINT VENTURE OF HPCL & GAIL)

BID DOCUMENT FOR

Annual Rate Contract for O&M allied services in Hyderabad GA

UNDER OPEN DOMESTIC COMPETITIVE BIDDING

Bid Document No.: BGL/595/2023-24

VOLUME-II of II

CONTENTS

VOLUMEN II OF II

SECTION – 7

SPECIAL CONDITIONS OF CONTRACT

1 DEFINITIONS AND INTERPRETATIONS

In addition to meaning ascribed to certain initial capitalised terms in "GCC", following initial capitalised terms shall have the meaning as ascribed to such term hereunder. In case any term defined hereunder is also defined in "GCC", the meaning ascribed to such term hereunder shall prevail**.**

1.1 Definitions

Bid Documents	shall mean documents issued to the bidder pursuant to IFB and listed in ITB Clause .
Effective Date	shall mean the date on which Contractor's obligations will commence and that will be the date of Fax of Intent.

2 INTERPRETATIONS

2.1 Where any portion of the GCC is repugnant to or at variance with any provisions of the SCC then, unless a different intention appears, the provisions of the SCC shall be deemed to govern the provisions of the GCC and SCC provisions shall prevail to the extent of such repugnancy, or variations exist.

2.2 In Contract Documents unless otherwise stated specifically, the singular shall include the plural and vice versa wherever the context so requires.

2.3 Notwithstanding the sub-division 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 Agreement so far as it may be practicable to do so.

2.4 All headings, subtitles and marginal notes to the clauses of the GCC, SCC or to the Specifications or to any other part of Bid Document are solely for the purpose of giving a concise indication and not a summary of the contents thereof, and they shall never be deemed to be part thereof or be used in the interpretation or construction thereof.

2.5 The terms fully capitalized and/or initial capitalized shall be interchangeable and shall have the meaning as assigned to fully capitalized term or initial capitalised term.

3 SCOPE OF WORK

3.1 As defined in Bid document.

4 INSPECTIONS AND TESTS

4.1 During execution of work, the works shall be inspected by the Owner or its authorised representative for acceptance of the same.

4.2 For contractor's supplied items, Third Party Inspection report shall be submitted by the contractor.

4.3 The Owner/ Consultant or its representative shall have the right to inspect and/ or to test the material to confirm their conformity to the specifications.

4.4 If any inspected or tested material fail to conform the specifications, the Owner/ Consultant may reject them and the Contractor shall either replace the rejected materials or make all the alterations necessary to meet the specifications, free of cost to the Owner/ Consultant.

5 STATUTORY VARIATIONS IN TAXES

5.1 The entire work covered under this contract shall be treated as works contract services. Unit rates mentioned in Schedule of Rates are inclusive of all applicable taxes & duties including freight, Insurance, Transit Insurance etc. except Goods & Service Tax (GST) on completed works as defined in the tender document.

Any statutory variation in the GST on completed works during the scheduled completion period only shall be considered by the owner against documentary evidence.

6 TERMS AND MODE OF PAYMENT

6.1 Advance

6.1.1 The Owner will not pay any advance.

6.2 The Payment terms shall be as follows:

- The CONTRACTOR shall raise the RA bill on monthly basis and payment shall be made as per the following terms: -
- 100 % payment will be released against submission of R.A bill along with necessary documents for completed work duly certified by Engineer-in-charge.

7 PAYMENT METHODOLOGY

7.1 The contractor shall raise invoices on monthly basis for works carried out duly certified by Engineer-in-Charge in triplicate along with Material booked details of free issue materials. The contractor to ensure that the invoices of completed work should be raised & duly certified by Engineer-in-charge within one month to avoid any statutory penalties on delay in paying taxes.

7.2 The payment shall be released within 15 days from the date of receipt of invoice, if found to be in order and duly certified by TPI/EIC.

7.3 Owner will release payment as per SCC cl. No. 6.

7.4 The Payment shall be released through RTGS or Bank cheque only.

8 COMPENSATION FOR IDLE TIME

8.1 The Owner shall make every reasonable effort to have free issue materials available so as not to delay any related activities. No Idle time claim shall be entertained under any circumstances.

9 PRICE REDUCTION SCHEDULE (PRS)

9.1 In case contractor fails to complete the work/ services within stipulated period as defined in allotment letters then unless such failure is due to force majeure as defined in Bid document, there will be reduction in contract price @ ½ % for each week of delay or part thereof subject to maximum of 5% of contract price.

9.2 Owner may without prejudice to any methods of recovery, deduct the amount of such PRS from any money due or which may at any time become due to contractor from its obligations or liabilities under the contract or by recovery against the performance bank guarantee. Both Owner and contractor agree that the above percentage of price reduction are genuine pre-estimates of the loss/ damage which Owner would have suffered on account of delay/ breach on the part of contractor and the said amount will be payable on demand without there being any proof of the actual loss/ damage caused by such delay/ breach. Owner decision in the matter of applicability of price reduction shall be final and binding.

10 ALTERATIONS IN SPECIFICATIONS, DESIGN AND EXTRA WORKS

10.1 The ENGINEER-IN-CHARGE shall have to make any alterations in, omission from, additions to or substitutions for, the Schedule of Rates, the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the WORK and the CONTRACTOR shall be bound to carry out the such altered/ extra/ new items of WORK in accordance with any instructions which may be given to him in writing signed by the ENGINEER-IN- CHARGE, and such alterations,

Commissions, additions or substitutions shall not invalidate the CONTRACT and any altered, additional or substituted work which the CONTRACTOR may be directed to do in the manner above

specified as part of the WORK shall be carried out by the CONTRACTOR on the same conditions in all respects on which he agreed to do the main WORK. The time of completion of WORK may be extended for the part of the particular job at the discretion of the ENGINEER-IN- CHARGE, for only such alterations, additions or substitutions of the WORK, as he may consider as just and reasonable. The rates for such additional, altered or substituted WORK under this clause shall be worked out in accordance with the following provisions:-

I. For Item Rate Contract

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

b) If the rates for the additional, altered or substituted WORK are not specifically provided in the CONTRACT for the WORK, the rates will be derived from the rates for similar class of WORK as are specified in the CONTRACT for the WORK. The opinion of the ENGINEER-IN- CHARGE, as to whether or not the rates can be reasonably so derived from the items in this CONTRACT will be final and binding on the CONTRACTOR.

c) If the rates for the altered, additional or substituted WORK cannot be determined in the manner specified in sub-clause (a) and (b) above, then the CONTRACTOR shall, within 7 days of the date of receipt of order to carry out the WORK, inform the ENGINEER-IN-CHARGE of the rates which it is his intention to charge for such class of WORK, supported by analysis of the rate or rates claimed, and the ENGINEER-IN-CHARGE shall determine the rate or rates on the basis of the prevailing market rates, labour cost at schedule of labour rates plus 10% to cover contractor's supervision, overheads and profit and pay the CONTRACTOR accordingly. The opinion of the ENGINEER- IN-CHARGE as to current market rates of materials and the quantum of labour involved per unit of measurement will be final and binding on the CONTRACTOR.

d) Where the item of work will be executed through nominated specialist agency as approved by the ENGINEER-IN-CHARGE, then the actual amount paid to such nominated agency supported by documentary evidence and as certified by ENGINEER-IN-CHARGE shall be considered plus 10% (ten percent) to cover all contingencies, overhead, profits to arrive at the rates.

11 HEALTH SAFETY AND ENVIRONMENT (HSE)

11.1 The Contractor will strictly adhere to Health Safety and Environment policy as stated in Technical Specifications Vol. II of II of this Bid document and/ or the policies followed by the Owner.

11.2 Penalties for violation of HSE shall be imposed as per clause 24 of SCC**.**

12 PROVIDENT FUND

12.1 The Contractor shall strictly comply with the provisions of Employees Provident Fund Act,1952 applicable in India and register themselves with Regional Provident Fund Commission (RPFC) before commencing the work. The Contractor shall deposit employees and Owners contributions to the RPFC every month. The Contractor shall furnish along with each running bill, the challan/ receipt for payment made to the RPFC for the preceding months for all the employees deployed at site.

12.2 The contractor will be required to submit self declaration by the excluded employees as per Employees' Provident Fund Scheme , 1952 for claim of the exemption of provident fund if he has never been member of the provident fund and if he has, he shall remain and continue to be a member until he withdraws his Provident Fund accumulation from the fund. The contractor shall submit the indemnity bond clarifying names of the excluded employees .The contractor shall also indemnify that in case of any dispute raised by

Employees' Provident Fund Organisation (EPFO), shall be responsibility of the contractor himself and any penalty imposed will be borne by him.

12.3 In case the RPFC's challan/ receipt, as above, is not furnished, Owner shall deduct 10% (Ten percent) of the payable amount from Contractor's running bill and retain the same as a deposit and such retained amount shall be refunded to Contractor on production of RPFC Challan/receipt for the period for which it is retained.

12.4 EPF contribution made for contractor's employees/personnel deployed regularly/dedicatedly at BGL site(s). The PF contribution shall be deducted on the actual basic salary indicated in wage sheet. The basic wages cannot be less than the minimum wages at any point of time. In case the contractor's firm is not registered with EPF under the prevailing laws, the declaration for the same should be submitted to BGL. In such case, a declaration to BGL will be submitted by contractor on letter head in support of their stand on the matter. Subsequently an indemnity will be required to be submitted by the contractor as per the prescribed format in case contract awarded to them. The contractor shall be fully responsible in case of any consequence due to non-compliance of statutory obligations.

13 POWER AND WATER CONNECTION

13.1 The Owner/ Consultant will not provide any power and water during construction period. Contractor shall apply and obtain necessary power and water connection from relevant authority and will pay its uses charges or arrange the same from the other sources.

14 CONSTRUCTION AIDS, EQUIPMENTS, TOOLS & TACKLES

14.1 Contractor shall be solely responsible for making available all requisite Construction Equipment, Special Aids, Barges, Cranes, JCB and the like, all Tools, Tackles and Testing Equipment and Appliances including Customs of such equipment etc. as required for executing the work. In case of Customs of the same the rates applicable for levying of Custom Duty on such Equipment, Tools, & Tackles and the duty drawback applicable thereon shall be ascertained by the CONTRACTOR from the concerned authorities of Government of India. It shall be clearly understood that OWNER shall not in any way be responsible for arranging to obtain Custom Clearance and/or payment of any duties and/or duty draw backs etc. for such equipment so imported by the Contractor and the Contractor shall be fully responsible for all taxes, duties and documentation with regard to the same.

15 CONDITIONS FOR ISSUE OF MATERIALS

15.1 Whenever any material is issued by Owner, following conditions in addition to other conditions as specified in the contract shall be applicable.

15.2 Necessary indents will have to be raised by the Contractor as per procedure laid down by the Engineer-in-charge from time to time, when he requires the above material for incorporation in permanent works.

15.3 Materials will be issued only for permanent works and not for temporary works, enabling works etc. unless specifically approved by the Engineer-in-charge and the same shall not be taken into account for the purpose of materials reconciliation.

15.4 The contractor shall beer all other cost including lifting, carting from issue points to work. Site/ contractor's store, custody and handling etc. and return of surplus/ serviceable scrap materials to Owner's storage points to be designated by the Engineer-in-charge etc. No separate payment for such expenditure will be made.

15.5 No material shall be allowed to be taken outside the plant/ store without a gate pass.

15.6 The contractor shall be responsible for proper storage, preservation and watch & ward of the materials.

15.7 All free issue materials shall be issued to contractor against submission of Indemnity Bond (as per Form-14

attached in bid document) for 150% value of free issue materials.

15.8 In case of any manufacturing defect found in free issue material, same shall be communicated to Engineer-In-Charge in writing within 15 days from the date of issue of such material and return the same at BGL store within 30 days from the date of issuance.

15.9 Contractor to ensure that all free issue material shall be installed within a maximum period of 30 days from the date of issue.

16 LABOUR LICENCE

16.1 The contractor must obtain labour licence at the start of work at allotted site. Contractor will not be allowed to start the work at site without obtaining the labour licence and if there is inordinate delay in obtaining the licence, BGL reserves the right to penalize the contractor which may lead to termination of contract.

17 CONTRACTOR'S OBLIGATION AT SITE

17.1 Contractor shall establish and maintain office & stores in centrally located place of allotted Control Rooms allotted to them with adequate facilities (like two tables, four chairs, telephone, computer with mailing (internet), printer (including consumables), file rack, AC etc. for effective communication and documentation and required manpower for MDPE/GI/Cu O&M work & attending repair as instructed by Engineer-in-charge & as specified in the tender document.

17.2 Contractor shall provide as and when required a wagon(s) suitable for soil removal, for the delivery or reinstatement materials and for the transport of pipe to and from site.

17.3 Contractor shall provide transport for their personnel to move from site to site, and to move tools and equipment etc. from site to site.

17.4 Contractors shall make appropriate arrangements to ensure that their supervisor(s) / Shift Engineers have mobile sets & transport (minimum two-wheeler) and can attend sites or meetings with BGL, other authorities or customers as required, without any undue delay.

17.5 Contractor shall employ a Project Manager / Coordinator on company roll. The Project Manager / Coordinator must have qualification of BE Mech / Diploma in Mech Engineering with min. 3-5 years of work experience in gas pipeline job. He shall be single point of contact for all the works and must represent company in the review meetings. Contractor shall take approval from BGL before deputing Project Manager / Coordinator.

17.6 Contractor shall submit list of all manpower / employees deployed at site in 1st week of every month & ensure that manpower deployed shall wear proper uniform with badges as instructed by Owner. Contractor shall also ensure that manpower deployed at site have taken safety training from BGL and keep STC card with them.

17.7 Contractor shall deploy Equipments, Tools & tackles etc., as required / defined in tender documents.

17.8 Contractor shall deploy their manpower at site only after Police verification & keep records of police verification at site. Contractor will provide records of police verification to owner on demand.

17.9 Owner will not allow switching/swapping of key personnel of any contractor working at site from one contractor to another during the continuity of the contract.

17.10 Any change in key persons working at site shall be informed to the Owner promptly.

17.11 Contractor shall complete all the above activities within 15 days from the date of FOI. On failure to fulfil the above requirement, contractor shall be liable for a penalty of Rs. 2000/- per day.

18 RECONCILIATION OF OWNER SUPPLIED MATERIALS

18.1 The Contractor is responsible for completing the "Material Used" section of the worksheet for each job completed. This record will be used for the reconciliation of material at the end of the job or contract.

18.2 The full replacement or repair costs of all damages items will be recharged to the contractor.

18.3 It is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on monthly basis to Owner/ Owner's representative as per the approved format of the owner. The inventory details shall be in correlation with the Daily progress chart and material reconciliation sheet. Material reconciliation statement of all free issue materials shall be carried out on quarterly basis & reconciliation statement shall be submitted to BGL.

After the final reconciliation is carried out, the variances in materials issued against materials used and returned, will be assessed. All unused, scrap materials and salvageable materials shall be the property of the Owner and shall be returned by the Contractor category-wise at his cost to the Owner's designated store yard (s). In case the Contractor fails to do so or exceeds the limits of allowances specified below for scrap/ serviceable materials, then recovery for such quantities not returned as well as returned in excess of permitted limit by the Contractor will be done at the penal rate i.e. 200% of landed cost. at the time of final bill/ closing of contract by Engineer-in-charge shall be effected from the Contractor's bill (s) or from any other dues of the Contractor to the Purchaser. Contractor shall be responsible for the adjustment and measurement of the surplus materials to be returned to the store. Contractor shall also be responsible for suitable segregation of returned materials into separate stacks of serviceable and scrap materials. Wherever certain material is covered under Contractor's scope of supply whether part or in full for any item of work covered under SOR, no allowance towards wastage/ scrap etc. shall be accounted for during execution stage.

Item	Scrap	Unaccountable
Gas Meters	0 %	0 %
Regulators	0 %	0 %
Isolation & Appliance valves	0 %	0 %
MDPE Pipes	2 % (less than 2 mtr)	2 %
GI Pipes	2 % (less than 1 mtr)	2 %
PE Fittings	0 %	0 %

18.4 Material consumption shall will be recorded on area wise basis. Material issued from the BGL stores shall be consumed, recorded and returned using the same BGL item code.

18.5 Any payments due to the Contractor may be withheld to cover these charges.

18.6 All waste materials, part lengths of pipe and other partly used items are the property of BGL and must be returned to the stores with the appropriate documentation so that they can be considered as part of the material reconciliation.

19 COMPLIANCE WITH LAW

19.1 Contractor shall abide by all prevailing Laws of India including but not limited to:

19.1.1 Apprentices Act.

19.1.2 Contract labour (Regulation & Abolition) Act.

19.1.3 Employers Liability Act.

19.1.4 Environment Protection Act.

19.1.5 Factory Act.

19.1.6 Industrial Dispute Act.

19.1.7 Minimum Wages Act.

19.1.8 Payment of Wages Act.

19.1.9 Workman Compensation Act.

19.1.10 Building and Other Construction Workers (Regulation of Employment and Condition of service) Act, 1996

19.1.11 GST Regulation

19.1.12 Any other Statute, Act, Law as applicable.

20 INSURANCE

20.1 Contractor shall at his own expense arrange, secure and maintain insurance with reputed insurance companies to the satisfaction of the Owner as may be necessary and to its full value for all such amounts to protect the works in progress and his personnel 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 obligation under the Contract.

20.2 All costs on account of insurance liabilities covered under this Contract will be to Contractor's account and will be included in Contract Price.

20.3 Contractor as far as possible shall cover insurance with Indian Insurance Companies.

21 STATUTORY APPROVALS

21.1 General permissions shall be obtained by the Purchaser. However, working approval from any authority required as per statutory rules and regulation of Central/ State Government/ Local Bodies 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.

21.2 The Contractor shall arrange the inspection of the work by the authorities and necessary co-ordination and liaison work in this respect shall be the responsibility of the contractor. However, Owner will reimburse the statutory fees paid by the contractor, if any, to the Contractor at actual on production of documentary evidence for all inspections and approval to such authorities.

21.3 Any change/ addition required to be made to meet the requirements of the statutory authorities shall be carried out by the Contractor without additional cost to Owner. The inspection and acceptance of the work by statutory authorities shall however, not absolve the Contractor from any of his responsibilities under this Contract.

22 SITE CLEANING

22.1 Contractor shall clean and keep clean (Housekeeping and cleanliness) the work site always to the satisfaction of the Engineer–in-charge for easy access to work site and to ensure safe passage, movement and working.

22.2 The Contractor shall dispose of the unserviceable materials, debris etc. to any area, as decided by the Engineer–In–Charge.

22.3 No extra payment shall be paid on this account.

23 WORKMANSHIP

23.1 Regarding work completion, the decision of the Engineer-in-Charge will be final and binding.

23.2 The work executed and material supplied shall be to the satisfaction of Engineer-in-Charge and contract price shall include for any incidental and contingent work although not specifically mentioned in the contract but is necessary for its completion in an efficient and workman like manner.

23.3 The Engineer-in-Charge or his authorized representative shall approve the quality of all the materials used by contractor from time to time.

24 PENALTIES

BGL shall have right to levy following penalties on the Contractor and deduct applicable amount from the Contractor's Running Bills:

24.1 In case **proper barricading, along the trench and pits, as per technical specification** is not provided, the work shall be immediately suspended till such time proper barricading, as per the technical specification is provided and penalty will be levied as per SCC clause 24.3.

24.2 In case required numbers of **safety equipments** like Safety Harness belts, helmets, fluorescent jackets etc as per the Technical Specifications and Special conditions of the contract of the tender, could not be provided by the contractor during execution, work shall be suspended and penalty will be levied as per SCC clause 24.3.

24.3 Either of the case as in clause 24.1 & 24.2 above shall attract penalty of Rs. 1000.00 per instance. Any subsequent instance shall attract penalty of Rs. 5000.00 per instance with a notice to contractor. Subsequent non-compliance within 5 days shall lead to a deduction of upto 5% from RA bill at the discretion of the EIC and may also lead to black listing of the contractor for future jobs.

24.4 In case of complete compliance of HSE norms throughout the contract period the contractor shall be issued a letter of appreciation by the Owner on recommendation by the consultant.

24.5 In case the contractor does not mobilise the HDD machine at site and fails to start the work within 12 (twelve) hours from the time of intimation received from BGL, Penalty @ Rs. 1000 (One Thousand) / hour shall be levied beyond the stipulated time. In addition, BGL at its sole discretion may get it executed from an alternate agency at the risk and cost of the contractor. Also, an administrative charge @ 15% over and above the actual cost incurred shall also be deducted from the contractor's R.A bill.

24.6 In case of non–submission of material reconciliation statement in first week of every quarter, Rs. 5000/- per instance shall be levied from the running bills.

24.7 In case of installation of contractor's supplied material without inspection and prior approval EIC/sited in charge, Rs. 5000/- per instance shall be levied from the running bills.

24.8 In case it is noticed and confirmed by the BGL Site-In-charge that any fusion jointing or conversion is being penalty of Rs 2000.00 per joint or conversion shall be levied and the person supervising the work shall be

suspended from BGL sites. Contractor will provide list of persons involved in fusion jointing to Engineer-in-charge and in case of any change, same will be intimated to Engineer-in-charge immediately.

24.9 In case any tool/ equipment as defined in " Minimum Tools & Tackles" attached as Annexure 1 & 2 in PTS for Operation of PNG O&M Job at Control Rooms of Volume II of II of bid document, are not maintained in Control Room, a penalty @ Rs 2000.00 per day for A category, Rs. 500.00 per day for B category & Rs. 200.00 for C category shall be levied & deducted from the running bills.

24.10 In case it is noticed that any manpower deployed by contractor are found under fraudulent/ unethical practices with the customer, if proved, a penalty of Rs 25000.00 per instance shall be levied . it is discretion of Engineer-in-Charge to impose penalty.

24.11 In case the contractor does not mobilise the JCB machine/ pump/ breaker at site and fails to start the work within 6 (Six) hours from the time of intimation received from BGL, Penalty @ Rs. 1000 (One Thousand) / hour shall be levied beyond the stipulated time.

24.12 In case the contractor fails to start the work of O&M within 30 min from the time of intimation Of emergency / third party damage received from BGL, Penalty @ Rs. 1000 (One Thousand) / hour shall be levied beyond the stipulated time.

24.13 In case the contractor fails to complete the work of NG conversion within 24 (Twenty Four) hours from the time of intimation received from BGL, Penalty @ Rs. 50 (Fifty) / day shall be levied beyond the stipulated time.

24.14 If any complaint is not resolved to the entire satisfaction of PNG customer, following penalty will be imposed provided the reasons of delay in resolving complaint(s) are attributable to the contractor(s).

- If complaint is not resolved upto TAT level 2 (i.e. Level 1 & 2) - Penalty (with ceiling of Rs. 500 per complaint) shall be imposed as per discretion of BGL.

- If complaint is not resolved upto TAT level 3 - Penalty of Rs. 500 per complaint shall be imposed.

If complaint is not resolved within next 7 days after expiry of TAT period of level 3, penalty @ Rs. 2000 per instance shall be imposed

For TAT, please refer Form F-16

24.15 In case of noncompliance of statutory provisions penalty will be imposed by the owner as detailed below:

a. Delay of more than 21 days from the date of work order in obtaining / submitting **WC** cover or taken for shorter duration will result into penalty **of Rs. 5000/- per week or** part thereof.

b. Delay of more than 21 days from the date of work order in obtaining / submitting the required **insurance policies** as specified in the tender document will result into a penalty **of Rs. 5000/- per week** or part thereof.

c. Delay of more than 21 days from the date of work order in obtaining / submitting **CPBG of requisite amount as well as timely extension of value and / or time period shall attract a** penalty **of Rs. 5000/- per week.**

d. The contractor must obtain **labour licence** at the start of work for allotted sites & ensure that same is valid for a contract period. Delay of more than 30 days from the date of work order in submitting the labour licence shall attract a penalty of **Rs. 5000/-** per week or part thereof.

e.

Note: The maximum penalty shall not exceed by 20% of the monthly RA bill value.

24.16 Non-Submission of RA bill by 15th of subsequent month will attract a penalty of Rs. 10,000/- per instance and Rs. 100/- per day beyond 15 days of stipulated time for the applicable date of bill submission. Same will be deducted from the running bills.

25 COMPLETION DOCUMENT

25.1 Contractor in three sets shall submit the following documents in hard binder, as a part of completion documents:

25.1.1 Copies of the Inspection reports, HDD Profiles, Approved construction drawing, As-built drawing, Pre testing, final Hydrostatic and other Test reports if applicable

25.1.2 Consumption statements of PE/GI/Copper Pipes etc. duly certified by Owner's Site Engineer.

25.1.3 Material Reconciliation.

25.1.4 All other requirements as specified in the respective specifications.

25.1.5 Completion Certificate issued by Owner's Site Engineer.

25.1.6 No claim and No dues certificate by the Contractor.

25.1.7 Recovery statement, if any.

25.1.8 Statement for reconciliation of all the payments and recoveries made in the progress bills.

25.1.9 Copies of deviation statement and order of extension of time, if granted.

25.1.10 Copies of all documents related to statutory requirements like Labour License, CAR Policy, WCP, EPF, ESI challans etc.

25.1.11 Any other contractual documents required on completion.

25.1.12 Soft copy of Pipe Book and alignment drawing, Isometric drawing and other relevant documents.

26 NON COMPLIANCE RATIONALIZATION

26.1 In case of non availability of required material to be provided by the contractor and the material being available with BGL, it can be issued to the contractor on chargeable basis. The charges payable by the contractor shall be in advance and at the last PO rate plus 15% overhead charges. However, any delay on account of non-availability of material shall be to contractor's account only.

27 ABNORMALLY HIGH /LOW RATE ITEMS

27.1 The bidder is expected to quote rate for each item after careful analysis of cost involved for the performance of the complete item considering all specifications and Conditions of Contract. In case it is noticed that the rate quoted by the bidder of individual items rates are higher or lower by more than 50% of the estimated rates then such items shall be considered abnormally high or low rated items i.e. AHR /ALR items.

Abnormal High Rate (AHR) items

The quantity of high rate items shall be restricted to the SOR quantities Execution of AHR items beyond the SOR quantities shall be made at the least of the following rates:

A) Average rates of the item of all the qualified bidders

B) The rate estimated at the time of tendering.

C) In case the overall quote of the qualified L-1 bidder is less than the overall estimate, then the rate of contractor arrived after applying the same percentage of difference by which his overall quote was lower than the overall estimate.

28 MATERIAL TO BE SUPPLIED BY THE CONTRACTOR

28.1 Contractor will place timely orders on Owner's specified manufacturers/agencies so as to receive the material in accordance with the execution of project activities. The orders to be placed by the contractor shall incorporate certain clauses with respect to delivery schedule, guarantee/warranty, inspection and despatch clearance by Owner. The items and quantities shall be in accordance with the work to be executed and shall be verified by Owner for its appropriations.

28.2 All material will be manufactured as per approved Quality Assurance Plan (QAP) only to be specified by Owner. Material will be inspected by owner's appointed third party inspection (TPIA), the charges of which shall be in owner scope.

28.3 After approval of QAP, Contractor will submit a schedule production plan mentioning qty's of production along with inspection call at-least one week in advance from the date of commencement of production.

28.4 Contractor will submit a written request to Owner for dispatch clearance of material. For this purpose, he will be required to submit detailed material test inspection report and release note issued by the TPIA. On getting the dispatch clearance, the contractor will arrange material dispatch to the designated project site(s).

28.5 Contractor shall arrange for proper storage of his material distinctly separate from free-issued material. Contractor shall required to appraise Owner regarding cover area, lock & key arrangement of its safe custody, resources marked safe and proper receiving, stocking, issuing, maintaining all verifying records on regular basis.

28.6 Contract shall invariably submit copies of order placed by them on various agencies for sourcing material and shall ensure submission of invoices, challans/packing lists, LR Copy, material inspection report and guarantee/warranty certificate for each lot of material received at Owner's site.

28.7 All material should be covered under warranty for satisfactory performance for maximum period of defect liability of executed work. Any defect noticed during defect liability period shall be promptly attended as faulty material must be contractor's responsibility to take-up the matter with material supplier. Any delay on account of non-availability of ordered material or replacement of faulty material shall not be waived by the reason of material having ordered to and inspected by Owner's recommended agencies. Faulty material must be contractor's responsibility to take-up the matter with material supplier. Any delay on account of non-availability of ordered material or replacement of faulty material shall not be waived by the reason of material having ordered to and inspected by Owner's recommended agencies.

28.8 Before award of works order/ starting of work at allotted site, contractor shall provide details of stores and site office established by him for the intended work. Failing which the allocation of work may be deferred by Owner. Also, the contractors shall submit details of tools& tackles under his procession required for execution of the work. Owner shall verify all these aspects before allocating work to the contractor.

28.9 The networking work includes Horizontal Directional Drilling (HDD) at various locations by means of HDD machines of appropriate capacities. Contractor advised to apprise himself of all such requirements and confirm in writing to the owner of having HDD machines with him or having tie-up with some reputed contractor. Any delay during the executing due to non-availability of HDD machine shall not be accepted by Owner.

28.10 Contractor will not transfer any free issue as well as his supplied material to any other site/ any other contractor wit hout prior written approval of the Engineer- in-charge.

29 PRICE VARIATION

29.1 Deleted

30 GENERAL

30.1 All personnel of the contractor entering on work premises shall be properly and neatly dressed and shall wear uniform badges while working on premises of the Owner including work sites.

30.2 The rates quoted by the bidder must be inclusive of all the taxes, duties & levies excluding GST on completed works. All taxes, duties, other statutory levies and rates thereof applicable as of 10 days prior to due date of submission of bid shall be included in the quoted rates.

30.3 Contractor shall provide all labour and necessary supervision to carry out the work as per the scope of work as defined in tender document, which forms part of this contract in accordance with the conditions of the

31 contract laid down in this part of contract read in conjunction with General Conditions of Contract.

Contract Performance Security:

i. After finalization of the Contract, whenever work order is issued by the Owner, ASSOCIATES shall furnish 7.5% of one year contract value within 30 days of award of FOA/WO/PO or 5% of contract /order value within 30 days of award and balance to be deducted in each RA bills till balance 2.5% amount is achieved. The deducted amount can be released/ deduction can be stopped against submission of Bank Guarantee of equivalent amount.
ii. For security deposit/ Contract Performance Guarantee purpose, Contract/ Order Value a mentioned above shall be exclusive of taxes and duties.
iii. The Contract Performance Guarantee will be obtained for a period of 90 days beyond the contract period/ duration and applicable Warranty/ Guarantee /Defect Liability Period (if any).
iv. Contract performance guarantee is to be submitted by bidder within 30 days after issuance of Fax/Letter of Intent /Acceptance (notification of Award) and in event of delay in submission of CPBG / SD, the contract can be terminated.

SECTION – 8

SCOPE OF WORK & TECHANICAL SPECIFICATION

INTRODUCTION

1.0 INTRODUCTION

Bhagayanagar Gas Ltd. is a joint venture company of Gas Authority of India Ltd. (GAIL), Hindustan Petroleum Corporation Ltd. (HPCL). BGL plans to expand its underground natural gas distribution network throughout Hyderabad. The objective is to supply natural gas to both domestic and commercial customers, and to provide compressed gas as a fuel for automobiles. After commissioning, these areas are handed over to operation and maintenance department, who in turn are seeking contractors to assist in meeting their objective.

The present document covers the technical specifications for the enquiry.

1.0 GENERAL INFORMATION

Introduction

Bhagyanagar Gas Ltd. is a Joint Venture Company of Gas Authority of India Ltd. (GAIL), Hindustan Petroleum Corporation Ltd. (HPCL). BGL plans to expand an underground Natural Gas Distribution network throughout the Hyderabad. The objective is to supply Natural Gas to both DOMESTIC and COMMERCIAL customers, and to provide compressed gas as a fuel for Automobiles. After commissioning, these areas are handed over to Operation and maintenance department, who in turn are seeking Contractors to assist in meeting their objective.

The main scope of this Specification comprises of repair, operation and maintenance of underground Polyethylene main pipelines and service pipeline. The scope covers all the activities associated with the purchasing (specified items only), repair, laying, testing and re-commissioning of MDPE main pipelines and service pipelines in existing gas charged areas of sizes ranging from 20mm to 180mm OD, which includes PE/GI transition fitting above ground level.

This technical specification defines the basic guidelines to develop guidelines and suitable construction methodology for carrying out different activities related to repair and maintenance listed out in the schedule of rates of this tender.

Compliance with these specifications and / or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

2.0 DEFINITIONS

Owner	Bhagyanagar Gas Ltd., BGL
PTS	Present <<Particular Technical Specification>>and its entire appendix, if any.
TPIA	Third Party Inspection Agency to be appointed by BGL.
EIC	Engineer – in – charge

3.0 SCOPE OF WORK

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

3.1 Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner / Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of any modification work to Owner / Owner's representative for approval.

3.2 If required, obtaining permissions from land owning agencies such as HMDA, PWD, GHMC, NHAI, Railways, Irrigation department, etc. for road cutting for laying of the pipelines. Liaison with the concerned authorities during modification & repair job, obtaining NOC from concerned authorities, once the work is completed.
Getting back Bank Guarantee/security deposits made to the agencies for laying of the pipelines.

3.3 Coordination with concerned RWA of the allotted area for maintenance of internal network laying.

3.4 Receipt and Transportation of free issue material from BGL Stores to Contractor's stores, proper storing, stacking, providing security.

All materials shall be stored in contractor's stores in the vicinity of allocated C/R with due approval from EIC in such a manner as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals.

3.5 In case of planned shut downs, making trial pits to determine the underground utilities/services such as existing pipelines, Cables (Electrical/Communication), Conduits, U/G drainage, Sewers, tunnels, Subways foundations etc., and deciding optimum feasible route and depths for laying the pipelines based on the route plans indicated by Owner and Obtaining the approval for optimum route and ROU from the concerned authority.

3.6 Wherever required the grass/turfing, pavement, linings, drains roads and other such 'pucca' area shall be locally removed to facilitate trenching and re-laying works. The same is to be reinstated as original.

3.7 Installation of Safety/warning Signs and barricading of work area to be trenched. Pits to be similarly barricaded along with warning signs and caution boards.

3.8 To make trenches with stable slopes but restricting minimum disturbance to above ground/underground services/installation as per specifications and approved route plans keeping the trenches free from water and soil till placement of pipes.

3.9 Uncoiling/stringing the MDPE pipes of required sizes (i.e. 20, 32, 63, 125 & 180 mm) pipes into trenches as per approved procedure.

3.10 Joining the pipe ends with fittings & valves by approved electro-fusion techniques as per Owner Specification.

3.11 On event of damage, installation of pipe fittings as required like elbow, tees, reducers, couplers, tapping saddles, transition fittings, valves etc., including construction of supports, valves pits, inspection chambers etc. as per specification & satisfaction to the EIC.

3.12 Re-laying pipelines using trenchless technology methods with or without casing pipes (HDPE pipes) as per specifications and as directed by EIC.

3.13 Fabrication, Supply and Inspection of good quality of GI sleeve and Half round concrete sleeves and other materials, fittings to be supplied by the contractors as per the provisions of tender.

3.14 Back filling and compaction by jumping jack compactor, wherever required, using approved 'good' soil or using excavated earth or borrow earth as per requirement and specifications and replacement of the tiles, slabs removed during the excavation. Cleaning all unserviceable materials, debris, excess earth trenches etc. to designated disposal area.

3.15 Carrying out pneumatic testing and purging as per specifications and approved procedures, providing all tools & tackles, instruments, manpower and other related accessories for carrying out the testing of pipes.

3.16 Supply, fabrication, re-installation & painting of Stone route markers, RCC route marker, Pole marker with foundations, Plate markers etc. as per the directions of the EIC/Owner's representative.

3.17 Commissioning of gas in the tested PE Line shall be done as per the approved procedure.

3.18 Preparation and submission of As-built drawings & details of crossings for the repairs carried out.

3.19 Restoration of existing ground features such as grass/turfing, paving, roads, drains, concrete, floral beds, fencing, tiles, flooring masonry etc. to original condition, and to match with adjoining

conditions, functionally and aesthetically up to the entire satisfaction of Owner / Owner's representative /any other Third Party agency designated by Owner and local authorities, failing which, it will be done at the risk and cost of the contractor. If required, obtaining satisfactory completion certificates for the restoration work done from the concerned authorities.

3.20 Returning surplus material to Owner stores after obtaining clearance from Owner/Owner' s representative, reconciliation of free issue material/consumables on quarterly basis.

3.21 Handing over the completed works to Owner for their operation/use purposes.

3.22 Rectification of defects arising due to workmanship during defect liability period of pipelines/installations handed to Owner.

3.23 Preparation and submission of all documents like As-built drawings, details of crossings, utility graphs, deviation statements on repair/re-commissioning of work by way of drawing, sketches and tables in soft & hard copy.

3.24 Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to OWNER.

4.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY

4.1 Material, Procurement and Supply

Material to be Supplied by Owner as Free Issue

4.2 Unless otherwise specified, Owner will supply following material such as MDPE - pipes, fittings, valves, transition fittings, HDPE pipe as casing material to contractor (of all sizes) and all other material not mentioned above shall be supplied by contractor as per attached technical specification to complete the laying of gas main pipelines and service pipelines. Contractor shall maintain the minimum inventory of free issue materials at each control room as mentioned in **Annexure 3.**

4.3 The free issue material shall not be procured from any other source by contractor.

Material to be supplied by Contractor

4.4 The supply of items as indicated in SOR shall be strictly as per relevant Technical Specifications enclosed with the Tender and as per guidelines of various clauses of SCC and SOR.

4.5 All materials shall be handled safely and stored in a permanent, covered, lockable store/ ware house preferably near allotted central C/R in such a manner as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals.

Backfilling Material

4.6 The Contractor shall be responsible to arrange the supply of approved coarse sand (size 0.6 – 2 mm as per IS 383) free from any impurities like clay, mica, and soft flaky pieces, as per the instructions of EIC/Owner's representative. For supply of sand in trench in rocky terrain no separate payment is chargeable and is included in laying rates.

4.7 In case specified trench depths are not achieved & if directed by Engineer-In Charge Contractor has to provide concrete casing pipes/ slabs or cement concrete, without any cost implication to Owner.

Other Materials

4.8 The Contractor shall supply the following items wherever required.

- All materials required for formwork, trench support and temporary trench crossings.
- All sign boards, barricades, tin sheets, lighting arrangement and protective equipment.
- Material required for repair & modification of valve chambers.
- Material required for fabrication and installation of GI, Half Round Concrete Sleeves.
- Material required for fabrication and installation of Permanent markers as shown in the drawings enclosed in the tender.
- Stone Markers, Pole Markers & Plate Markers.
- Warning mat
- All other items not mentioned above but necessary for the satisfactory completion and performance of the Work under this Contract.

4.9 Manpower

The Contractor shall provide the skilled, semi skilled and unskilled labour, tools, material and equipment necessary for the proper maintenance, repairing and execution of the work, attending maintenance activities, leakage, fire and other emergency requirement.

4.10 Equipment, Machinery & Tools

This will include but not limited to the list of specialized items included in Attachment # 1. To maintain these machines, tools and equipment in ready condition. The Contractor shall maintain log book on daily basis at owner's control room confirming numbers, availability of equipment, machines & tools and their condition.

On every month, contractor has to get their equipment's, machines and tools checked & verified by respective O&M in charges which shall be submitted along with running bills. In case of non-availability of minimum Equipment, Machinery & Tools, applicable penalties shall be levied from the running bills as per special conditions of the contract.

4.11 All vehicular type machinery shall be in good working order and shall not cause spillage of oil or grease. To avoid damage to paved surfaces the Contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

4.12 In addition to above, the contractor must have dedicated bar coded electro fusion (Automatically readable) machine with power generator of at least 5.5 KVA (at any point of time minimum 1 nos.), Pipe Cutters (split cutters for upto 63mm & circular guillotine ranges upto 180mm), End Scrapers, Pipe Straightener, Top loading clamp for fusing saddle tapping tee, clamps of all sizes for Electro-fusion fittings, re-rounding tools and test ends etc. for pipes with outer diameter size of 20mm to 180mm. Contractor has to arrange all equipment's for trench less crossings such as HDD, Moling & rock cutting equipment, HDPE fusion equipment at the site whenever required.

4.13 Contractor must also have to arrange equipment for restoration work like water tanker and jumping jack compactor for compaction of backfilled trenches and roller and other required equipment/ machinery for asphalting/ road works.

4.14 Acquisition, Receipt & Storage of Materials

The Contractor shall collect free issue materials from BGL's stores, between the working hours following all documentation procedures laid down and as directed by the EIC. The Contractor shall carry pipe in such a manner as to preclude damage during transportation and handling. Polyethylene pipes supplied in straight lengths may be carried in straight pipe racks.

The Contractor shall at the time of receipt of material physically examine all materials and notify the EIC immediately of any damage or defect noticed by the Contractor. The Control room in-charge/EIC shall duly note any damage or defect in a site instruction book and both parties shall countersign the entry. Any damage not so recorded will be deemed not to have existed at the time of receipt of material by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.

Any material once issued from BGL store, if found in non-working condition at site shall be brought to the notice of EIC with PO reference in written within 15 days and after subsequent approval shall return defective material in BGL stores within 30 days.

If delay is more than 30 days and material is under warranty, the material will be accepted with a penalty, else the material will not be reconciled and amount of the same will be deducted from bills shall be levied as per SCC. The contractor shall ensure that no defective material shall be returned to store at the time of closure of contract. The format for defective materials returning to stores will be made available by EIC.

The contractor shall maintain locked store and proper office set up as defined in bid document preferably near allotted central C/R so that all the materials are stored in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals. The PE pipes and fittings shall be stored in covered storage to protect material from sunshine, rain etc. The contractor shall make adequate security arrangements for the stacked material & any loss to the material on account of theft or improper storage is attributable to the contractor.

The Contractor shall maintain log book at their respective stores stating issue and availability of free issue material at a given day. Further, it is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on quarterly basis to Owner/ Owner's representative as per the approved format of the owner.

In case of non-submission of material reconciliation in first week of every quarter, applicable penalties shall be levied as per SCC from the running bills. In case if shortage in free issue material is observed at the time of quarterly physical reconciliation / verification by BGL, equivalent value of material found short shall be withheld from running bills, Same shall be released after settlement of free issue material.

On quarterly basis, contractor has to get their material reconciliation sheet checked and verified by respective O&M In-Charges/representatives and shall be submitted along with RA bills for records. Consumption of Free issue material must be booked before processing the RA bills and copy of SAP generated print out shall be attached along with each running bill.

5.0 PROGRESS OF WORK

The contractor shall proceed with the Work under the Contract with due expedition and without delay. **The EIC may direct in what order and at what time, the various stages or parts of the work under the Contract shall be performed. On every instance, special work as per SOR, work allotment letters will be issued by EIC stating duration in which these are to be performed.** Contractor has to regularly submit complaint register with compliance & status reports, material consumption and inventory reports, any deviation statements etc.

6.0 APPROVALS & PERMISSIONS FOR PIPELINE LAYING

In event of damage to gas charged pipelines, shifting/Replacement of pipeline, contractor may need to obtain special permissions from statutory bodies for carrying out repair work on pipelines. Statutory bodies in this case are PWD, GHMC, HMDA Authority, NHAI, CPWD, AAI, Indian Railways, State Police, Fire Departments, and any other Government Agencies who maintains the public lands and accord permissions for laying of pipeline by various utilities.

BGL will pay the road restoration / Departmental charges / security deposit / Bank guarantees for getting the clearances from statutory bodies. It is the contractor's responsibility to inform and co-ordinate with concerned local authorities, RWA, residents, customers and other utility agencies before and after the commencement of repair work at site. To ensure smooth repair work on as and when basis, the contractor has to liaison with respective authorities.

It is the responsibility of the contractor to obtain "No Objection Certificate" (NOC) from land owing agencies/Statutory bodies, after completion of the restoration to their satisfaction and getting released the security deposit / bank guarantees submitted by BGL for obtaining permissions on production of documentary evidence (this is applicable on case to case basis).

No Separate payment will be made on account of approvals/permissions. In case of any deviation/change in the route/additional laying, BGL shall pay the additional Road Restoration Charges only after receiving of revised estimate and further to written confirmation from the concerned Owner site in-charge.

The inspection of work by statutory authorities shall be the responsibility of the contractor without any extra cost to BGL.

Any change / addition required to be made to meet the requirements of the statutory authorities shall be carried out by the contractor without any extra cost to BGL. The inspection and acceptance of the work by statutory authorities shall however, not absolve the contractor from any of his responsibilities under this contract.

7.0 REFERENCE SPECIFICATION, CODES AND STANDARD

The contractor shall carry out the work in accordance with the requirement of latest relevant applicable standards, this specification, Owner's Engineering Standards; relevant Oil Indian Safety Directorate (OISD) norms, PNGRB Regulations, ASME B31.8-Gas Transmission and Distribution Piping Systems; Australian Standard 3723-Installation and Maintenance of Plastics Pipe Systems for Gas; and the American Gas Association Document – Purging Principles and Practice. ISO-4437/IS: 14885 for underground polyethylene pipes and OWNER's approved procedures.

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

8.0 QUALITY OF WORK

All works carried out under this contract shall confirm to applicable standards, codes of practice, construction, procedures and other technical requirements as defined in the technical specifications.

The manpower deployed on the respective work shall be adequately trained & shall have necessary skills to execute / supervise the work. However, the assessment on the qualification of the personnel shall be at the discretion of EIC.

Fusion operators and other skilled personnel shall be approved by Owner / Owner's representative and identification cards duly signed by EIC shall be issued to them. Only those personnel who are approved by EIC shall be allowed to execute the critical activities like Electro fusion jointing of MDPE Pipes & Fittings. The detailed list of associated persons must be submitted before fusion or conversion work.

9.0 SAFETY

9.1 Trench walls shall be battered with sufficient slope in order to minimize a trench collapse. Where there is a danger of an earth slide or collapse, the trench shall remain open for the minimum time possible with proper barricading. The Contractor is to ensure that no person enters a trench, which is of a depth of 1.5 meters or greater, unless the trench has adequate shoring or the sides are battered to such an extent as to prevent a trench collapse.

9.2 The Contractor shall also protect all work sites with warning signs, barricades and night lighting on requirement basis.

9.3 The trenches/ pits shall not be kept open in night times. However in case the same is essential the same shall be properly barricaded with proper lighting arrangements & manned.

9.4 The Contractor shall provide all safety equipments like helmets, books, etc. to the labour which are necessary for safe working practice.

9.5 Any accident causing injury to any person or damage to property or equipment shall be reported to the EIC and the cost of repair / replacement of the damage equipment shall be borne by the contractor. Where the EIC determines that the work is being performed by the Contractor in an unsafe manner, he may suspend the work until corrective action is taken by the Contractor.

9.6 For further details Refer "Special Terms and conditions of Contract" and attached HSE PTS.

10.0 ORGANISATION CHART

10.1 Contractor shall designate Supervisor/Coordinator who will be the single point contact to interact with EIC and authorized to attend review meetings, receive material, authorized to sign documents, claims etc.

Prior approval of BGL is mandatory before deploying Supervisor/Coordinator/Fusion Technician/ Plumber. After approval from BGL, all manpower shall take safety training from BGL and individuals shall keep the Safety Training Competency (STC) card during duty hours.

10.2 All work will be issued and sanctioned through the EIC and site control exercised by Control room Engineers. The contractor shall ensure that technical quality standards are maintained, that construction is carried out cost effectively and that a good customer and public image is maintained for Owner.

10.3 The contractor will deploy his own supervisors as directed by site engineers/EIC. These personnel will be reporting to the Control room Engineer for monitoring construction standards and for ensuring that all technical requirements are met for the job being carried out. The contractor's supervisor(s) will have day-to-day liaison with the Site Engineer and will provide the Site Engineer with technical reports and audits, and other management information as is required on work progress and construction quality standards.

10.4 The contractor's supervisor shall have Mobile sets to ensure that they can be contacted at all times. The contractor will also nominate one person who can be contacted if necessary in odd hours, for the duration of the works. The contractor's supervisor will have access to transport at all times to allow them to visit sites and attend meetings with Owner. The normal day-to-day issue of work instructions, communication between Owner and the contractor's supervisor and the Site Engineer.

10.5 Contractor shall operate all works from area control room and is mandatory to maintain a Store near to the allotted central Control rooms with following facilities :

- Telephone or Mobile Phones.
- Easily approachable or has proper roads for easy movement of vehicles
- Equipped with all emergency tools and tackles for attending any emergency complaints and ongoing execution work.

No deviation from the approved technical specification/issued construction drawings shall be undertaken without written approval of EIC.

11.0 STRUCTURES, SERVICES AND OTHER PROPERTY

11.1 Location of Underground Utilities

The contractor shall avoid damages to all buried utility pipes, underground cables, water mains and other obstructions intersecting or adjacent to existing gas pipeline while excavating for repairing the damages occurred to pipe and shall make available necessary labour to expose and achieve proper depth over all obstructions.

It is contractor's responsibility to interact with other utility agencies regarding their existing utilities and shall ensure no damages along with these agencies and Owner/ Owner's representative.

11.2 Protection of Structures and Utilities

The Contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities e.g. Electrical cables, Telephone Cables, Water pipelines, Sewer pipelines etc., and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work. Special care shall be taken while any repair works and laying pipelines near the trees. In case of any damage/claim raised by third party agencies, contractor shall settle the claims at his risk and cost or BGL may settle the claims after deducting the claimed amount from Contractor's running bill.

11.3 Interference with Traffic, Street Drainage and General Public

The repair work shall be executed in such a manner as to cause a minimum of inconvenience to persons requiring using public or private roads, lanes, thoroughfares, walkways, rights-of use or passages through which the repairs are to be executed. The trench shall be backfilled, compacted, levelled and extra earth shall be removed immediately after completion of pipeline repair to avoid public inconvenience. Closure of roads, etc, shall not be permitted without the approval of the EIC.

The Contractor shall comply with all local Authorities requirements to traffic, and keep roads open to traffic, and maintain access to and within any private property. The Contractor shall not, in any circumstance, use a private driveway, access track or entrance without the prior approval of the EIC. The Contractor shall provide suitable access where necessary in the form of temporary bridges, culverts, flumes, etc, of a size and type approved by the EIC.

The Contractor shall comply with all relevant road laws. Where limits and/or speed limits have been placed in the vicinity of the repair works, the Contractor shall provide for the necessary movement of plant and equipment in accordance with the requirements of the relevant authority.

The Contractor shall not obstruct any drainage pipes or channels in any road but shall be deviated, in case repair is only possible after removing them, use all proper measures to provide free passage of water.

The Contractor shall deliver the completed works after proper cleaning of the site.

The contractor shall conduct his operation at all times, with a view to minimizing as far as practicable noise from plant and other objectionable nuisances (e.g. oil leakage).

12.0 REPAIR AND RESTORATION OF GAS SUPPLY AT HIGH PRESSURE

On event of Replace / Re-laying information related to emergency laying works from O&M In-charge or its representatives, the contractor has to immediately mobilize manpower, labours with tools and tackles, safety gadgets and fire-fighting equipment, available at control rooms and rush to spot to attend the same. On reaching the spot, the contractor shall immediately cordon the site and place barricading around the work/ damaged section. After assessing the site conditions and affected area, the contractor shall call for mobilization of extra manpower, skilled or unskilled for carrying out the repair work smoothly and within a stipulated time as per directions of EIC/O&M in-charge.

This shall include receiving, handling, loading, transportation and unloading of owner supplied MDPE pipes & fittings, and other free issue items from BGL's designated stock yards to emergency site / Control room/Contractor's own stock-yards/ work-sites. Proper storing, stacking, identification, providing security and insurance cover for the materials Liaisoning with Landowning agencies / statutory authorities, preparation of detailed route plan, making trial pits to determine the underground utilities/ services etc., obtaining permission from Land owning agencies, restoration of the abandoned excavation / trial pits (excavated to depth of 1.5 m or more as per satisfaction to EIC to original condition, barricading the work area as per the procedures & drawings provided in the tender and as per the directions of EIC / O&M in-charge. Trenching to the required depth in normal surface, uncoiling / stringing of pipes, damping, jointing of the pipe ends/ fittings / valves by qualified personnel, using approved electro fusion techniques as per specification.

Pipeline laying by any method including excavation of the pits/trench, Lowering the MDPE pipe line in trench, padding around pipeline with suitable soil, laying of PE warning mat over the pipeline along the complete route, jointing, flushing, testing, purging, commissioning, backfilling with available excavated material and submission of as built graphs as defined in bid document & as instructed by EIC / Site Engineer of Owner/ Consultant. Compaction with jumping jack compactor and water at subsequent layers of 150mm, placement of all tiles/ slabs/ curb stones etc. removed during excavation. Roads, pavements, footpaths etc. shall be made motorable wherever pipeline is laid. Cleaning the area of all unserviceable materials, debris, excess earth near trenches to the designated disposal area as per specifications, instructions of land owners/ EIC to the complete satisfaction of local authorities. The laying shall be carried out by any methodology as per applicable SOR. All road crossings shall be carried out using HDPE casing pipe (free issue item from BGL) or as per the directions of EIC / O&M In-charge.

Rates are inclusive of liasoning with statutory authorities, other utility agencies and settlement of 3rd party claims.

All such repairs carried out on gas charged pipeline shall be drafted in an auto-cad drawings and submitted to respective control room as directed by EIC before payment.

13.0 TRENCHING

The schematic diagram with the details of trench is enclosed in the tender document.

The Contractor shall perform the excavation works so as to enable the re-laid pipe in conformity with the levels, depths, slopes, curves, dimensions and instructions shown on the Drawings, Specifications or as otherwise directed by the EIC. Contractor shall excavate and maintain the pipeline trench on staked centreline as per approved alignment sheets taking into account the horizontal curves of the pipelines. While trenching care shall be taken to ensure that all underground structures and utilities are disturbed to the minimum. Suitable crossing shall be provided and maintained over the ROU wherever necessary to permit general public, property owners or his tenants to cross or move stock or equipment from side of the trench or another.

Trenching shall be made with sufficient slopes on sides in order to minimize collapsing of the trench. On slopes wherever there is danger of landslides, the pipeline trench shall be maintained open only for the time strictly necessary. Owner may require excavation by hand, local route and detouring. Before trench cuts through water table, proper drainage shall be ensured, both near the ditch and ROU in order to guarantee the soil stability. The Contractor shall ensure that trench bottom is maintained in the square form as far as possible, with equipment, so as to avoid/minimize the hand grading at the bottom of the trench. The Contractor shall do all such handwork in the trench as required to free the bottom of trench from loose rock, pebbles and to trim protruding roots the bottom and sidewalls of the trench.

13.1 Depth of Trench

The minimum depth of cover shall be measured from top of pipe to the top of undisturbed surface of the soil or top of the graded working strip or top of road or top of rail, whichever is lower. In case of crossing of water bodies the minimum depth shall be measured from the top of the pipe to the bottom of Scour level.

The depth of the trench will be such as to provide minimum cover as stipulated below:
For Distribution and service lines
□□□□□□□□□□Minor Water Crossing/Canal 1.5 meter

□□□□□□□□□□□Major Water Crossing/Canal 2.5 meter

□□□□□□□□□□□□□□□□□□□□□□ Uncased/Cased Road Crossing 1.5 meter

□□□□□□□□□□□□□□□□□□□□□□ Rail/Road Cased Crossing 1.7 meter

□□□□□□□□□□□□□□□□□□□□□□ □□□Normal Areas 1.0 meter

The minimum depth may be greater than as mentioned above as may be required by Government/Public authorities under jurisdictions. The Contractor shall perform such work without extra compensation, according to the requirement of concerned authorities and existence of laid pipeline.

Also, in case of Drains/Culverts/utilities crossing through open cut where excavation cut is more than 1.5m, the extra excavation is inclusive in the laying rates. No separate payment is chargeable for extra excavation and includes backfilling as well.

In case, the depth could not be achieved due to practical problems and the same is demonstrated, EIC after examining thoroughly and considering the codes and standards may allow the contractor to provide suitable protection by way of concrete casing pipes or slabs without any extra cost to Owner.

13.2 Width of Trench

The width of the trench shall be wide enough to provide bedding around the pipe as specified and to prevent damage to the pipe inside the trench. Unless otherwise directed by the EIC and where ground conditions permit, the minimum distance from the inside edge of the trench wall to the outside of the pipe shall be as per the drawing attached enclosed with tender.

13.3 Trench Base

The trench bottom shall be cut or trimmed to provide a uniform bedding for the pipe, and shall be free of stones, metal, wood, vegetation, clods of earth or other debris before replacement of the pipe. In case trenching is done in rocky terrain a bedding of soft soil or sand 150 mm form all sides, as decided by EIC, shall be provided in the trench base.
If any hard rock/marram or large boulder strata is encountered during excavation, in any direction of the trench and removable only by pneumatic chisel / drill, no additional rates shall be applicable.

13.4 Clearances

Unless otherwise approved, the following clearances shall be maintained between the external wall of the gas pipe and the external surface of other underground assets/utilities in the vicinity of the repair works.

When a buried pipeline has to cross any existing underground pipeline, cable, drain or other services, the pipeline shall be laid at least 500mm below such services.

When laid parallel to any existing underground pipeline, cable, drain or other services, the underground

pipeline shall be laid with a clear horizontal distance of at least 500mm.

Where the above clearances cannot be achieved during repairing, or in other special circumstances, the EIC may approve/specify protection with concrete/MS coated pipe, etc. The protective material shall be supplied and installed by the Contractor at his cost.

13.5 Under Ground Interferences

The Contractor shall locate and expose manually all underground facilities if any during trenching and exposing of damaged pipe. Safety barriers shall be erected along the trench to prevent any accidents. On locations where pipeline is laid under the existing facilities and near the approaches of the crossing, the trench shall be gradually deepened to avoid sharp bends.

All sewers, drains, ditches and other natural waterways encountered while trenching shall maintained open and functional by providing proper temporary installations if required. Suitable dewatering pumps shall be deployed to dewater, if required.

Whenever it is permitted by Authorities and /or Owner to open cut paved road crossing, or where the line is routed within the road pavement, the Contractor shall removed the paving in accordance with the restrictions and requirements of the authorities having jurisdiction thereof as directed by Owner. After re-laying the pipe, backfilling shall be immediately performed and all the areas affected connected with the exaction works shall be temporarily restored.

In case of damage to any of above referred structures/utilities the Contractor shall be responsible for repairs/replacement at his own cost, which shall be carried out to the satisfaction of concerned authorities, resident and Owner.

13.6 Others

Throughout the period of execution of such repair work, the Contractor shall provide and use warning signs, traffic lights or lanterns, barricades, fencing, watchman etc. as required by the local authorities' jurisdiction and/or Owner.

For all roads, paths, walkways etc. that are open-cut, the Contractor shall provide temporary diversions properly constructed to allow the passage of normal traffic with the minimum of inconvenience and interruptions. The paving shall be restored to its original condition after repairing of pipeline.

The Contractor shall excavate to additional depth at all the points where the contour of the earth may require extra depth, or where as deep trenches is required at the approaches to crossings of roadways, railroads, rivers, streams, drainage ditches without any extra cost implication to Owner.

The Contractor shall excavate all such aforesaid depths as may be required at no extra cost of Owner. The trench shall be cut to a grade that will provide a firm, uniform and continuous support for the pipe. The Contractor shall take conducive measures to ensure the protection of underground utilities as per the instructions of Owner or relevant authorities.

Where the pipeline crosses underground utilities/structures, Contractor shall first manually excavate to a depth and in such a manner that the utilities/structures are located, then proceed with the conventional methods.

The locations, where the pipeline has to be laid more or less parallel to an existing pipeline cable and/or other utilities in the Right-of-way, the Contractor shall perform the work to the satisfaction of the Owner of the existing pipeline/cable/utility. In such locations, the Contractor shall perform work in such a way that even under the worst weather and flooding conditions, the existing pipeline/utilities remain stable and shall neither become undermined nor have the tendency to slide towards the trench.

13.7 Bedding

The Contractor shall ensure that the pipe when placed in the trench is supported and surrounded by a bed of screened excavated soil, which shall be stone free and have a maximum grit size of 5mm, in order to ensure no damage occurs to the pipe. However, in case of rocky soil the bedding shall be done with approved good quality packing sand subject to the approval of the Site Engineer. The packing sand shall be placed to a minimum thickness of 150mm around the pipe in case of rocky terrain. The payment for supply of sand is inclusive in the laying rates. Unless directed by the EIC the quantity of bedding and surrounding sand shall confirm specifications. There shall be no void space in the packing sand around the pipe.

14.0 LAYING FOR REPAIRS OF MAINLINE & SERVICE

Re-laying of MDPE pipelines shall be commenced only after ensuring proper dimensions and clean surface of the trench. The trench bottom shall be free from the presence of cuts, stones, roots, debris, stakes, rock projections up to 150mm below underside of pipe and any other material, which could lead of perforation/tearing of the pipe wall. After ensuring above the MDPE pipe coil shall be uncoiled smoothly through proper equipment's/care inside the trench ensuring no damage to pipe coil during laying. The contractor must ensure that pipe caps are provided at ends before lowering of Pipeline. The trench after this can be released for back filling leaving adequate lengths open at the ends for jointing.

Contractors shall ensure open ends of pipe placed in the trench shall be securely capped or plugged prevent the ingress of water or other matter. The Contractor is to ensure that nothing enters the inside of the pipe during the laying process as this could cause a future blockage or regulator malfunction due to dust, etc.

MDPE ball valves shall be installed at locations as directed by the EIC or O&M In-charge and joined with PE pipes by electro fusion techniques. The valves shall be placed on a concrete square block at the bottom to achieve equivalent support of the incoming and outgoing pipe work. Details of depth, length, offsets from fixed references, other utility crossings, fittings, sizes of the casing pipe used for the pipeline shall be prepared and be incorporated in to As-Built Drawings.
Where given specific approval by the EIC a pipe may pass through an open drain or nallah. Where this is permitted the PE pipe shall be installed inside a concrete or steel sleeve for protection with no cost implications to the owner. The sleeve material shall be procured and laid by the Contractor, with prior inspection and approval of the EIC for the quality of material. In general, the GI Sleeve material specification shall be confirming to IS 1239 (Heavy Duty) specification of reputed make**.**

In case of damage to charged mainline & service line, the contractor shall immediately ensure that ball valve installed on the mainline shall be closed/shut off so that leakage of gas from the damaged section is contained and shall cordon the damaged section area immediately and make nearby standing people aware of leakage so that no body uses lighters, match sticks and blow lamps, etc which may result in fire. Once the gas vents off, the contractor shall expose the damaged section and repair by placing pipe of same size and fusing at both ends with couplers. For all sizes, for lengths to be replaced on damaged section, flushing and testing is mandatory before re-commissioning. The fresh piece/length of pipe shall be released for laying only after visual checking for any damage, deep cuts. After fusion of fittings, the gas charging shall be allowed only after completion of cooling time of these fused fittings. After gas charging, both ends of fused joints need to be checked with soap solution to ensure no leakage.

For restoring supply through transition fitting, after closing of ball valve, a pit shall be excavated on the alignment route of service line on which transition fitting is fused for manual squeezing of pipe. After squeezing the pipe, the gas supply shall be restored for other users and the damaged section be repaired. The surface damaged for repairing of service line shall be restored to original condition and includes making of pedestal (size 150 x 150 x 150 mm for GI Sleeve, size 200 x 200 x 150 mm for Half Round Concrete Sleeve), if excavated near to Transition fitting. This excavation along with other work necessary to break through the walls of the obstruction, insertion of MDPE pipe, sealing of the annulus between the pipe and the sleeve, sleeve and the wall supply (if required), re-installation of sleeve shall be deemed included in the laying rates of pipes respectively as per the applicable SOR. **However, replacement with half round concrete shall be given preference over GI Sleeve.**

15.0 MOLING

The Manual Moling shall be carried out as per the requirement specified by Owner / Owner's representative and approved procedures. The contractor has to carry out survey of the underground utilities before going for the Moling to avoid any damage to other utilities. No extra payment will be made for any trial/abandoned pits made during the survey. The supply of all equipment, power required for carrying out moling work is in contractor's scope. The type of moling to be carried out i.e. with or without casing shall be at the discretion of Owner and prior approval is to be taken before starting the work.

For Moling the contractor shall ensure that the size of the hole shall not be more than 20% of the size of the casing/carrier pipes whichever is applicable. After completion of Moling the hole shall be properly compacted / filled with soil by watering and by approved procedures. The moling rates are payable as per the size of carrier pipe irrespective whether laying is carried out with or without the casing and includes jointing and insertion of carrier pipe through the hole, flushing, testing & re-commissioning.

Any damages occurred to other utilities during the Moling operation shall be immediately, notified and rectified by the contractor without any cost implication to Owner.

16.0 HORIZONTAL DIRECTIONAL DRILLING (HDD)

One of the above techniques is required to be carried out by the Contractor where repairing of pipe is not possible by conventional trenching or Moling method or when the damaged pipe was earlier laid by HDD method only. The Contractor shall obtain details of such crossings form Owner's control room and in consultation with Owner shall prepare proposed replacement construction drawings. Execution of the work shall be based on the Owner / Owner's representative approved drawings. The contractor has do the thorough survey of the under ground utilities before commencement of HORIZONTAL DIRECTIONAL DRILLING to avoid the damage to the other existing utilities. No other extra payment will be made for any trail, failed attempts, abandoned pits made during the replacement work. The supply of all equipment required for carrying out the HDD is in contractor's scope. The HDD operation shall be carried out accordance with API-1102. The type and availability of machines is sole responsibility of the contractor and as per the site conditions & requirements to entire satisfaction of EIC.

Once the work is allotted, any delay in mobilizing / non – availability of HDD machines as per site requirement and conditions shall result in levying of penalties on daily basis as per SCC. However, in such cases, owner shall mobilize HDD machines and carry out execution of work on the contractor's risk and cost and as per SCC.

The type of HDD to be carried out with or without casing shall be at the discretion of Owner and prior approval is to be taken before starting the HDD.

The rate includes transportation of MDPE & HDPE pipes from Owner's stores to Site, mobilisation of HDD machines, excavation of pits, backfilling, compaction, jointing and insertion of carrier pipe, flushing, testing till re-commissioning.

Any damages occurred to other utilities during the HDD operation shall be immediately notified and rectified by the contractor without any cost implication to OWNER. The length of the Hole (excluding the sizes of the pits on both ends) shall be considered for the measurement of HORIZONTAL DIRECTIONAL DRILLING length.

17.0 CASING PIPE

The tentative sizes of the HDPE casing pipe for Moling/Horizontal Directional Drilling shall be as follows:

S. No.	MDPE Carrier Pipe Dia size (mm)	Min. Dia of HDPE Casing Pipe (mm)	Max. Dia of HDPE Casing Pipe (mm)
1	20	50	50
2	32	50	90
3	63	125	160
4	125	200	250
5	180	250	315

However, the size of the casing pipe may vary according to the length of the carrier pipe. However, the higher size of HDPE casing pipe shall be preferred over Lower size casing pipe.

18.0 JOINTING OF POLYETHYLENE PIPE

The procedure for jointing of Polyethylene pipe and fittings machines is placed at **Attachment # 3**. Only Bar coded electro-fusion machine (Automatically Readable) that can read the bar code of the fittings automatically shall be used for joining of the MDPE pipes/fittings. Manual feeding Electro-fusion machines are not acceptable for jointing purpose. The contractor has to submit the certificate of calibration of Fusion machine at the time of start of work and at fixed intervals as per the instructions of Owner.

The contractor shall flush the Pipeline with air to remove dust, water, mud etc. before fusing the joints. Before jointing, the Contractor shall place packing sand under the pipes on both sides of the joint to keep the pipes in line and at the correct alignment during the jointing process. The jointing process shall start only after Alignment clamps with the correct size are aligned with the pipe and coupler during the electro-fusion cycle.

The Contractor shall ensure that polyethylene pipe is only cut with an approved plastic pipe-cutting tool (Rotary Cutter up to 63mm/Guillotine Cutter for 63mm and above). Before fusion is attempted, he shall removed the oxidised surface of the pipe using Universal Scrapper up to 63mm/Rotary Peeler for 63 and above before inserting into the electro-fusion coupler. The tool must remove a layer of 0.1mm to 0.4mm from the outer surface of the polyethylene pipe. No fusion will be allowed without clamping device and the approved cutting tools (Hack saw shall not be allowed for cutting the tool).

The contractor has to supply all the consumables required for carrying fusion of the joints (like tissue paper, napkin, acetone etc.). If, upon inspection, the EIC determines a joint is defective, Contractor shall remove the joint by an approved method. The cost of replacing joint shall be borne by the Contractor including the cost of pipe and fittings removed.

For electro-fusion joining, the contractor must bring own tools, tackles and equipments. Only, approved Jointers shall carry out fusion of all joints. Contractors shall provide the list of jointers to be used on the job and make arrangements for Qualification Testing of the jointers in presence of Owner / Owner's representative as per the standard procedures forwarded by Owner / Owner's representative. **All approved Jointers shall be bear identity cards signed by Owner / Owner's representative during fusion job and shall furnish the same on demand by Owner / Owner's representative. Applicable penalties shall be levied, in case, it is found that fusion is being carried by non-qualified jointers as per the provisions made in Special Conditions of the Contract.**

Contractor shall arrange generator along with voltage stabilizer for power supply to fusion machine. Taking power connection form electric poles, connections without written permission from the concerned authorities or residential premises is strictly not permitted.

19.0 TESTING

Pressure testing of repaired pipes shall be carried out with compressed air. Compressed air will be provided by Contractor for testing purposes and is to be included in the laying rates. The test pressure shall be 6.0 bar (g), and there shall be no unaccountable pressure loss during the test period. The test duration shall be 30 min for pipe length less than 10 mtrs, whereas it shall be minimum 4 hrs for length more than 10 mtrs and can be increased to 24 hrs, if the damaged section is affecting the supply of gas to any nearby areas, is in loop. In case of 4 & 24 hrs tests, the pressure should be allowed to stabilize for a period of 30 minutes after pressurization. The holding period may then commence and continue for 4 or 24 hours as per the site conditions.

Pressure gauges/Measuring instruments of suitable range shall be supplied by contractor and shall have been calibrated, their accuracy and sensitivity confirmed. The pressure gauges shall be calibrated from time to time as desired by Engineer-in-Charge. All testing shall be witnessed and approved

by the EIC or his delegated representative. Tie-in joints may be tested at working pressure following commissioning.

20.0 PURGING

Purging shall be carried out in accordance with the principles defined in the American Gas Association publication "Purging Principles and Practice".
The Contractor shall also provide nitrogen required for purging as per the direction of O&M In-charge. Nitrogen shall be supplied in labelled, tested and certified cylinders, and completed with all necessary regulators, hoses and connections, which will be in good condition and working order. No separate payment shall be paid for supplying Nitrogen cylinders for purging and is included in the rates for laying.
In addition the Contractor shall submit and get approved a Purging Plan before commencing any purging work. The Plan shall include, but not be limited to, the provision of the following materials and equipment: Personal Safety Equipment, Fire Extinguisher, Purging Adaptor, Purge stack with flame trap and gas sampling point, Gas sampling equipment (may be gas leak detector), squash-off tool,
Polyethylene connecting pipe work.

The Plan shall also include the purging process along with detail on the sequence of events. The process is to also specifically mention the need to lay a wet cloth over the PE main and in contact with the ground, to disperse static electricity during the purging work. A purge stack with flame trap shall be used when purging services. Care shall be taken to ensure that the purge outlet is so located that vent gas cannot drift into buildings.

21.0 BACKFILLING

Backfilling shall be done after ensuring that appurtenance have been properly fitted and the pipe is following the trench profile at the required depth that will provided the required cover and has a bed which is free of extraneous material and which allows the pipe to rest smoothly and evenly. Dewatering shall be carried out prior to backfilling. No backfilling shall be allowed if the trench is not completely dewatered.

Prior to backfilling it should be ensured that the post padding where required of compacted thickness 150mm is put over and around the pipe immediately after lowering. Backfilling shall be carried out immediately after the post padding where required has been completed in the trench, inspected and approved by Owner/ Owner's representative, so as to provide a natural anchorage for the pipe, avoiding, sliding down of trench sides and pipe moment in the trench. If immediate backfilling is not possible, a padding of at least 300 mm of earth, free of rock and hard lumps shall be placed over and around the pipe.

The backfill material shall contain no extraneous material and/or hard lumps of soil, which could damage the pipe and/or coating or leave voids in the backfilled trench. In case, it is required and directed by EIC screening of the backfill material shall be carried out with specified equipment before backfilling the trench.

The surplus material shall be neatly crowned directly over the trench and the adjacent excavated areas on both sides of the trench to such a height which will, in Owner/Owner's representative opinion of provide adequately for future settlement of the trench backfill during the maintenance period and thereafter. The down shall be high enough to prevent the formation of the depression in the soil when backfill has settled into its permanent position should depression occur after backfill, Contractor shall be responsible for remedial work at no extra cost to Company. Surplus material, including rock, left from this operation shall be disposed off to the satisfaction of landowner or authority having jurisdiction at no extra cost to Owner.

Where rock, gravel, lumps of hard soil or like materials are encountered at the time of trench excavation, sufficient earth, sand or select backfill materials shall be placed around and over the pipe to form a protective cushion extending at least to a height of 150mm above the top of the pipe. Select backfill materials for padding that area acceptable shall be soil, sand, clay or other material containing no gravel, required selected backfill material has been placed, provided the rock or lumps of hard soil. The padding earth shall not contain any stones, i.e. the earth shall be screened for sand padding of the Pipeline in order to avoid damage to the pipeline. Contractor shall carry out all these works at no extra cost to Owner. Loose rock may be returned to the trench after the required selected backfill material has been placed, provided the rock placed in the ditch will not interfere with the use of the land by landowner, or tenant.

In case where hard rock is encountered or as desired by EIC / site engineer sand padding is to be provided up to height of 150 mm around the pipe. When the trench has been dug through driveways or roads, all backfilling shall be executed with sand/suitable material in layers as approved by Owner /Owner's representative and shall be thoroughly compacted. Special compaction methods as specified may be adopted. All costs incurred there upon shall be borne by the Contractor.

Trenches excavated in dikes which are the properties of railways or which are parts of main roads shall be graded and backfilled in their original profile and condition. If necessary, new and/or special backfill materials shall be supplied and worked-up to.

PE Warning Grid/Mat 1mm thick and 300mm wide shall be placed on distribution main and service line inside premises, after backfill of the trench up to a height of 300 mm on the top of the carrier pipes. The warning grid is to be unrolled centrally over the pipe section and thereafter further backfilling will commence.

Backfilling activity shall include proper compaction by jumping jack compactor, wherever required and as per instruction of EIC, and watering in layers of 150mm above the warning mat. Proper crowning of not more than 150mm shall be done. All the excavated material that could be used during the Restoration process shall be stacked and kept separately and properly. Wherever Road cutting/Tiles removal/PCC cutting has been done during excavation for laying, the area shall be back filled and compacted immediately so that no inconvenience is caused to the general public.

Electro-fusion of joints is to be undertaken immediately after lowering and the activity shall not be kept pending for lack of Electro-fusion jointing. The backfilling shall be considered complete only after the jointing the complete. Debris and other surplus material shall be removed immediately after the back filling.

22.0 ASSISTANCE IN COMMISSIONING

Contractor shall provide the required personnel, Vehicles, labour, supervision, tools, equipment, instruments and technical assistance for performance tests and commissioning activities as per requirement / satisfaction of Owner /Owner's representative.

23.0 RESTORATION

Wherever the excavation is carried out for repair of damaged pipeline, restoration to the original surface condition is in the scope of Owner or as directed by EIC. All excavated pits for repairing like on roads, footpaths (including roads and footpaths inside colonies) shall be restored to original condition, and the same shall be done as per CPWD/IRC norms and to the satisfaction of the concerned local Authority/Third Party Agencies designated by Owner (if any). To retard curing of the installed concrete, wet sackcloth is to be placed on the finished surface and kept damp for a period of 36 hours.

Where slabs and blocks are to be restored, the level of the compacted sub-base is to be adjusted according to the slab/block thickness. The slabs or blocks should be laid on moist bedding material, which should be graded sand, mortar or mortar mix. The slabs or blocks should be tapped into position to ensure they do not rock after laying.

The restored slabs or blocks should match the surrounding surface levels. Joint widths should match the existing conditions, and be filled with a dry or wet mix of mortar. The procedure for restoration of Road/Footpath, placed at **Attachment # 4**, is only indicative. However, the restoration shall be done in accordance with the norms of the concerned Land owning agencies.

Turf shall be replaced in highly developed grassed area. In lesser-developed grassed areas topsoil should be replaced during the restoration process. Where permanent surface restorations cannot be completed immediately, the Contractor shall provide and maintain a suitable temporary running surface for vehicular traffic and pedestrians. The Contractor will be responsible for the maintenance of all restoration carried out, for the duration of the Contract guarantee period.

The Contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose and properly compacted. Where the required standards are not achieved the Contractor will be required to replace the defective restoration work.

Note that payment for restoration will be released only after satisfactory completion and certification by Owner/Owner's representative with clearing the sites of all surplus materials, etc. Contractor has to obtain the No Objection Certificate (NOC) from the concerned local authorities/RWA after completion of the restoration work (if required). The restoration specification specified in the tender is only a typical specification and the contractor has to carry out restoration as per the latest version CPWD/IRC/MCD specification to its original condition and also to the entire satisfaction of landowner (Private/Public).

The expenditure incurred towards testing of the material used for restoration, as per the applicable standards, shall be born by contractor.

24.0 INSTALLATION OF SLEEVES, CONSTRUCTION OF PEDESTAL AND MODIFICATION IN OLD TF POINTS

24.1 On allocation of work by EIC, as built drawings showing pipe size details, existing gas charged areas, name & address of gas users, location & valve size inside valve chambers, approximate location of the existing mains will be issued to the contractor at the start of the survey by the owner.

24.2 Installation of new or replacement of damaged GI sleeves & Half round RCC Sleeves

GI Sleeve:

A bending tool shall be used to bend the GI sleeve pipe so that it has the appropriate curvature and is free of kinks. The installation of GI sleeve for service lines shall be done by sealing the annulus between pipe and sleeve, firm fixing of the GI sleeves by concrete mix pedestal, clamping, sand filling, etc.

The contractor shall supply the minimum dia. size of 2.5" or 3" GI sleeves (Heavy Duty), 300 mm in length as per direction of EIC. The vertical portion of the sleeves shall be fixed to the wall of the premises in a secure manner. The Service lines shall be installed in accordance with the drawing enclosed in the tender.

Half Round Concrete Sleeve:

The installation of Half Round Concrete sleeve for service lines shall be done by sealing the annulus between pipe and sleeve, firm fixing of the Concrete sleeves by concrete mix pedestal, clamping, sand filling, etc. Half round concrete sleeve shall be made as per attached drawing.

The replacement and new installation shall be carried out only after allotment of work from EIC. As all the work is being carried out near to gas charged pipeline, due care shall be taken to avoid any damages while excavating on existing network. All safety gadgets and fire fighting equipments shall be placed at all work sites before start of work as precautionary measures. The rates for new and replacement of sleeves includes appointment with existing gas users for informing planned shut down on riser, supply, transportation of material to site, mobilization of manpower, dismantling of regulator, excavation of pits for squeezing and restoration of excavated pits with making of pedestal.

The final replacement/installation with GI or RCC sleeve will be worked out as per site conditions in consultations with the O&M In-charge after route survey on existing installations. Any change in plans for replacement/installation of sleeve due to site constraint will be notified to O&M In-charge & his specific written approval shall be obtained before carrying out the job.

This shall include supply & installation of GI Sleeves, 2.5" NB x 300 mm length GI Sleeve / Half Round Concrete Sleeves for domestic connections , 3" NB x 300 mm length GI Sleeve as per IS 1239 part I heavy duty for commercial and industrial installations, excavation, breaking through any obstructions, Squeezing of MDPE pipe near to Transition fittings ,dismantle of regulator, shutdown the riser /individual connections, insertion of GI pipe, sealing the annulus, firm fixing of the sleeves with concrete mix, preparation of pedestal & restoration of excavated pits within the size of pedestal. The rate includes liasoning with statutory bodies if required and no separate rates are payable.

24.3 Construction of Pedestal & Sand filling

Construction of pedestal and sand filling will be worked out as per site conditions in consultations with the O&M In-charge after survey on existing installations.

The Contractor shall be responsible to arrange the supply of approved coarse sand (size 0.6 – 2 mm as per IS 383) free from any impurities like clay, mica, and soft flaky pieces, as per the instructions of EIC/Owner's representative**.**

Scope includes all civil works including supply of manpower, materials, excavation of pit including PCC, finishing, clean up, Sand Filling and restoration as defined in technical specification & instruction of EIC. The rate includes liasoning with statutory bodies also.

24.4 Modification of Old Transition Fittings

Any modification required in existing transition fittings will be worked out as per site conditions in consultations with the O&M In-charge after survey on existing installations.

Scope includes excavation, breaking any obstructions, Squeezing of MDPE pipe near Transition fittings and modification/shifting of PE pipes, dismantling regulator, shutdown the riser/individual connections, modification of GI pipe, Installation of isolation valve (if required), re-testing, commissioning of GI and MDPE pipe, sealing the annulus, firm fixing of the sleeves with concrete mix, preparation of pedestal & restoration of excavated pits within the size of pedestal. The rate includes liasoning with statutory bodies if required, all civil works including supply of manpower, materials, excavation of pit, PCC, finishing, clean up, restoration and sand filling.

Construction, Repair & Maintenance of valve Chambers

The Construction/modifications/repair of valve chambers will be worked out as per site conditions in consultations with the O&M In-charge after survey on existing valve chambers.

All civil works including supply of manpower, materials including water proofing compound of reputed make, excavation of pit, piping supports including all PCC, RCC and Brick works for valve pits, pedestals with insert plates as required, sealing of pipe at pits, providing cover etc., finishing, painting, clean up and restoration as per technical specification & instruction of EIC. Water proofing

compound shall be used in such proportion as recommended by manufacture but in no case it shall exceed 3% by weight of Cement.

All the debris shall be immediately removed after completion of the job. As for easy identification of valve chambers, the manhole cover shall always be painted with Canary yellow paint and rates inclusive.

On repairing of RCC Slab of valve chamber, the rates include dismantling existing RCC slab & erection and re-fabrication new slab without disturbing the side walls of chamber.

The contractor shall ensure the valve chambers to be free of any leakage/water seepage after its construction/repair/modification.

For new construction/replacement of valve chamber, pre-cast concrete chamber may be allowed after written approval from EIC.

Scope also includes installation of PE valve in valve chamber with required squeezing of on line Gas network, cutting, cleaning, electro fusion jointing, testing and commissioning of gas network. The rate includes liasoning with statutory bodies and no separate rates are payable

Material for Valve Chambers

RCC Pre-cast Slab shall conform to IS: 456. Heavy Duty RCC Manhole Cover shall be used. It shall be with raised with Lifting hooks. The RCC manhole cover shall have a clear opening as per the Construction Drawings issued to the contractor. All material required for modifications, repair etc is scope of supply by contractor.

Workmanship

□□□□□□□□□□The excavation work shall be done at a location given by Engineer-in-Charge. All care shall be

taken not to damage existing facilities and surface of construction shall be restored to its original state.

- For carrying out modification work, the MDPE valve pit shall be covered with sand bags from bottom to top and then only work will start. Sandbags to be placed without disturbing the laid pipe. Gunny bags and Sand should be of approved quality.
- Pre-cast RCC slab shall be placed as indicated in the construction drawing issued to the contractor. PCC to be placed below the pipe as indicated. Once PCC is set sand is to be filled and properly rammed so that pipe and pre-cast concrete blocks are firmly place.
- Valve will be supplied without the operating stem. Approved quality sand is to be placed in between area. The supply of sand and is included in the rates of construction/repair of valve chamber.
- Installation of MS rungs shall be inclusive & carried out at time of cleaning of valve chamber.
- Surrounding area to be properly cleared and PCC to be placed around the location where pre-cast slab with RCC Manhole cover is placed. The RCC pre-cast slab to be laid in level and finished smooth.

24.5 Fabrication, Installation, Painting & Relocating of Pipeline Markers

A joint survey will be conducted by Owner's representative/Owner with contractor along the route for identifying & recording new installations/re-location/painting of various existing markers.

This shall include supply and installation /reinstallation of Route Markers / Pole Markers/plate marker as per the attached drawings, along the route / along boundary wall, lamp posts including all associated civil works such as excavation and construction in all types of soils, construction of pedestals

and grouting with concrete, cleaning, supply and application of approved color and quality of primer and paint, stencil letter cutting of numbers, direction, chainage etc., restoration of area to original condition and performing all works as per drawings, specification and instruction of Engineer-in-Charge. Contractor will provide a list of installation or reinstallation of markers to EIC and get their approval before start of work.

The contractor will be responsible for liaison with statutory bodies if required and making necessary arrangements for carrying out the work. Contractor shall maintain job card for work carried out at site.

Permanent Markers (Drawings are enclosed with the tender document.) shall be fabricated, supplied and installed on the ROU as per the directions of EIC/Control room In-charge. The installation of the type of the Permanent Marker shall be decided by the EIC depending on site condition. The contractor shall also ensure that a sample of all type of markers shall get inspected and approved from EIC before installation at the site. The RCC/stone Markers shall be painted before installation as per the approved procedure. Whereas the Pole with foundation & Plate markers are to be supplied with powder coated Golden Yellow paint. The supply various types of markers as per the specification is in contractor's scope..

In many areas, the existing and installed markers needs total repainting with art work on it which is payable under applicable SOR for RCC, Stone & Pole Markers of all sizes. Due to regular construction activities near to vicinity of gas pipeline, markers needs to be relocated as there are chances of damages to them.

Guidelines:

- Interval between any two RCC/ Stone markers for mainline (180mm to 63mm) shall not be more than 50m.
- Pole markers with foundations shall be installed after two RCC/ Stone markers as per attached drawing.
- In addition to above, Plate markers (As per attached drawing) shall be installed in individual societies/areas as per the instructions of the O&M In-Charge.
- For the distribution network 32mm & 20mm pipe, plate markers shall be installed as per the site conditions and directions of the O&M In-Charge.

The artwork is typical for all the markers, with Owner's logo on it. The contractor must take prior approval for the artwork from EIC before installation of Markers.

25.0 STANDARD OF WORK

All work carried out under this contract shall be to standards, codes of practice construction procedures and other technical requirements as defined in the technical specifications. The manpower deployed on the respective work shall be adequately trained and shall have necessary skills to executive/supervise the work. However, the assessment on the qualification of the personal shall be at the discretion of EIC.

Fusion Operators and other skilled personnel like plumbers, conversion techniques shall be approved by Owner /Owner's representative. Simultaneous Identification Cards duly signed by Owner/Owner's representative shall be issued to them. The contractor shall maintain proper record for the identification cards issued to their workers.

26.0 RECORDING (AS-BUILT DRAWINGS)

The as-built drawing shall be submitted on location & area wise as specified. The bill of materials used for the particular area shall be specified on the drawings. One-site sketches, picking up key

reference points, shall be made during the installation of services. The lengths, depths of re-installed pipe work, offsets from fixed references, changes in direction, major fittings, crossing details of trench less method etc., shall be recorded together with appropriate references to other services crossed and in the proximity of the gas pipe.

The following points shall be taken care to the preparation of as built drawings.

a) The as built drawings should be in the scale of 1:200 and shall be submitted in an A-0 sheet. The drawings shall be in layers according the AUTOCAD features category.

b) Pipeline feature shall be shown as a continuous line, breaks only at joints, fittings, valves, tee point, etc. Diameter, Pipe material, length, and location of pipeline whether on the road or footpath, should be clearly indicated.

c) Minimum three (03) offsets of every joint, from permanent structure shall be recorded on As Built.

d) Distance of pipeline from permanent property/structure should be provided at least every 20 metres. If there is any change in alignment / orientation and offset distances etc. of the pipeline in between the above said 20 mtr, the same shall be clearly mentioned in the as built drawing. Gas objects (off valves, tees, elbows, couplers, transition fittings etc.,) shall be shown as block objects (which form a single node to connect) with respect to Owner symbols / legend. The as built drawings shall be as per the approved legends provided by EIC.

e) Details & offset distances from other utilities present in excavated pits (e.g. MTNL, NDPL, BSES, DJB etc.) should be given in as built drawing. If there is any change in depth of the pipeline, the same shall be clearly marked with details in the as built drawings. The details (material, size & length) of additional protection provided to pipeline shall also be clearly indicated.

f) Details of the PE stop off valves &. Other fittings used (i.e. tees, elbows, couplers, transition fittings, etc.) should be shown with adequate information orientation & offsets from permanent structures in the immediate vicinity.

g) Technical deviations (if any) should be provided with reference to the buildings permanent structures around, and the same should be cited clearly with all the relevant details, including separate sketches/Blowups / sectioned drawings / exploded view.

h) Total as built-length (size wise), bill of materials should be mentioned in each sheet respectively.

i) Complete details of nallah crossings should be shown in a separate sketch.

j) Names of roads, major landmarks and buildings should be mentioned appropriately for reference.

k) Proper chainage shall be mentioned on all the drawings to be referred with continuation reference.

l) Direction of gas flow shall be indicated in each of the drawings.

m) Text on the as laid drawing should be clearly visible.

n) Land base features shown on the drawing shall match the exact distance as they were on real ground with respect to scale (1:200).

o) As built drawings shall be duly signed & stamped by area TPIA.

p) The details shall be prepared in standard format using MAP INFO/AUTOCAD MAP and submitted in CD. Contractor shall also make the item wise material consumption report for the respective areas in a soft copy and to be submitted along with the as-built drawings

ANNEXURE # 1

MINIMUM TOOLS & EQUIPMENTS TO BE PROVIDED BY THE CONTRACTOR FOR EMERGENCY REPAIR AND MAINTENANCE OF MDPE INSTALLATIONS

Sl. No.	Category	Equipment Details	Qty.(Nos.)
1	A	Electro Fusion Machine (Automatically readable)	1
2	B	Voltage Stabilizer	1
3	A	Portable Generator (5.5 KVA)	1
4	B	Squeeze Tools (Manual) upto 63 mm	2 sets
5	A	Squeeze Tools (Hydraulic) 63 mm to 180 mm	2 sets
6	B	Rotary Peelers for PE pipes of 63mm to 180 mm dia.	2
7	C	Universal Scrapers	2
8	B	Tapping Tools/Allen Keys	Two sets of all sizes
9	B	Pipe Cutter upto 63 mm	2
10	A	Pipe Cutter (Guillotine)	1
11	B	Pipe Alignment Clamps	1 set
12	C	Joining Clamps for Coupler	2 sets
13	C	Joining Clamps for Saddle	2 sets
14	B	Re-rounding Tools	1 Set
15	B	Calibrated Pressure Gauges (0-10 Bar)	4
16	A	First Aid Kit	1 set

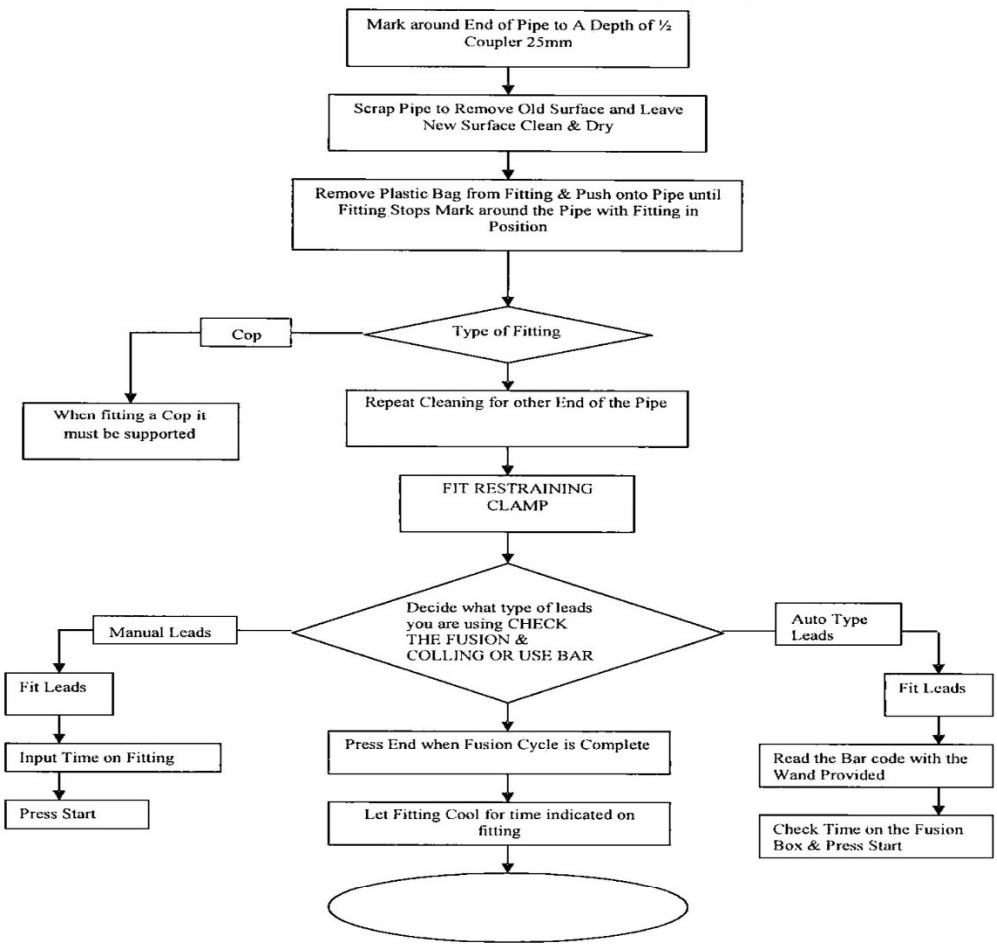
Note - Any other tools & tackles not mentioned above but otherwise required for satisfactory completion of work shall also be provided by the Contractor without any cost implication to BGL.

ANNEXURE # 2

FUSION COUPLERS FROM 20MM TO 180MM

ANNEXURE # 2

FUSION COUPLERS FROM 20MM TO 180MM



Annual Rate Contract for O&M allied services work in Hyderabad, GA.

Annexure – 3

MINIMUM INVENTORY TO BE MAINTENED BY THE CONTRACTOR FOR PE LAYING, MAINTENANCE JOBS

S. No.	Mat. Code	Description	Unit	Minimum Requirement
1	0605008000	PIPE MDPE 20 MM DIA	m	100
2	0605012800	PIPE MDPE 32MM DIA	m	100
3	0605025200	PIPE MDPE 63 MM DIA	m	50
4	0605050000	PIPE MDPE 125 MM DIA	m	50
5	0605072000	PIPE MDPE 180 MM DIA	m	12
6	0606050000	PIPE, HDPE, DIA 125 MM, PE-80 PN-6	m	10
7	0606080000	PIPE HDPE 200MM DIA PE80 PN6	m	10
8	0606100000	HDPE PIPE 250 MM PE80 PN6	m	10
9	0606126000	PIPE HDPE DIA -315 MM. PE80 PN6	m	5
10	0705005000	APPLIANCE BALL VALVE 1/2"	No.	50
11	0706005000	ISOLATION BALL VALVE SIZE 1/2"	No.	20
12	0706007500	ISOLATION VALVE 3/4"	No.	20
13	0706010000	ISOLATION BALL VALVE 1"	No.	5
14	0706015000	ISOLATION VALVE 1-1/2" (40 MM)	No.	2
15	0708025210	MDPE BALL VALVE 63 EF END (WITHOUT STEM)	No.	1
16	0708050010	MDPE BALL VALVE 125 EF END (WITHOUT STEM	No.	1
17	0708072010	MDPE BALL VALVE 180 EF END (WITHOUT STEM	No.	1
18	0708112810	MDPE BALL VALVE 32 EF END (WITHOUT STEM)	No.	1
19	0801025210	MDPE BENDS 63 MM OD 90 DEG PE80/100	No.	1
20	0801050010	BEND MDPE 125 X 90 DEG PE80/ PE 100	No.	1
21	0801072010	BEND MDPE 180MM 90 DEG. PE80/ PE100	No.	1
22	0802025210	MDPE BENDS OF SIZE 63 MM OD OF 45 DEGREE	No.	1
23	0802050010	BEND MDPE 125 X 45 DEG PE80/ PE100	No.	1
24	0802072010	BEND MDPE 180MM 45 DEG PE80/ PE100	No.	1
25	0813008010	COUPLER MDPE 20MM OD PE80/ PE100	No.	10
26	0813012810	COUPLER MDPE 32MM OD PE80/ PE100	No.	10
27	0813025210	COUPLER MDPE 63MM OD PE80/ PE100	No.	5
28	0813050010	COUPLER MDPE 125MM OD PE80/ PE100	No.	5
29	0813072010	COUPLER MDPE 180MM PE80/ PE100	No.	2
30	0814000110	SADDLE TAPP. MDPE 63X20MM PE80/PE100	No.	1
31	0814000210	SADDLE TAPP. MDPE 63X32MM PE80/PE100	No.	2
32	0814000710	SADDLE TAPP. MDPE 32X20MM PE80/PE100	No.	5
33	0814000810	SAD TAP. MDPE 125X63MM PE80/PE100 W CPLR	No.	1
34	0814050010	SADDLE TAPP. MDPE 125X32MM PE80/PE100	No.	1

35	0814072010	SAD TAP. MDPE 180X63MM PE80/PE100 W CPLR	No.	1
S. No.	**Mat. Code**	**Description**	**Unit**	**Minimum Requirement Per Control Room**
36	0815000210	REDUCER MDPE 63X32 PE80/PE100 WTH CPLR	No.	1
37	0815000310	REDUCER MDPE 180X63 PE80/PE100 WTH CPLR	No.	1
38	0815000410	REDUCER MDPE 125X63 PE80/PE100 WTH CPLR	No.	1
39	0815000510	REDUCER MDPE 32X20 PE80/PE100 WTH CPLR	No.	1
40	0817008010	EQUAL TEE MDPE 20MM PE80/PE100 WITH CPLR	No.	5
41	0817012810	EQUAL TEE MDPE 32MM PE80/PE100 WTH CPLR	No.	5
42	0817025210	EQUAL TEE MDPE 63MM PE80/PE100 WTH CPLR	No.	2
43	0817050010	EQUAL TEE MDPE 125MM PE80/PE100 WTH CPLR	No.	1
44	0817072010	EQUAL TEE MDPE 180MM PE80/PE100 WTH CPLR	No.	1
45	0818008010	END CAP MDPE 20MM EF END PE80/ PE100	No.	25
46	0818012810	END CAP MDPE 32MM EF END PE80/ PE100	No.	10
47	0818025210	END CAP MDPE 63MM EF END PE80/ PE100	No.	5
48	0818050010	END CAP MDPE 125MM EF END PE80/ PE100	No.	2
49	0818072010	END CAP MDPE 180MM EF END PE80/ PE100	No.	2
50	1003000000	TRANSITION FITTING PE TO GI 32 MM TO 1"	No.	2
51	1003000100	TRANSITION FITTING PE TO GI 32MM TO 3/4"	No.	2
52	1006000010	TR. FITTING PE TO CS 63MM X 2" PE80/100	No.	1
53	1302000001	DIAPHRGM METER G-1.6 (with serial nos)	No.	20
54	1303000000	DIAPHRGM METER G-1.6 REVERSE	No.	5
55	1430000001	REGULATOR DOMESTIC 4 BAR TO 21m BAR 6.5	No.	20

RESTORATION PROCEDURE/GUIDELINES FOR ROAD CUTS OF MCD AND OTHER LANDOWNING AGENCIES

1.0 PURPOSE AND OBJECTIVE

The main purpose and objective of this document is to ensure that all the work are carried out with proper specifications and standards with high quality and timely accomplishment, and the restoration of infrastructure is according to standards Aimed at achieving the original condition of the road infrastructure.

2.0 DOCUMENTS/FILES TO BE MAINTAINED

The following documents shall be maintained during execution of the job and shall be handed over to OWNER/TPI after completion of the job;

- Copy of permission letter obtained from MCD.
- Drawing/Sketch showing the details of stretch to be cut, highlighting the type of surfaces and its chainage/length (area).
- Stage wise Photographs of the stretch.
- Test Certificates of the Construction materials to be used.
- Routine Test Certificates for construction materials during progress of job. **3.0**

RESTORATION OF TRENCHES/PITS:

After laying pipeline, backfill material without containing extraneous material or hard lumps of soil or stones shall be filled and watered in layers of 150mm. Warning mats shall be placed as per specification. Earth shall be filled watered and compacted in layers with the help of earth compactor (Jumping jack compactor where ever space is available). After backfilling, the crown of the earth shall be between 50 mm and 100 mm above road surface and shall be free from sharp-edge stone and boulders.

After consolidation of backfill, the surplus earth shall be removed and disposed at place directed by OWNER (at suitable locations, as per direction of MCD)

Further, depending upon the Surface types of following specification shall be adopted:

Sl. No.	Surface Types	Specification Recommended
1	Cement Concrete Surface	Top Surface – PCC 1:2:4, 100 mm Thick Compacted with Plate Vibrator shall be laid over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
2	Brick Soiling	Top Surface – Brick Soiling (as per original type) shall be laid over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.

3	Interlocking CC Paver Block	Top Surface – Interlocking CC Paver Blocks (as per original type) shall be laid over compacted fine sand 50 mm Thick over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
Sl. No.	**Surface Types**	**Specification Recommended**
4	Chequered Cement Concrete Tiles/Pre-cast CC Tiles/Kota Stone Floor/Red Stone Floor	Top Surface – Tiles/Floor (as per original type) shall be laid over Cement Sand Mortar 1:6, 20mm Thick over base course, Joints shall be pointed/finished to match colour. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
5	Bituminous Surface (for Category D Roads i.e.; Roads less than 13.70 M width)	Top Surface – 40mm Thick Bituminous Concrete (as per original type) shall be laid over PCC 1:2:4, 100 mm Thick over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
6	Bituminous Surface (for Category C Roads i.e.; Roads less than 18 M width but greater than 13.70 M width.)	Top Surface – 40mm Thick Bituminous Concrete (as per original type) shall be laid over PCC 1:2:4, 150mm Thick over base course. Base Course – PCC 1:5:10, 150 mm Thick laid over compacted backfilled earth.

The specification mentioned above may be modified in line with relevant MCD/CPWD/IRC specifications. Contractor has to follow the changes as informed to them time and again.

NOTE: Wherever the Bituminous portion is cut in small patches or isolated locations where area of Bituminous portion is very less due to constraints like other utilities, the surface shall be restored, same as specified for the cement concrete surface, with prior approval of EIC/TPI.

4.0 TESTING OF CONSTRUCTION MATERIALS

For the different construction materials proposed to be used the following tests are required to be carried out for approval:

Sl. No.	Material	Test	Method of Testing	Frequency of Test
1	Cement	Setting time, soundness, compressive strength and fineness	As per IS: 4031	Once for each consignment or as and when required/directed
2	Bricks	Compressive strength, water absorption and efflorescence	As per IS: 3495	Minimum five samples or as per IS: 5454
3	Coarse Aggregates	Sieve analysis, flakiness index, estimation of deleterious materials, organic impurities, moisture contents and specific gravity	As per IS: 2386	One test per source of supply and routine test regularly as directed
4	Fine Aggregates	Sieve analysis, clay silt and moisture contents and specific gravity	As per IS: 2386	One test per source of supply and routine test regularly as directed

In addition to the above construction materials such as inter locking paver blocks, chequered cement concrete tiles, Pre-cast CC tiles, Kota/Red Stones Flooring samples shall be arranged for approval before use and if required testing shall be arranged.

For Cement concrete works the minimum frequency of sampling of concrete (CC cubes) shall be as follows:

Sl. No.	Quantity of concrete in Cu. M	No. of Samples
1	3 – 5	1
2	6 – 15	2
3	16 – 3	3
4	31 – 50	4
5	51 and above	4 + 1 additional sample for each additional 50 Cu. M and part thereof.

The cement concrete cubes shall be tested for 7 & 28 days as per relevant IS code.

5.0 INSPECTION BY THIRD PARTY INSPECTION (TPI) AGENCIES NOMINATED BY LAND OWNING AGENCIES

It is the responsibility of the contractor to give inspection call, at least one week in advance to OWNER, to arrange for inspection by TPI nominated by land owning agencies along with the file containing all documents mentioned in Clause No. 2 of this document. Before inspection by TPI nominated by land owning agencies, contractor has to arrange for the inspection to obtain "No Objection Certificate" (NOC) from the TPI nominated by the land owning agencies and further NOC from Land Owning Agencies and to get the securities/Bank Guarantees paid to them, for obtaining the permissions.

BHAGYANAGAR GAS LTD

CITY GAS DISTRIBUTION PROJECT IN HYDERABAD

PTS – GI/CU O&M WORKS (LOW RISE)

TABLE OF CONTENTS

1.0 GENERAL INFORMATION

1.1 Introduction

Bhagyanagar Gas Ltd. (OWNER) is a Joint Venture Company of Gas Authority of India Ltd. (GAIL), Hindustan Petroleum Corporation Ltd. (HPCL). Owner plans to expand Natural Gas Distribution network throughout the Hyderabad.
The objective is to supply Natural Gas to both domestic and commercial customers, and to provide compressed gas as a fuel for Automobiles. BGL has demarcated zonal boundaries for Hyderabad for all existing areas and now is seeking Contractors to assist in meeting the above objective of each individual zones.

The main scope of this contract comprises Maintenance, Testing, Shifting, removals & modifications (if required), painting of GI & Copper Pipes along with Meter installation both for domestic and commercial segment i.e. above ground pipes from the outlet of 'PE / GI transition fitting' up to the domestic/commercial customers 'Appliance/stove/oven valve' as per the Distribution schedule placed in enclosed drawing in Existing Gas charged areas.

The scope includes installation, testing and commissioning of above ground GI / Cu pipes and associated fittings, valves, regulator up to and including meter for commercial / Domestic Customers. However, the piping may have to be carried out up to Appliance valve, in case of some commercial/domestic connections as per customer requirement.

Except free issue items like Domestic & Commercial meter, regulator, Isolation and appliance valve, Contractor shall procure all other material (GI fittings, GI pipes, Cu pipe, Cu/Brass fittings, Reinforced Rubber hose etc. which is required from the outlet of PE / GI transition fitting up to the Domestic / commercial customers "Appliance / stove / oven valve".

This technical specification defines the basic guidelines to develop an acceptable design and suitable construction methodology for carrying out different activities listed out in the schedule of rates of this tender.

Compliance with these specifications and/or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

2.0 DEFINITIONS

OWNER	Bhagyanagar Gas Ltd., BGL
EIC	Engineer – in – charge
TPIA	Third Party Inspection Agency

3.0 SCOPE OF WORK

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

3.1 Plan and prepare a schedule for Maintenance work implementation as per QA/QC plans to be issued by Owner / Owner's representative. Contractor has to submit the Maintenance & Execution procedures before commencement of work to Owner / Owner's representative for approval.

3.2 Contractor shall submit the QAP/procedure/drawing etc. of all the material to be procured by him for approval before procuring the items. If, QAP/procedure/drawing etc are not approved from client/consultant then owner has the authority to refuse /reject the material.

3.3 Receipt of regulators, domestic meters, Isolation and Appliance Valve as a free issue items from Owner's stores, loading, transportation, unloading at project site. Proper storing, stacking,

identification, providing security, and insurance, during and before modification, installation and re-commissioning of pipelines. Obtaining the approval for optimum route and permission for work from customer/concerned authority and EIC.

3.4 Selection of route for modifications, repair with the EIC / O&M In-charge and marking the same on walls/floors anywhere between 'transition fitting' to 'cooking oven/stove/appliance', making openings and provisions for fixing clamps. Making temporary but stable platforms/scaffolding/rope ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.

3.5 Contractor shall procure all other material to be used from the outlet of PE/ GI transition fitting upto the Domestic/Commercial customers "Appliance /stove / oven valve except free issue materials issued by BGL for satisfactory completion to the owner/owner's representative.

3.6 Supply and Installation for Maintenance of GI pipes of ½", ¾", 1" , 1-1/2" & above dia. anywhere between transition fittings to customer's kitchen appliances including NPT threading of GI pipes, supply of proper seal outs for threads, to join fittings such as elbows, tees, connectors, unions, plugs, sockets, regulators, meters, appliance & isolation valves etc., as per laid procedures and specification including clamping and sealing etc. The GI pipe shall be painted after the testing of the GI installation.

3.7 Installation of Copper pipes by supplying solder wire and flux to join fittings such as elbows, tees, connectors, meters, valves etc., complete as per procedures and specifications including clamping and sealing etc.

3.8 Supply and Installation of clamps for fixing pipes, Meter brackets, supply of paints for painting of GI Pipes and fittings. Providing consumables grout material, repair/restoration of walls/floors changes for the pipes including the materials required for conversions and tools and tackles etc., complete as per specification.

3.9 Carry out testing of GI Riser and internal Kitchen piping (GI or Copper) installed in kitchens till appliance valves.

3.10 Carry out removal & dismantling of all sizes of GI/ Copper of pipes on customer's /BGL request.

3.11 Conversion of all types of LPG kitchen appliances to NG based appliances, also taking Signatures on GIRM/Maintenance Cards & Joint Meter Records (JMRs) of customer. Changing side of appliance (i.e. left to right or right to left), disconnecting a PNG connection, Drill in all type of Slab during NG Conversion, replacement of faulty meter, replacement of anaconda, steel reinforced rubber hose, other related request/complaints are part of the scope.

3.12 To maintain material inventory, emergency tools and tackles for attending all type of complaints.

3.13 To demonstrate the Customer regarding use, safety and maintenance related aspects of NG based appliances and installations.

3.14 Cleaning, flushing, pneumatic testing and re-commissioning of GI/Cu pipe & fittings, meters, valves etc as per specification and hand over the same to Owner/Customer to the entire satisfaction of EIC/O&M In-charge.

3.15 Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.

3.16 Restoration of walls, flooring and other damages while executing the above ground installation.

3.17 Preparation and submission of above ground installation card for each house/commercial establishment indicating the laid qty. of GI/Cu pipe including fittings.

3.18 Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works in existing gas charged areas shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner.

3.19 Contractor shall be responsible for any misconduct/unethical activities of his personnel if reported by customer and a penalty will be levied on contractor as per SCC of Contract. Contract may also be terminated at the sole discretion of EIC.

3.22 Supply of Warning Mat shall be in Contractor's scope:

3.23 Supply of Stone Marker and new brass fittings and associated fittings in place of "Anaconda" shall be in Contractor's scope. Replacement of existing anaconda with new fittings shall be as per instruction of EIC.

3.25 Contractor shall store "Dismantled Material" in his Store/custody. Such material kept at contractor's store shall be verified, reconciled and returned to BGL on half yearly basis or as per requirement of BGL.

3.26 Digital Photographs of internal installation after internal testing.

4.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY

4.1 Material to be supplied as a free issue material

Domestic Meters, Regulators, Isolation and Appliance valve shall be supplied by BGL as a free issue material to the contractor. The contractor shall not use any other material from any other source of supply other than owners supplied material without written approval from EIC.

4.2 Material / Equipment & machinery to be supplied by contractor

Contractor shall procure / purchase GI Pipes & fittings, Brass fittings, Cu pipes & fittings and Reinforced Rubber Hose and consumables which is required to satisfactory completion / safety / statutory of the works as per tender at no extra cost to Owner. The BGL logo shall be marked on the material supplied by contractor. The contractor shall take approval from owner / owner representative for marking on the material to be procured by contractor before placement of order.

The Contractor shall provide labour, tools (such as Hammer Drill, Piston Drill, Pipe Cutters, Dies for threading, Pipe wrenches, spanners, conversion kits, solder torch, copper tube Cutters, tube benders, lacquering, thinner etc.) in specified numbers, all types of clamps, Plant and equipment necessary for the proper execution of the work. This will include but not be limited to list of specialised tools and tackles indicated in **Annexure # 1**.

On monthly basis, contractor has to get their equipments, machines and tools checked & verified by respective BGL's O&M In-Charges which shall be submitted along with RA bills for records. In case of non-availability of minimum equipment, machinery & tools, applicable penalties shall be levied from the running bills as mentioned in SCC of commercial tender.

Special tools shall be available at the site for carrying out drilling work in walls other than Brick or RCC (Ex. Granite, Marble, Wooden, Glass Cutting etc.).

The contractor has to ensure the availability of generator for drilling of holes. In case the power supply is availed at the site from societies, individual residents, contractor shall settle the claims raised by the electricity providers without any cost implication to OWNER. In case contractor doesn't settle the claims for using the electricity from societies / individual residents, on demand by

the providers, OWNER will settle the claims and the same will be deducted form the contractor's bills. The progress of work shall not hamper due to non-availability of power supply.

The contractor has to purchase minimum 2 sets of Die of ½" & ¾" and 1 set of 1" & above dia. and submit the certificate for Die sets confirming to NPT thread and calibration certificate for Pressure gauges.

Contractor shall submit the specification of all the material to be supplied by him to EIC for approval before commencing the execution. No hiring of equipments, tools and tackles by the contractor is allowed at the site. **In case, contractor is found not in possession of enlisted required tools and tackles, penalty shall be levied as per Special Conditions of Contract and will be deducted from the contractors running bills.**

4.1.1 Plant and Equipment

All vehicular type machinery shall be in good working condition and shall not cause spillage of oil or grease. To avoid damage to paved surfaces the contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

4.1.2 Sealant, Grout

The contractor shall be responsible to arrange the supply of any consumable sealant or ready mix grout material required for restoration of holes. The sealant/grout supplied by the contractor shall be compatible with the area to be restored/ rectified. No separate payment form the supply of sealant and grout shall be made to the contractor.

4.1.3 Clamps, Rawal Plugs, Screws and Nozzles etc.

The Clamps, Brackets for meter, Rawal Plugs, Screws, Nozzles, etc. shall be approved lot wise by EIC prior to installation. Re-drilling of existing appliance (burners) nozzles is strictly not permitted. The quality of materials procured will get approved and will be as directed by EIC.

The indicative sketch of the Meter Brackets and GI/Copper Pipe Clamps is enclosed with the tender.

4.1.4 Consumables Items and other materials:

Special Consumables such as Teflon Tapes, solder wire, flux, lacquer, thinner, heating element for Copper soldering shall be supplied by the contractor.

These consumables shall be of reputed make and required grades/class.

All materials required for work, NPT threading Die, Copper pipe jointing, testing etc.

All signs, barricades, lights and protective equipment.

All material required for working at higher floor levels (i.e., scaffolding, Ladder, Safety Belts, Self Locking Safety Harness Belts etc.).

Special consumable such as grease for maintenance of domestic appliances, all paints for painting of GI Pipes, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included in the rates.

All other items not mentioned above but necessary for the satisfactory completion and performance of the work under this contract shall also be in Contractor's scope.

4.3 Acquisition, Receipt and Storage of Materials

The Contractor shall collect Domestic meter, Regulators, Isolation and Appliance Valve from Owner's designated stores in between the hours to be advised by the EIC.

The contractor shall carry out assessment of material required for GI/Copper installation in allocated area. Contractor has to maintain minimum inventory level at their respective control rooms. After approval from Owner, contractor shall place order for procurement of GI Pipes & fittings, Copper pipes & fittings, Brass Fittings and Reinforced Rubber Hose (Technical specifications attached in the tender document) to any of **approved vendors** as per the list attached in the tender document. The contractor shall also ensure that the QAP for these materials shall be approved by BGL before the start of production activity. Once QAP is approved, contractor shall forward inspection call to the Owner depending upon the material requirement at the site. The inspection of these materials shall be carried out by Owner appointed third party agency. It is contractor's responsibility for document submission, arranging dispatch clearance, handling, loading, transportation and unloading of these materials at their own respective store.

Any other activity not mentioned/covered, explicitly, but otherwise required for satisfactory completion / operation/safety / statutory / maintenance of works shall also be covered under scope of work and has to be completed by contractor within specified schedule at no extra cost to BGL. The Contractor shall carry free issue material in such a manner as to preclude damage during transportation and handling.

The Contractor shall at the time of receipt of material physically examine all materials and notify the EIC immediately of any damage or defect noticed by the Contractor. The Control room in-charge/EIC shall duly note any damage or defect in a site instruction book and both parties shall countersign the entry. Any damage not so recorded will be deemed not to have existed at the time of receipt of material by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.

Any material once issued from BGL store, if found in non-working condition at site shall be brought to the notice of EIC with PO reference in written within 15 days and after subsequent approval shall return defective material in BGL stores within 30 days.

If delay is more than 30 days and material is under warranty, the material will be accepted with a penalty, else the material will not be reconciled and amount of the same will be deducted from bills shall be levied as per SCC. The contractor shall ensure that no defective material shall be returned to store at the time of closure of contract. The format for defective materials returning to stores will be made available by EIC.

The contractor shall maintain locked store and proper office set up as defined in bid document preferably near allotted central O&M so that all the materials are stored in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals. The PE pipes and fittings shall be stored in covered storage to protect material from sunshine, rain etc. The contractor shall make adequate security arrangements for the stacked material & any loss to the material on account of theft or improper storage is attributable to the contractor.

The Contractor shall maintain log book at their respective stores stating issue and availability of free issue material at a given day. Further, it is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on quarterly basis to Owner/ Owner's representative as per the approved format of the owner.

In case of non-submission of material reconciliation in first week of every quarter, applicable penalties shall be levied as per SCC from the running bills. In case if shortage in free issue material is observed at the time of quarterly physical reconciliation / verification by BGL, equivalent value of material found short shall be withheld from running bills, Same shall be released after settlement of free issue material.

On quarterly basis, contractor has to get their material reconciliation sheet checked and verified by respective O&M In-Charges/representatives and shall be submitted along with RA bills for records. Consumption of Free issue material must be booked before processing the RA bills and copy of SAP generated print out if applicable shall be attached along with each running bill.

5.0 ISSUE OF WORK INSTRUCTIONS

5.1 The contractor will be required to carry out GI modifications/shifting of installations in the areas where MDPE pipeline has been already laid and gas charged. The methodology followed for GI modifications/shifting may vary in case of individual and multi storied flats.

5.2 All skilled personnel like Plumbers/Technicians will be approved and certified by O&M In-Charge/EIC. The technicians who will carry out joining of copper material and conversions will undergo a test by Owner/representative. Those who clear the test will be issued identity cards duly signed by O&M In-Charge. These technicians shall be only authorized to take up respective jobs. In case it is found that some other contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per special conditions of the contract.

5.3 The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour, skills, supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.

5.4 The schedule of items of GI/Cu installations have been described in brief and shall be held to be completed in all respect including safety requirements as per HSE PTS attached herewith. The payment shall be made against completed and measured works only. No extra works whatsoever shall be considered in execution of these items**.**

5.5 In case of any unwarranted extra works carried out in any zone and other than SOR, necessary approvals shall be taken by EIC with the management.

6.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay as per the defined Turnaround Time (TAT) period. Contractor shall assess the material requirement of the allotted area and submit the schedule plan for execution & purchasing before start of actual work.

The EIC may direct in what order and at what time the various stages or parts of the work under the contract shall be performed. Weekly progress reports shall be submitted in the formats approved by Owner, indicating broadly details of work carried on modifications, removal of GI installations, replacement of defective and non functional meters and regulators (domestic and commercial), status of various complaints like no gas, flame problem, gas leakage etc., conversions & re-conversion, painting of GI Pipes and riser testing.

7.0 WORK SHEETS

7.1 The quantities of GI/Cu pipe installed for modifications and other repair maintenance job will be checked by Owner's site engineer and the same shall be incorporated in Modifications & repair maintenance cards, customer call sheets, signed & dated as certified, on site. The cards will then be

approved by the EIC. **The contractor shall collect the existing company policy documents against Repair and Maintenance work from Owner to keep updated from time to time.**

7.2 Measurement sheets/Documents shall be prepared based on the Modifications & repair maintenance cards and checked and certified by the site engineers and customer where as required for billing purpose.

7.3 If measurement sheets submitted are illegible, incomplete or incorrectly booked they will be returned to the contractor.

8.0 PERMISSIONS / APPROVALS

8.1 Contractor shall be responsible for obtaining permissions from society management, RWA, individual residents and any other concerned authority, if required, for completion of the work. Contractor must take the prior appointment from the residents for carrying out the work.

8.2 The prospective bidder shall work in close consultation/coordination with the EIC.

8.3 The prospective bidder shall not sign/execute any agreement and/or undertaking on any such documents which amounts to be undertaken by Owner. The same shall only be signed and executed by Owner, however, the prospective bidder shall also liaison and coordinate for the same.

8.4 The necessary coordination liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the complaints registered by customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.

A log book/job card for such appointments with Consumer/any other agencies shall be maintained and the schedule/appointment once taken shall be adhered to by the contractor. C/r in-Charge/EIC may review the records every week. The contractor shall submit the detailed list of work carried/attended and balance work on users at least once biweekly as per approved format.

8.5 The contractor is also required to obtain a "Labour License" from the Assistant Labour Commissioner of Concerned Authority.

8.6 It will be the contractor's responsibility to familiarize himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.

8.7 The contractor has to take responsibility of the actions of supervisors, plumbers and helpers provided by him.

9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS

The contractor shall carry out the work in accordance with this specification, Owner's Engineering Standards: PNGRB, ASME B31.8 – Gas Transmission and Distribution Piping Systems; Oil Indian Safety Directorate Norms (OISD) and the American Gas Association Document – Purging Principles and Practice.

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

10.0 SAFETY

The contractor shall take care of all safety norms applicable for such works at site. Contractor shall provide all safety appliances e.g., uniforms, safety helmets, gloves, safety belts, ladders, staging, shoes, goggles, self-locking safety harness belts etc.

All necessary care shall be taken while deploying personnel for working heights and workmen with proper skills only shall be deployed. Proper barricading and warning signs shall be installed. Adequate care shall be taken while taking supports from balconies, chajjas/protection parapets and like structures to be sure of strength and adequacy of the same.

In case, contractor is found not following the safety guidelines as per attached HSE procedure, penalty shall be levied as per Special conditions of Contract. No night working shall be permitted, without proper lighting and prior approval of EIC.

Refer "Special Terms and conditions of Contract" and attached Technical specifications.

11.0 RIGHT-OF-USE SURVEY AND MARKING

The modifications in existing GI / Copper pipeline route shall be decided with consent of the consumer and Site Engineer/EIC. Contractor must ensure that the persons/workers/supervisors/ workers at site shall have proper identity cards prior to entering the premises of the consumer.

No temporary or permanent deposit of any kind of material resulting from the work shall be permitted in the approach or any other position, which might hinder the passage and / or natural water drainage, or any area where there is objection from consumer.

The contractor shall obtain necessary permissions from land Owners and tenants and shall be responsible for all damages caused by the construction and use of such approaches, pavements, gardens, rooms, walls, roof etc., at no extra cost to Owner.

Owner/Owners Representatives along with the contractor will conduct survey of each premises where modifications and repair work has to be carried out. The survey record will note Customer requirement and proposed modifications details available gas supply points and proposed meter relocation (on case to case basis) and estimates of material quantities. The contractor's representatives will make as sketch of the agreed pipe routes, if necessary.

The contractor will be responsible for contacting the Customer and making the necessary arrangements for access, and appointments to carry out the work. Owner will not be responsible for any time lost due to broken appointments or disputes with Customer.

The contractor shall confine its operations within limits of the Right in use. The contractor shall restore any damage to property outside ROU. The contractor shall also carryout all necessary preparatory work if needed to permit the passage of men and equipment. Lights, Curbs, signs shall be provided wherever and/or required by the Owner necessary to protect the public.

12.0 PROTECTION OF STRUCTURES AND UTILITIES

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

While painting, contractor must take care of the consumer premises while carrying out the job such as spillage on floor, walls, ceilings, shades etc. If the same does occur, the contractor is to immediately make good to original.

13.0 PREVENTIVE MAINTENANCE OF GI RISERS AND DOMESTIC CONNECTIONS

On allotment of work, Contractor shall visit the site and prepare plans for execution of the work. Only after written confirmation from O&M in charges and issue of written Permits, shall start with the allotted work.

Contractor shall deploy manpower after assessing the work load along with required tools and tackles to carry out work as per customer requirement and in accordance with technical specifications. All type of work shall be prioritized for attending.

Contractor has to supply different types/sizes of approved powder coated clamps (Mild Steel) for fixing GI pipes, Meter Brackets, consumables suiting to the site conditions. The contractor shall get approval from EIC for every fresh lot of the clamps, brackets and other consumables, prior to start of maintenance of GI Risers and Domestic Connections work.

Testing & Painting of Riser and Internal Kitchen Piping

Identification of Area /Houses where Preventive Maintenance work on Commercials & Domestic PNG installations has to be carried out as per direction of EIC.

Before start of work, contractor shall get approved their manpower, material & tools for Preventive Maintenance Job along with all necessary safety equipment, PPEs and safe work practice.

Detailed feasibility survey of existing PNG connections and Identification of activities which are to be executed shall be carried out by the contractor for Preventive Maintenance job.

Contractor shall inform customer/owner about the time and date of visit, details of job to be carried out & related safety precautions.

Contractor shall provide written Information & receiving consent of the customer/owner about temporary gas shutdown and filling of shutdown card.

Closing of isolation valve (located upstream of the regulator) to stop gas supply towards the house.

Venting of pipeline, dismantling of regulator and gas meter.

Testing of riser pipe up to isolation valves using pressurized air (at 2 bar) .

If leakage/pressure drop is observed, then soap solution testing shall be performed at each and every joint in the riser to rectify/replace the identified damaged/faulty portions/fittings.

Testing of the pipe after isolation valves up to rubber tube using pressurized air at 100 mbar.

If leakage/pressure drop is observed, then soap solution testing is performed at each and every joint to identify the damaged/faulty portions/fittings.

Rectification/Replacement of damaged fittings/portions.

Reassembling of dismantled pipe, fittings and other items.

Putting the meter/ regulator under operation and observe with close supervision for successful working.

Restoration of gas supply.

Online testing of pipe from Transition fitting up to regulator.

If leakage/pressure drop is observed, it shall be informed to O&M In-Charge and repair/rectification of the same is in the scope of contractor.

Painting and clamping of whole assembly as per the specification, if required.

Informing owner about reconnection and final signing by them.

Crosschecking for any pending job.

Filling of the riser & measurement card, recording data of the job according to the prescribed formats. Making note of the customer's point of disagreement in the job sheet, in case he/she had some objection with the work

Recording concealed piping/Technically unsafe cases and taking suitable necessary actions.

Note: During the testing if any leakage / pressure drop is observed, rectification of the same shall be done by contractor without any additional cost implication to BGL.

The contractor shall ensure that all reusable pipes and fittings and specially meter and regulators shall be stored properly with both ports sealed and if required shall be packed in a box so as to avoid dust etc. All such material (considered as free issue at the time of reconciliation), received by contractor on dismantling any domestic or commercial installation, shall be first verified and certified from Control Room In-charge and then kept at contractor's store for future usage.

On reinstallation of GI/copper pipes & fittings in above mentioned dismantled cases, as per site requirement, contractor shall carry out modification primarily using old lot of GI/Cu pipes & Fittings dismantled from other houses, however shall supply his own procured fresh material for additional GI/Copper pipes & fittings for competing the installation.

The GI installation shall be clamped to the building at intervals not exceeding 1.5 mtrs. Maximum distance between clamps shall be 1.0 – 1.5 m when pipe goes to the straight, if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from centre line of fittings at every sides. However, the same may be changed as per site conditions/as directed by EIC. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.

Where pipe passes through a balcony floor, the floor surface shall be made slightly elevated around the service pipe or its surrounding sleeve to prevent the accumulation of water at that point. Where a short piece of sleeve is used around the gas pipe, the sleeve should be embedded in then concrete with a mix of mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be bevelled such as to prevent an accumulation of water. Supply of clamps for all sizes of the GI pipes is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc. after drilling of holes, a PVC sleeve of suited size shall be placed in side hole before GI/Copper installation. The rates for installation of GI/Copper pipes includes supply of PVC on as and when requirement basis.

Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.

For carrying out any modification or shifting work, the gas supply of existing customer tapped on the same riser or lateral shall be discontinued. Before stoppage of gas supply, the contractor has to take appointments & consents from existing customers for carrying out the work. Sometimes, modification work takes more than one day, the affected customer shall be pre-intimated to make separate arrangements due to non-availability of gas for a day. Contractor shall ensure to complete the work with in shut down time period.

On start of modification work, the source points of gas in a riser i.e. regulator shall be tripped and dismantled after closing brass isolation valves on upstream of regulator. Thereafter, a dead plug shall be tightened on open end of brass valves having 4 bar pressure. After completion of modification/shifting work, the reinstalled riser and lateral shall be tested at pressure of 2 bar for minimum 2 hrs. As for LMC after modifications, the installation shall be tested on manometer at 150

mbar for minimum 15 min (in case of line pressure in non LMC part 100 mbar) and the installation shall be tested on manometer at 100 mbar for minimum 15 min (in case of line pressure in non LMC part 21 mbar). No pressure drop is allowed on testing of this installation and once the pneumatic testing is completed, the regulator shall be installed, reset for gas charging of riser till appliance.

Removal of functional meter & its reinstallation with meter brackets is included in rates of modifications and shall not be charged in extra to owner.

On riser testing, the contractor shall plan, schedule, coordinate and take consent of gas users on that riser before carrying out shut down. Once contractor plans and gets clearance from customers, they shall carry out testing of the pipe installation with in the stipulated shut down time. All such testing work will involve closing/shutting of brass valves installed before meters of individual existing customer and subsequent
removal of regulator from riser after closure of isolation valve installed on upstream of regulator. After taking shut down, the riser shall be tested by pneumatic pressure at 2 bar for 2 hrs (Range of Calibrated pressure gauge shall not be more than 2 times of test pressure). No pressure drop is allowed. In case of pressure drop, the contractor shall identify leakage point and repair/replace with new fittings or valves whichever is required within the shut down period and again test the riser before it is cleared for gas charging.

In case where only pneumatic testing is carried out on commissioned GI/Copper riser and internal piping of a connection, the removal & reinstallation of GI pipes & Fittings, Copper Pipes & Fittings, regulator & meter in case of any leakage shall not be paid separately.

The consent format for riser testing and any planned shutdown of riser will be provided by Owner.

The internal piping of GI & Copper is considered as piping installed inside kitchen. In case of flats and bungalows, where the meter is installed inside the kitchen, it is from pipe installed on downstream of meter isolation valve till appliance valve however, in case of flats & bungalows, where meter is installed outside the kitchen next to regulator and far away from the appliance, the meter shall be dismantled and piping on upstream and downstream of meter i.e. GI piping shall be tested at 2 bar after removing regulator. As for LMC after modifications, the installation shall be tested on manometer at 150 mbar for minimum 15 min (in case of line pressure in non LMC part 100 mbar) and the installation shall be tested on manometer at 100 mbar for minimum 15 min (in case of line pressure in non LMC part 21 mbar). The rates for testing includes dismantling of meters and regulators (wherever required). At the time of testing, the defects/loosened, tightening of clamps shall also be checked for each individual riser & internal piping. No separate rates are payable for reinstallation of caps on riser clamps. If it requires replacement of clamps due to any defects/damages or new as not installed earlier

For modifications in commercial connections with GI pipes & fittings 1" & above, dismantling & reinstallation of pipes & fittings in commercial connection is payable i.e. using old or fresh lot and as per site requirement, and includes testing & painting. On event of any leakage from single or multiple points while testing of MRS of commercials includes dismantling, reinstallation and testing of MRS.

The contractor shall also ensure that gas supply shall not be provided to the customer in any Concealed Piping, meter installed in closed cabinet. During installation the Copper pipe is to be Cut to proper length with tube Cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer/inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional blow torch to melt solder wire. Contractor shall submit the joining procedure of Cu pipe & Fitting for approval from EIC. **The jointing of copper pipes shall be carried out by approved plumbers only.**

Contractor has to supply different types/sizes of approved clamps (PE 80/PVC) for fixing Copper pipes suiting to the site conditions Contractor has to take prior approval of EIC for quality of the clamps, solder wire, flux, lacquer, thinner etc. The approval shall be taken for every fresh lot of clamps from EIC before installation at site.

All copper piping shall be clamped to the building at intervals not exceeding 500 mm. The solder wire shall be of reputed company of diameter size 3.25mm, Lead free as per BS 29453:1994 (Soft solder alloys) and supplied in coils. Solders for use with copper tube & fittings generally melt within the temperature range 180°C - 250°C. The contractor has to furnish the certificate of confirmation of standards before start of work.

Contractor may also be instructed to replace GI/copper installation of existing gas user without any formal complaints by customer, however as a exercise to check and ensure that all installed PNG installations, Pipes, Fittings are in exposed condition and does not pose any threat of accidents, leakage or blast due to gas entrapment inside the closed cabinet or concealment of pipeline by customer inside kitchen i.e. below slab, etc. The rates for modifications in such cases are applicable as per respective SOR i.e. dismantling, reinstallation, modifications, meter installations/relocations etc.
Any other activities not mentioned above, otherwise required to complete the job shall be executed by contractor without any cost implication to Owner.

The contractor shall supply the Calibrated Pressure Gauges / Manometer / Diaphragm Gauges of suitable range for testing of GI / Copper Installations ranging from 0-10, 0-4 bars/0-150 m bar/0-250 m bar respectively. The calibration certificate of pressure gauges shall be submitted before the start of the execution work. The pressure gauges shall be calibrated as desired by EIC but positively once in every six months. The details of testing shall be properly recorded in the Modification cards.

14.0 INSPECTION

The contractor to the entire satisfaction of EIC before proceeding further shall rectify any defect noticed during the various stages of inspection. Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract.

15.0 PURGING & COMMISSIONING

The rate for purging & commissioning shall be included in the GI/Cu installations.

Care shall be taken to ensure that the outlet is so located that vent gas cannot drift into buildings. The re-commissioning of the GI installation should be performed as follows:
Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.
Ensure that all appliance connections are gas tight, all appliance gas valves are turned off and there are no open ends.
Where possible, select an appliance with an open burner at which to commence the purge i.e., a hotplate burner.
Ensure the area is well ventilated, and free from ignition sources.

Ensure branches that do not have an appliance connected are fitted with a plug or cap.

Turn on one burner control valve until the presence of gas is detected. A change in the audible tone and smell is a good indication that gas is at the burner. Let the gas flow for a few seconds longer, then turn off and allow sufficient time for any accumulated gas to disperse.

Turn on one gas control valve again and keep a continuous flame at the burner until the gas is alight and the flame is stable.

Continue to purge until gas is available at other appliances.

16.0 DISMANTLING & REPLACEMENT OF METERS, MRI (METER RELATED ISSUES)

The work in this section includes:

Removal of non-functional, defective or damaged domestic and non-domestic meters & regulators and then re-installation of these with associated inlet and outlet connections (GI/Brass fittings), on the wall/GI service pipe with approved powder coated meter brackets, Clamps and angles in existing gas charged areas. The GI Pipes, fittings and CS fittings for the commercial installations shall be supplied by the contractor.

The contractor shall supply approved powder coated meter brackets and angle brackets. A sketch of the brackets is referred from the enclosed drawing for reference. It is required that one sample of each type of bracket is approved before the work is started.

Firmly secure the meters on the wall with good quality Rawal Plugs, screws etc. In case the Rawal Plugs are not holding than wooden blocks or other fixing arrangements like cement etc. to be used for proper grouting.

The same rates for removal & installation will apply irrespective of whether the meter is situated inside or outside the property. Wherever a bank of meters & regulators is to be replaced or reconstructed the rate shall be for each complete meter replaced and simultaneous installation.

The Meter & regulator installation shall be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. In case, the same as mentioned above has not been followed earlier and after directions from EIC, necessary modifications shall be taken up by contractors after approval from EIC/control rooms and claims shall be settled according to respective SOR. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

The contractor shall ensure that GI installations and rubber hoses shall not be exposed to direct heat of Gas burners. The installation should have minimum clearance of about 1 meter from electric point mains & switches. Minimum distance between Appliance Valve & Gas Burners shall be 0.3 Meters.

The isolation valves shall be installed after just entering the customer premises/kitchen but before the meter installation. If not installed earlier, for installation of brass valves, modifications shall be carried out and shall be payable according to respective SOR, after direction from EIC.

Contractor manpower especially technicians shall assist Control room staff in repairing & correcting volume corrector, however commissioning will be carried out by Owner's staff only. To attend complaints of high billing, contractor shall prepare a test piece with master meter as per directions of EIC/ O&M In-charge. The master meter will be issued by Control room on as and when requirement basis. The contractor may be able to charge such testing according to respective SOR and includes all visits required for checking, however on replacement of meter after it is found defective , individual cost of removal & installations is included in SOR item for testing of Riser & internal pipe.

The above activities along with restoration of the area to original shall be carried out to the complete satisfaction of consumer and EIC.

17.0 POWDER COATING / PAINTING OF GI PIPES

Powder Coating / Painting of GI Pipes

The entire lengths of the newly laid pipeline along with fittings are to be painted / powder coated after proper surface preparation as follows:

(a) **PAINTING (for scratched powder coated pipes, old laid GI pipe and fittings only)**:

i. One coat of Primer Application (Appropriate Zinc based primer)

ii. Two coats of synthetic enamel paint- canary yellow of minimum of 30 microns per coat of reputed make like Asian, Berger, Nerolac. (No other make shall be used for painting).

All painting materials including primers and thinners brought to site by contractor for application shall be procured directly from manufacturers/dealers as per specifications and shall be accompaniedby manufacturer's test certificates. Paint formulations without certificates are not acceptable. The contractor shall ensure that smooth finish is attained after carrying out painting.

Engineer-in-Charge at his discretion may call for test for paint formulations. Contractor shall arrange to have such tests performed including batch wise test of wet paints for physical and chemical analysis. All costs there shall be borne by the contractor. The painting work shall be subject to inspection and certification by Engineer-in-Charge at all times.

(b) POWDER COATING (REFER ATTACHED PTS FOR POWDER COATING)

Contractor will be required to install Powder Coated GI Pipes and shall submit detailed procedure of powder coating for approval to CONSULTANT prior to supply of powder coated GI pipes. After installation of the entire piping system, final touching with paint shall be done to the satisfaction of EIC.

18.0 CONVERSION OF BURNERS:

The work in this section includes:

The changing of nozzles and associated controls in accordance with manufactures instructions for both domestic and imported burners/ovens/grills/hotplate.

The changing of old appliance connection rubber hoses and nozzles and re-greasing taps as necessary. Attend leakages of rubber hoses and on instructions of EIC replace with new.

The contractor shall supply the steel reinforced rubber hoses with fixing clamps at the time of conversions as per attached technical specification.

The contractor has to supply all types of nozzles/jets required for all types of appliances including imported burners, Grills, Ovens, without any extra charges to Owner.

Cleaning and performing minor maintenance of appliances.

Attend all complaints related to proper working of appliances.

Attend temporary & permanent disconnections request by customers. Replace and reconvert NG appliances to work on LPG is payable. Testing for gas escapes, soundness and performance of appliances.

Instructing the Customer for safe use of natural gas and for fixing of safety and conversion labels.

Contractor must attend the complaints regarding appliances, leakage, fire etc. till the total area is handed over to Owner's operation and maintenance.

All consumables (Nozzles, greases etc.) are in contractor's scope.

Changing or repairing of any items damaged during conversion.

The contractor will have to provide both Pin gauges and standard sized nozzles. The payment will be released only after submission of necessary documents i.e. JMR Card of the individual house to owner.

19.0 RESTORATION

Contractor has to restore the area where ever he has carried out drilling, clamping etc. to its original condition to the satisfaction of the consumer and to ensure no passage to the premises and seepage. If the work was carried out in Govt. Flats (CPWD/Army/Institutional areas), contractor has to restore the area according to CPWD specifications and obtain a NOC / Clearance certificate from the concerned authorities maintaining the flats, after completion of the work.

The restored slabs or brickwork should match the surrounding surface levels. Joint widths should match the existing conditions, and be filled with a dry or wet mix of mortar. Wherever any items of the consumer is damaged/broken during working, the same will be made good or replace to the total satisfaction of the consumer.

The contractor will be responsible for the maintenance of all restoration carried out, for the duration of the contract guarantee period. The contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose. Wherever the required standards are not achieved the contractor will be required to replace the defective reinstatement work.

Note that Payment for GI/Copper installation will be released only after satisfactory restoration and clearing of the sites of all surplus materials etc.

20.0 SUBMISSION OF FINAL RECORDS

Contractor shall submit three sets each of the following documents in hard & soft copy:

a) Total list of houses & commercial establishments in the area allotted to him giving details of modifications/connections provided & reasons where connection could not be given / completed.

b) The details recorded in Modifications cards of every domestic house.

c) Details of houses where piping done along with materials used.

d) Total material consumption report.

e) Material reconciliation with respect to the materials issued.

f) Test reports & calibration certificates of gauges etc.

g) Customer call sheet.

h) GIRM

i) Any other documents/records required.

Annexure-1

MINIMUM TOOLS & EQUIPMENT TO BE PROVIDED BY CONTRACTOR FOR GI/COPPER MODIFICATION WORK

S.N0.	Category	HAND TOOLS DESCRIPTION	Qty. (Nos.)
1	C	Pipe wrench 250 mm	2
2	C	Pipe wrench 350 mm	2
3	C	Pipe wrench 450 mm	2
4	C	Adjustable spanner 50 mm	2
5	C	Adjustable spanner 150 mm	2
6	C	Adjustable spanner 250 mm	2
7	B	Set of combination spanner 3/16”-11/4” AF	1
8	B	Set of combination spanners 5mm - 30mm	1
9	C	Large tool boxes	2
10	C	Set flat-headed screw drivers	2
11	C	Set Philips screw drivers	2
12	C	Small hammer	2
13	B	Combination pliers/mole grips	2
14	C	Set of files	2
15	B	Drill bits for 1” pipe	2
16	B	Stocks and dies for NPT threading ½”, ¾”, 1 “ GI Pipe	2 sets each for ½”& ¾”and 1 set For 1”
17	C	Blowtorch	2
18	C	Soldering iron	2
19	B	Copper Pipe Bending Machine	1
20	B	Hand drill 3/8” chuck	2
21	A	Portable electric drill 240V, heavy duty	2
22	C	Spare blades	4
23	C	Battery powered torches	2
24	C	Measuring tape 30 m	2
25	C	Wire brush	2
26	B	Portable pipe vice & tripod	2
27	C	Set steel twist drills 0.5-2.0 mm (for appliance conversion)	1
28	C	Set steel twist drills 1mm-10mm	2
29	C	Set masonry drills 1mm-10mm	2
30	C	Graphite based grease	As required
31	C	Lubricating oil	As required
32	C	Hand cleaner	As required
33	C	Copper pipe Cutter 12mm	2
34	B	GI Pipe Cutters ½” – 1” Calibrated Pressure Gauge (0-4 bar) Calibrated Diaphragm Gauge (0-400 m bar) Calibrated Manometer (0-150 m bar)	2 4 2 1
35	C	Rubber Hose Cutter	2
36	C	Foot Pump	2
37	C	Soap Solution	As required

Note - Any other tools & tackles not mentioned above but required for satisfactory completion of work shall also be provided by the Contractor without any cost implication to BGL.

ANNEXURE – II

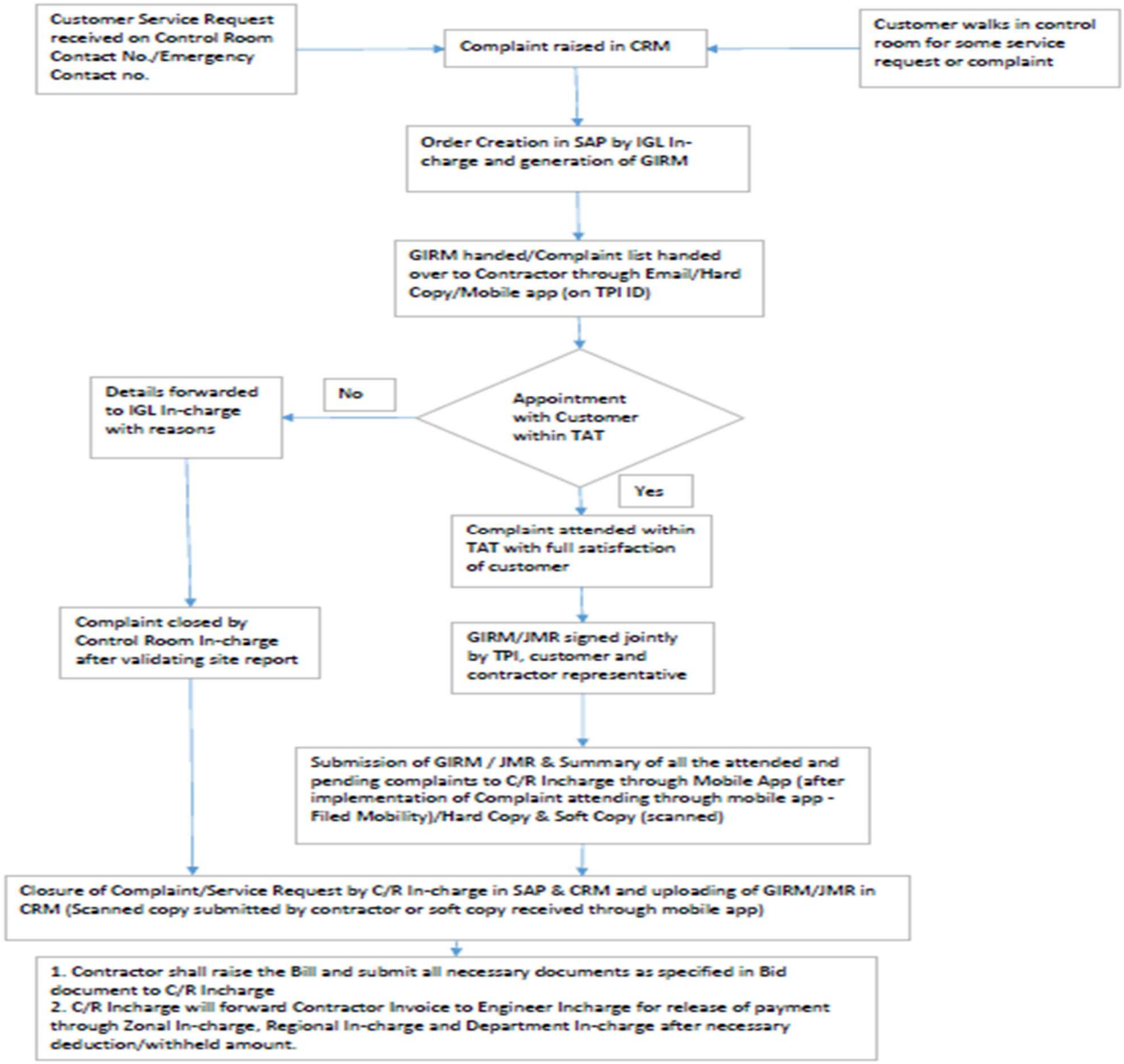
MINIMUM INVENTORY (CONTRACTOR SUPPLIED MATERIAL) TO BE PROVIDED BY CONTRACTOR FOR

EMERGENCY REPAIR & MAINTENANCE OF GI/CU INSTALLATIONS

S. No.	DESCRIPTION	UNIT	QUANTITY
1	GI Pipe 1/2"	M	500
2	GI Pipe 3/4"	M	500
3	GI Pipe 1"	M	200
4	Cu Pipe 12mm	M	200
5	Steel Reinforced Rubber Hose	Nos.	75
6	Brass Adaptor	Nos.	75
7	Brass Union Connector	Nos.	75
8	All types of nozzles / jets	Nos.	100 Nos. of each type
9	Additional Brass fittings to replace existing Anaconda	Nos.	100 Nos. of each type
10	All types of GI Fittings suitable for GI Pipes of sizes 1/2" & 3/4"	Nos.	100 Nos. of each type
11	All types of Forged Fittings suitable for GI Pipes of sizes 1/2" & 3/4"	Nos.	50 Nos. of each type
12	All types of GI & Forged Fittings suitable for GI Pipes of sizes 1", 1 1/2" & 2"	Nos.	25 Nos. of each type
13	Copper fittings (Elbow, Coupler, Tee)	Nos.	100 Nos. of each
14	Meter Clamps	Nos.	75
15	GI Clamps (1/2", 3,4", 1", 1 1/2" & 2")	Nos.	75 Nos. of each type
16	PVC Clamps	Nos.	100
17	Paints (Primer)	Ltr.	5
18	Synthetic Enamel Paint - Canary Yellow	Ltr.	5
19	Half Round Concrete Sleeve	Nos.	30
20	GI Sleeve (2.5" x 300mm)	Nos.	30
21	Warning Mat	M	100
22	All consumables like Oil, Teflon Tape, Tissue Paper, Soldering Wire etc.		

Note: Any other material not mentioned above but otherwise required for satisfactory timely completion of work shall also be provided by the Contractor without ant price implication to BGL.

Annexure-III



BHAGYANAGAR GAS LTD.

CITY GAS DISTRIBUTION PROJECT

PTS – GI/CU O&M WORKS (HIGH RISE BUILDING)

TABLE OF CONTENTS

1.0 GENERAL INFORMATION

1.1 Introduction

Bhagyanagar Gas Ltd. (OWNER) is a Joint Venture Company of Gas Authority of India Ltd. (GAIL), Hindustan Petroleum Corporation Ltd. (HPCL). Owner plans to extend the PNG pipeline network in Hyderabad for supplying natural gas to Domestic consumers. It is proposed to execute the work of GI / Copper installations for PNG connections in High Rise Buildings in Hyderabad. Owner is seeking Contractors to assist in meeting the above objective.

The main scope of this contract comprises Maintenance, Testing, Shifting, removals & modifications (if required), painting of GI & Copper Pipes along with Meter installation both for domestic and commercial segment i.e. above ground pipes from the outlet of 'PE / GI transition fitting' up to the domestic/commercial customers 'Appliance/stove/oven valve' as per the Distribution schedule placed in enclosed drawing in Existing Gas charged areas.

The scope includes installation, testing and commissioning of above ground GI / Cu pipes and associated fittings, valves, regulator up to and including meter for commercial / Domestic Customers. However, the piping may have to be carried out up to Appliance valve, in case of some commercial/domestic connections as per customer requirement.

Except free issue items like Service regulator, Domestic & Commercial meter, Meter regulator, Isolation and appliance valve, Contractor shall procure all other material (GI fittings, GI pipes, Forged Fittings, Cu pipe, Cu/Brass fittings, Reinforced Rubber hose etc. which is required from the outlet of PE / GI transition fitting up to the Domestic / commercial customers "Appliance / stove / oven valve".

This technical specification defines the basic guidelines to develop an acceptable design and suitable construction methodology for carrying out different activities listed out in the schedule of rates of this tender.

Compliance with these specifications and/or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

The scope includes installation & procurement of above ground GI / Cu pipes and associated fittings for Domestic Customers in High Rise Buildings above G + 14 floors.

2.0 DEFINITIONS

OWNER	Bhagyanagar Gas Ltd., BGL,
PTS	Present <<Particular Technical Specification>>and its entire appendix, if any.
TPIA	Third Party Inspection Agency to be appointed by BGL.
EIC	Engineer – in – charge

3.0 SCOPE OF WORK

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

3.1 Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner / Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of work to Owner / Owner's representative for approval.

3.2 Contractor shall submit the ITP/procedure/drawing etc. of all the material to be procured by him for approval before procuring the items. If, ITP/procedure/drawing etc are not approved from client/consultant then owner has the authority to refuse /reject the material.

3.3 Receipt of Service Regulators, Domestic Meters, Meter Regulators, Isolation and Appliance Valve as a free issue items from Owner's stores, loading, transportation, unloading at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approval for optimum route and permission for work from the concerned authority and EIC.

3.4 Selection of route with the EIC / Consultant and marking the same on walls/floors between 'transition fitting' to 'cooking oven/stove/appliance', making openings and making provisions for fixing clamps. Making temporary but stable platforms/scaffolding/rope ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.

3.5 Contractor shall procure all material except free issue items for installation at the outlet of PE/ GI transition fitting upto the Domestic customers "Appliance /stove / oven for satisfactory completion to the owner/owner's representative.

3.6 Supply and Installation for Maintenance of GI pipes of ½", ¾", 1" , 1-1/2" & above dia. anywhere between transition fittings to customer's kitchen appliances including welding, NPT threading of GI pipes, supply of proper seal outs for threads, to join fittings such as elbows, tees, connectors, unions, plugs, sockets, regulators, meters, appliance & isolation valves etc., as per laid procedures and specification including clamping and sealing etc. Procurement of GI Pipes (heavy duty) as per IS-1239 Part-I duly powder coated & wrought steel fittings (forged fittings) conforming to IS-1239 Part-II from any of the approved vendors of BGL. The GI pipe shall be painted after the testing of the GI installation.

Scheduling, Planning of material & forwarding inspection call, Getting Dispatch clearance from BGL, Handling, loading, transportation and unloading of these materials at contractor's store / site.

Preparation and approval of sketches, schedules, execution procedures & WPS as per technical specification. All consumables e.g. electrodes, flux etc. for welding pipes and fittings are under contractor's scope. Finalizing optimum route in consent to BGL representative from transition fitting to last floor of building including lateral piece with isolation valve as per Drawing.

Erection, Fabrication, Socket Welding, Testing & Installation of welded GI Pipes & Fittings etc., including NPT threading as per technical specification.

Supply & fixing of MS angle clamps, Ceiling clamps & dowel plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape / lock tight, Supply and fixing of studs & bolts of various sizes ranging from 1/2" to 2", Jointing of transition fittings to above ground GI pipes, purging, testing and commissioning of the complete installation.

Welded riser shall be installed after successful testing at ground level. Pneumatic testing shall be carried out for entire riser length after installation of riser as per technical specification. All the safety equipments, tools and tackles required for satisfactory execution of welding/installation work are under contractor's scope. Any other material & activities not mentioned/covered above, but otherwise required for satisfactory completion/safety of work as defined in tender has to be supplied / done by contractor within specified schedule at no extra cost to owner

3.7 Installation of Copper pipes by supplying solder wire and flux to join fittings such as elbows, tees, connectors, meters, valves etc., complete as per procedures and specifications including clamping and sealing etc.

3.8 Carry out testing of GI Riser and internal Kitchen piping (GI or Copper) installed in kitchens till appliance valves.

3.9 Carry out removal & dismantling of all sizes of GI/ Copper of pipes on customer's /BGL request.

3.10 Conversion of all types of LPG kitchen appliances to NG based appliances, also taking Signatures on GIRM/Maintenance Cards & Joint Meter Records (JMRs) of customer. Changing side of appliance (i.e. left to right or right to left), disconnecting a PNG connection, Drill in all type of Slab during NG Conversion, replacement of faulty meter, replacement of anaconda, steel reinforced rubber hose, other related request/complaints are part of the scope.

3.11 To maintain material inventory, emergency tools and tackles for attending all type of complaints.

3.12 To demonstrate the Customer regarding use, safety and maintenance related aspects of NG based appliances and installations.

3.13 Cleaning, flushing, pneumatic testing and re-commissioning of GI/Cu pipe & fittings, meters, valves etc as per specification and hand over the same to Owner/Customer to the entire satisfaction of EIC/O&M In-charge.

3.14 Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.

3.15 Restoration of walls, flooring and other damages while executing the above ground installation.

3.16 Preparation and submission of above ground installation/ testing / maintenance job card for each house/commercial establishment indicating the laid qty. of GI/Cu pipe including fittings. Reason for not providing the connection to the customers and deviation statements/consent form on completion /commissioning of work in a particular society/block.

3.17 Digital Photographs of internal installation after internal testing.

3.18 Installation of Service Regulators as per attached drawing.

3.19 Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works in existing gas charged areas shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner.

3.20 Providing adequate manpower for data logging like testing/modification/disconnection request & GI tracking, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period (TAT) Turn Around Time.

3.21 Providing adequate manpower for carrying out laying for PNG installation for emergency cases as and when required. The TAT period for carrying out such emergency cases are defined in tender document.

4.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY

4.1 Material to be supplied as a free issue material

Service Regulators, Domestic Meters, Meter Regulators, Isolation and Appliance valves shall be supplied as a free issue material to the contractor. The contractor shall not use any other material from

any other source of supply other than owner's supplied material without any written approval from EIC.

4.2 Material / Equipment & machinery to be supplied by contractor

Contractor shall procure / purchase GI Pipe & fittings, Wrought Steel Fittings (Forged Fittings), Brass fittings, Cu pipe & fittings and Reinforced rubber hose with other material which is required for satisfactory completion / safety / statutory of the works as per tender at no extra cost to Owner. BGL logo/BGL shall be marked on the material supplied by contractor. The contractor shall take approval from owner / owner representative for marking on the material to be procured by contractor before placement of order.

The Contractor shall provide labour, tools (such as Hammer Drill, Piston Drill, Pipe Cutters, Dies for threading, Pipe wrenches, spanners, conversion kits, solder torch, copper tube Cutters, tube benders, lacquering, thinner etc.) in specified numbers, all types of clamps, Plant and equipment necessary for the proper execution of the work. This will include but not limited to list of specialised tools and tackles indicated in Annexure # 1.

Special tools shall be required at site for carrying out drilling work in walls other than Brick or RCC (Ex. Granite, Marble, Wooden, Glass Cutting etc.)

The contractor has to ensure the availability of DG sets for continuous power supply. In case the power supply is availed at the site from societies, individual residents, contractor shall settle the claims raised by the electricity providers without any cost implication to OWNER. In case contractor doesn't settle the claims for using the electricity from societies/individual residents, on demand by the providers, OWNER will settle the claims and the same will be deducted from the contractor's bills. The progress of work shall not hamper due to non-availability of power supply.

The contractor has to submit the valid calibration certificate for Pressure gauges.

Contractor shall submit the manufacturer test certificate / lab test certificate for all items procured by him for approval before commencing the execution.

No hiring of equipments, tools and tackles by the contractors is allowed at the site. In case, any contractor is found not in possession of enlisted required tools and tackles, penalty will be levied as per SCC which shall be deducted from the running bill.

4.2.1 Plant and Equipment

All vehicular type machinery shall be in good working condition and shall not cause spillage of oil or grease. To avoid damage to paved surfaces, the contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

4.2.2 Sealant, Grout

The contractor shall be responsible to arrange the supply of any consumable sealant or ready mix grout material required for restoration of holes. The sealant/grout supplied by the contractor shall be compatible with the area to be restored / rectified. No separate payment for the supply of sealant and grout shall be made to the contractor.

4.2.3 Clamps, Rawal Plugs, Screws and Nozzles etc.

The Clamps, Brackets for meter, Rawal Plugs, Screws, Nozzles, etc. shall be approved lot wise by EIC prior to installation. Re-drilling of existing appliance (burners) nozzles is strictly not permitted. The quality of materials procured will be approved by Owner/Owner's representative or as directed by EIC.

The indicative sketch of the Brackets for Meter, Regulator Boxes and GI/Copper Pipe Clamps is enclosed with the tender. No separate payment for the supply of Meter Brackets and GI/Copper clamps shall be made to the contractor.

4.2.4 Consumables Items

Consumables such as Electrodes, Teflon Tapes, solder wire, flux, lacquer, thinner shall be supplied by the contractor and are included in installation rates.

These consumables shall be of reputed make companies and required grades/class.

4.2.5 Other Materials

The contractor shall supply the following items wherever required:

a. All materials required for work, NPT threading, Copper pipe jointing, testing etc.

b. All signs, barricades, lights and protective equipment.

c. All material required for working at height (i.e., scaffolding, Ladder, Safety Belts.

d. Self Locking Safety Harness Belts like PETZL or equivalent as mentioned in safety procedure are mandatory.).

e. Special consumable such as grease for maintenance of domestic appliances, all paints for painting of GI Pipes, Regulator Boxes, Consumables such as Teflon Tapes, Solder-wire, Flux, Lacquer, Thinner, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included within the rates.

f. All minor items not expressly mentioned in the contract but which are necessary for the satisfactory completion and performance of the work under this contract.

4.3 Acquisition, Receipt and Storage of Materials

The Contractor shall collect Service Regulators, Domestic Meter, Meter Regulators, Isolation and Appliance Valve estimated for maximum one month from Owner's designated stores in between the hours to be advised by the EIC.

The Contractor shall carry out assessment of material required for GI/Copper installation in allocated area. After approval from Owner, contractor shall place order for purchasing of GI Pipes & fittings, Wrought Steel Fittings(Forged Fittings), Copper pipes & fittings, Brass Fittings and Reinforced Rubber hose (Technical specifications attached in the tender document) to any of the approved vendors as per the list attached in the tender document. The contractor shall also ensure that the ITP for these materials shall be approved before the start of production activity. Once ITP is approved, contractor shall forward inspection call to the Owner depending upon the material requirement at the site. The inspection of these materials shall be carried out by Owner appointed third party inspection agency. It is contractor's responsibility to submit documents, arranging dispatch clearance, handling, loading, transportation and unloading of these materials at their own respective stores.

Any other activity not mentioned / covered, explicitly, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of works shall also be covered under scope of work and has to be completed by contractor within specified schedule at no extra cost to Owner. The Contractor shall carry free issue material in such a manner as to preclude damage during transportation and handling.

The Contractor shall be required to submit inventory details of materials every month.

Any other activity not mentioned/covered, explicitly, but otherwise required for satisfactory completion / operation/safety / statutory / maintenance of works shall also be covered under scope of work and has to be completed by contractor within specified schedule at no extra cost to BGL. The Contractor shall carry free issue material in such a manner as to preclude damage during transportation and handling.

The Contractor shall at the time of receipt of material physically examine all materials and notify the EIC immediately of any damage or defect noticed by the Contractor. **The O&M in-charge/EIC shall duly note any damage or defect in a site instruction book and both parties shall countersign the entry. Any damage not so recorded will be deemed not to have existed at the time of receipt of material by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.** Any material once issued from BGL store, if found in non-working condition at site shall be brought to the notice of EIC with PO reference in written within 15 days and after subsequent approval shall return defective material in BGL stores within 30 days.

If delay is more than 30 days and material is under warranty, the material will be accepted with a penalty, else the material will not be reconciled and amount of the same will be deducted from bills shall be levied as per SCC. The contractor shall ensure that no defective material shall be returned to store at the time of closure of contract. The format for defective materials returning to stores will be made available by EIC.

The contractor shall maintain locked store and proper office set up as defined in bid document preferably near allotted central C/R so that all the materials are stored in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals. The PE pipes and fittings shall be stored in covered storage to protect material from sunshine, rain etc. The contractor shall make adequate security arrangements for the stacked material & any loss to the material on account of theft or improper storage is attributable to the contractor.

The Contractor shall maintain log book at their respective stores stating issue and availability of free issue material at a given day. Further, it is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on quarterly basis to Owner/ Owner's representative as per the approved format of the owner. The inventory details shall be in correlation with the Daily progress chart and material reconciliation sheet.

In case of non-submission of material reconciliation in first week of every quarter, applicable penalties shall be levied as per SCC from the running bills. In case if shortage in free issue material is observed at the time of quarterly physical reconciliation / verification by BGL, equivalent value of material found short shall be withheld from running bills, Same shall be released after settlement of free issue material.

On quarterly basis, contractor has to get their material reconciliation sheet checked and verified by respective O&M In-Charges/representatives and shall be submitted along with RA bills for records. Consumption of Free issue material must be booked before processing the RA bills and copy of SAP generated print out if applicable shall **be attached along with each running bill.**

5.0 ISSUE OF WORK INSTRUCTIONS

5.1 The contractor will be required to carry out GI installation as per instructions of EIC.

5.2 All skilled personnel like welders, jointers, conversion technicians will be approved and certified by Owner/Owner's Representative . The technicians who will carry out welding of Risers, joining of copper material and conversions will undergo a test by Owner. Those who clear the test will be issued identity cards duly signed by Owner/Owner's representative. Approved technicians shall be only authorized to take up respective jobs. In case it is found that contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per contract.

5.3 The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour, , supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.

5.4 The schedule of items of GI/Cu installations have been described in brief and shall be held to be completed in all respect including safety requirements as per PTS of HSE, tests, inspection, QA/QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works whatsoever shall be considered in execution of these items.

6.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay.

Contractor shall assess the material requirement of the allotted area and submit the schedule plan for execution & purchasing before start of actual work.

The EIC may direct in what order and at what time the various stages or parts of the work under the contract shall be performed. Daily and Weekly progress reports shall be submitted in the formats approved by Owner, indicating broadly the laying, testing, RFC, conversions and extra piping.

7.0 WORK SHEETS

7.1 The quantities of GI/Cu pipe installed for modifications and other repair maintenance job will be checked by Owner's site engineer and the same shall be incorporated in Modifications & repair maintenance cards, customer call sheets, signed & dated as certified, on site. The cards will then be approved by the EIC. **The contractor shall collect the existing company policy documents against Repair and Maintenance work from Owner to keep updated from time to time.**

7.2 Measurement sheets/Documents shall be prepared based on the Modifications & repair maintenance cards and checked and certified by the site engineers and customer where as required for billing purpose.

7.3 If measurement sheets submitted are illegible, incomplete or incorrectly booked ,it will be returned to the contractor.

8.0 PERMISSIONS / APPROVALS

8.1 Contractor shall be responsible for obtaining permissions from society management, RWA, individual residents and any other concerned authority, if required, for completion of the work. Contractor must take the prior appointment from the residents for carrying out the work.

8.2 The Contractor shall work in close consultation/coordination with the Owner/Owner's Representative..

8.3 The Contractor shall not sign/execute any agreement and/or undertaking on any such documents which amounts to be undertaken by Owner. The same shall only be signed and executed by Owner, however, the prospective bidder shall also liaison and coordinate for the same.

8.4 The necessary coordination, liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the registered customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.

A log book/job card for such appointments with Consumer/any other agencies shall be maintained and the schedule/appointment once taken shall be adhered to by the contractor. Owner/Owner's Representative shall review the records every week. The contractor shall submit the detailed list of repair/maintenance /Conversions and allotted balance work at least once a week as per approved format.

8.5 In case of any unwarranted extra works carried out in any zone and other than SOR, necessary approvals shall be taken by EIC with the management.

8.6 It will be the contractor's responsibility to familiarise himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.

8.7 The contractor has to take responsibility of the actions of supervisors, plumbers and helpers provided by him.

9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS

The contractor shall carry out the work in accordance with this specification, Owner's Engineering Standards: ASME B31.8 – Gas Transmission and Distribution Piping Systems; Oil Indian Safety Directorate Norms (OISD), the American Gas Association Document – Purging Principles and Practice and PNGRB Guidelines.

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

10.0 RIGHT-OF-USE SURVEY AND MARKING

The route of the pipeline to be installed shall be decided with consent of the consumer and Owner/Owner's Representative.. Contractor must ensure that the persons/workers/supervisors/ working at site shall have proper identity cards prior to entering the premises of the consumer.
No temporary or permanent deposit of any kind of material resulting from the work shall be permitted in the approach or any other position, which might hinder the passage and / or natural water drainage, or any area where there is objection from consumer.

The contractor shall obtain necessary permissions from land Owners and tenants and shall be responsible for all damages caused by the construction and use of such approaches, pavements, gardens, rooms, walls, roof etc., at no extra cost to Owner.

Owner/Owner's Representative and the contractor will conduct a joint survey at each premises or housing colony to be supplied with gas. The survey record will note Customer details, the potential gas supply points and proposed meter positions and estimates of material quantities. The Contractor will make a sketch of the agreed pipe routes .

The Contractor will be responsible for contacting the Customer and making the necessary arrangements for access and appointments to carry out the work. Owner will not be responsible for any time lost due to failed appointments or disputes with Customer.

The Contractor shall confine its operations within limits of the Right in use. The contractor shall restore any damage to property.

The Contractor shall also carryout all necessary preparatory work if needed to permit the passage of men and equipment. Lights, Curbs, signs shall be provided wherever and/or required by the Owner necessary to protect the public.

11.0 PROTECTION OF STRUCTURES AND UTILITIES

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

During painting, contractor must take care of the consumer premises while carrying out the job such as spillage on floor, walls, ceilings, such shades etc. If the same does occur, the contractor has to immediately make things to original.

12.0 SAFETY

The contractor shall take care of all safety norms applicable for such works at site. Contractor shall provide all safety appliances e.g., uniforms, safety helmets, gloves, safety belts, ladders, staging, shoes, goggles, self-locking safety harness belts etc.

All necessary care shall be taken while deploying personnel for working heights and workmen with proper skills only shall be deployed. Proper barricading and warning signs shall be installed. Adequate care shall be taken while taking supports from balconies, chajjas/protection parapets and like structures to be sure of strength and adequacy of the same.

In case, contractor is found not following the safety guidelines as per attached HSE procedure, penalty shall be levied as per Special conditions of Contract. No night working shall be permitted, without proper lighting and prior approval of EIC.

Refer "Special Terms and conditions of Contract" and attached Technical specifications.

13.0 GI AND COPPER ABOVE GROUND SERVICE PIPE

13.1 Definitions:

i. High Rise Buildings – A building having G + 8 or more storeys above ground level. (i.e. of G + 8

ii. Riser - A riser is the vertical section of a service pipe laid up a building which supplies a number of laterals.

iii. Lateral - A lateral is a horizontal off-take from a riser, which supplies a single customer/dwelling.

iv. Service Regulator (SR) – Service Regulator is a regulator installed on a gas service line to control the pressure from 4 Bar to100 mbar that, in an emergency automatically assumes control of the pressure downstream of the station, in case that pressure exceeds a set maximum.

v. Meter Regulator (MR) – Meter regulator is a pressure regulator installed in series with another pressure regulator which reduces the pressure from 100 mbar to 21 mbar.

vi. Riser Isolation Valve (RIV) - Riser Isolation valve is fitted at the bottom of the riser to isolate the riser from the underground gas supply network.

vii. Lateral Isolation Valve (LIV) – Lateral Isolation Valve is fitted on horizontal riser (lateral) after TEE to facilitate online Tapping and other maintenance works.

viii. Meter Control Valve (MCV) - A Meter Control Valve is fitted immediately upstream of the meter to enable the internal pipe work inside the property to be isolated from the upstream gas supply network. It must be fitted in a manner that the consumer can easily operate the valve handle.

ix. Non LMC -Non LMC GI pipe shall be defined as the GI pipe installed from transition fitting to lateral isolation valves.

x. LMC - LMC GI/Cu pipe shall be defined as the GI pipe installed from lateral isolation valve to appliance valve.

13.2 Specification For Welding

The requirements stated herein shall be followed for the fabrication of fillet type of welded joints of carbon steels (IS 1239 heavy class) piping systems connected with pipe line and related facilities.
The welded pipe joints shall include the followings:

All line pipe joints of the Circumferential fillet welded type
Attachments of fitting and other supports pipes

Welding Consumables:
The Welding electrodes shall confirm to the class AWS E 6013. All electrodes shall be purchased in sealed containers stored properly to prevent deterioration. The electrodes shall be handled with care to avoid damage.

Welding Process:

Welding of Carbon steel material under this specification shall be carried out using Shielded Metal Arc Welding Process (SMAW).

Welding

Root pass and final pass shall be done with 2.5 mm dia. Electrode. Welding to be carried out in line with PQR / WPS approved by BGL. Welding to be done by qualified welders only.

14.0 Preventive Maintenance of Risers and Domestic Connections

On allotment of work, Contractor shall visit the site and prepare plans for execution of the work. Only after written confirmation from O&M in charges and issue of written Permits, shall start with the allotted work.

Contractor shall deploy manpower after assessing the work load along with required tools and tackles to carry out work as per customer requirement and in accordance with technical specifications. All type of work shall be prioritized for attending.

Contractor has to supply different types/sizes of approved powder coated clamps (Mild Steel) for fixing GI pipes, Meter Brackets, consumables suiting to the site conditions. The contractor shall get approval from EIC for every fresh lot of the clamps, brackets and other consumables, prior to start of maintenance of Risers and Domestic Connections work.

Testing & Painting of Riser and Internal Kitchen Piping

Identification of Area /Houses where Preventive Maintenance work on Commercials & Domestic PNG installations has to be carried out as per direction of EIC.

Before start of work, contractor shall get approved their manpower, material & tools for Preventive Maintenance Job along with all necessary safety equipment, PPEs and safe work practice.

Detailed feasibility survey of existing PNG connections and Identification of activities which are to be executed shall be carried out by the contractor for Preventive Maintenance job.

Contractor shall inform customer/owner about the time and date of visit, details of job to be carried out & related safety precautions.

Contractor shall provide written Information & receiving consent of the customer/owner about temporary gas shutdown and filling of shutdown card.

Closing of isolation valve (located upstream of the regulator) to stop gas supply towards the house.

Venting of pipeline, dismantling of regulator and gas meter.

Testing of riser pipe up to isolation valves using pressurized air (at 2 bar) .

If leakage/pressure drop is observed, then soap solution testing shall be performed at each and every joint in the riser to rectify/replace the identified damaged/faulty portions/fittings.

Testing of the pipe after isolation valves up to rubber tube using pressurized air at 100 mbar.

If leakage/pressure drop is observed, then soap solution testing is performed at each and every joint to identify the damaged/faulty portions/fittings.

Rectification/Replacement of damaged fittings/portions.

Reassembling of dismantled pipe, fittings and other items.

Putting the meter/ regulator under operation and observe with close supervision for successful working.

Restoration of gas supply.

Online testing of pipe from Transition fitting up to regulator.

If leakage/pressure drop is observed, it shall be informed to O&M In-Charge and repair/rectification of the same is in the scope of contractor.

Painting and clamping of whole assembly as per the specification, if required.

Informing owner about reconnection and final signing by them.

Crosschecking for any pending job.

Filling of the riser & measurement card, recording data of the job according to the prescribed formats.

Making note of the customer's point of disagreement in the job sheet, in case he/she had some objection with the work

Recording concealed piping/Technically unsafe cases and taking suitable necessary actions.

Note: During the testing if any leakage / pressure drop is observed, rectification of the same shall be done by contractor without any additional cost implication to BGL.

The contractor shall ensure that all reusable pipes and fittings and specially meter and regulators shall be stored properly with both ports sealed and if required shall be packed in a box so as to avoid dust etc. All such material (considered as free issue at the time of reconciliation), received by contractor on dismantling any domestic or commercial installation, shall be first verified and certified from O&M In-charge and then kept at contractor's store for future usage.

On reinstallation of GI/copper pipes & fittings in above mentioned dismantled cases, as per site requirement, contractor shall carry out modification primarily using old lot of GI/Cu pipes & Fittings dismantled from other houses, however shall supply his own procured fresh material for additional GI/Copper pipes & fittings for competing the installation.

The GI installation shall be clamped to the building at intervals not exceeding 1.5 mtrs. Maximum distance between clamps shall be 1.0 – 1.5 m when pipe goes to the straight, if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from centre line of fittings at every sides. However, the same may be changed as per site conditions/as directed by EIC. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.

Where pipe passes through a balcony floor, the floor surface shall be made slightly elevated around the service pipe or its surrounding sleeve to prevent the accumulation of water at that point. Where a short piece of sleeve is used around the gas pipe, the sleeve should be embedded in then concrete with a mix of mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be bevelled such as to prevent an accumulation of water. Supply of clamps for all sizes of the GI pipes is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc. after drilling of holes, a PVC sleeve of suited size shall be placed in side hole before GI/Copper installation. The rates for installation of GI/Copper pipes includes supply of PVC on as and when requirement basis.

14.1 Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.

For carrying out any modification or shifting work, the gas supply of existing customer tapped on the same riser or lateral shall be discontinued. Before stoppage of gas supply, the contractor has to take appointments & consents from existing customers for carrying out the work. Sometimes, modification work takes more than one day, the affected customer shall be pre-intimated to make separate arrangements due to non-availability of gas for a day. Contractor shall ensure to complete the work with in shut down time period.

On start of modification work, the source points of gas in a riser i.e. regulator shall be tripped and dismantled after closing brass isolation valves on upstream of regulator. Thereafter, a dead plug shall be tightened on open end of brass valves having 100 m bar pressure. After completion of modification/shifting work, the reinstalled riser and lateral shall be tested at pressure of 2 bar for minimum 2 hrs. As for copper installation, after modifications, the installation shall be tested on manometer at 150 mbar for minimum 15 min. No pressure drop is allowed on testing of this installation and once the pneumatic testing is completed, the regulator shall be installed, reset for gas charging of riser till appliance.

Removal of functional meter & its reinstallation with meter brackets (if required) is included in rates of modifications and shall not be charged in extra to owner.

On riser testing, the contractor shall plan, schedule, coordinate and take consent of gas users on that riser before carrying out shut down. Once contractor plans and gets clearance from customers, they shall carry out testing of the pipe installation with in the stipulated shut down time. All such testing work will involve closing/shutting of brass valves installed before meters of individual existing customer and subsequent removal of regulator from riser after closure of isolation valve installed on upstream of regulator. After taking shut down, the riser shall be tested by pneumatic pressure at 2 bar for 2 hrs (Range of Calibrated pressure gauge shall not be more than 2 times of test pressure). No pressure drop is allowed. In case of pressure drop, the contractor shall identify leakage point and repair/replace with new fittings or valves whichever is required within the shut down period and again test the riser before it is cleared for gas charging.

In case where only pneumatic testing is carried out on commissioned GI/Copper riser and internal piping of a connection, the removal & reinstallation of GI pipes & Fittings, Copper Pipes & Fittings, regulator & meter in case of any leakage shall not be paid separately.

The consent format for riser testing and any planned shutdown of riser will be provided by Owner.

The internal piping of GI & Copper is considered as piping installed inside kitchen. In case of flats, where the meter is installed outside/ inside the kitchen, it is from pipe installed after non LMC isolation valve (near tapping point of Non LMC riser) till appliance valve. For testing of internal piping, it shall be tested pneumatically at 150 mbar using manometer for 15 min. At the time of testing, the defects/loosened, tightening of clamps shall also be checked for each individual internal piping. No separate rates are payable for reinstallation of caps on riser clamps. If it requires replacement of clamps due to any defects/damages or new as not installed earlier.

For modifications in commercial connections with GI pipes & fittings 1" & above, dismantling & reinstallation of pipes & fittings in commercial connection is payable i.e. using old or fresh lot and as per site requirement, and includes testing & painting. On event of any leakage from single or multiple points while testing of MRS of commercials includes dismantling, reinstallation and testing of MRS.

The contractor shall also ensure that gas supply shall not be provided to the customer in any Concealed Piping, meter installed in closed cabinet. During installation the Copper pipe is to be Cut to proper length with tube Cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer/inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional blow torch to melt solder wire. Contractor shall submit the joining procedure of Cu pipe & Fitting for approval from EIC. **The jointing of copper pipes shall be carried out by approved plumbers only.**

Contractor has to supply different types/sizes of approved clamps (PE 80/PVC) for fixing Copper pipes suiting to the site conditions Contractor has to take prior approval of EIC for quality of the clamps, solder wire, flux, lacquer, thinner etc. The approval shall be taken for every fresh lot of clamps from EIC before installation at site.

All copper piping shall be clamped to the building at intervals not exceeding 500 mm. The solder wire shall be of reputed company of diameter size 3.25mm, Lead free as per BS 29453:1994 (Soft solder alloys) and supplied in coils. Solders for use with copper tube & fittings generally melt within the temperature range 180°C - 250°C. The contractor has to furnish the certificate of confirmation of standards before start of work.

Contractor may also be instructed to replace GI/copper installation of existing gas user without any formal complaints by customer, however as a exercise to check and ensure that all installed PNG installations, Pipes, Fittings are in exposed condition and does not pose any threat of accidents, leakage or blast due to gas entrapment inside the closed cabinet or concealment of pipeline by customer inside kitchen i.e. below slab, etc. The rates for modifications in such cases are applicable as per respective SOR i.e. dismantling, reinstallation, modifications, meter installations/relocations etc. Any other activities not mentioned above, otherwise required to complete the job shall be executed by contractor without any cost implication to Owner.

The contractor shall supply the Calibrated Pressure Gauges / Manometer / Diaphragm Gauges of suitable range for testing of GI / Copper Installations ranging from 0-10, 0-4 bars/0-150 m bar/0-250 m bar respectively. The calibration certificate of pressure gauges shall be submitted before the start of the execution work. The pressure gauges shall be calibrated as desired by EIC but positively once in every six months. The details of testing shall be properly recorded in the Modification cards.

a. Except Service Regulator, Meter, Meter Regulator, Isolation and appliance valve, Contractor shall procure all other materials (i.e. Pipe, fittings, clamps etc.) as per attached specification for installation and to the entire satisfaction of Owner/Owner's Representative.

b. The contractor shall also ensure that gas supply shall not be provided to the customer in any Concealed Piping.

c. The Copper service pipe installation work includes all work necessary to connect downstream of the meter (inside the kitchen) to the Customers appliances. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with these, he will be required to provide ladders, scaffolding pipe, drills for concrete and other masonry, special drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, sleeves to facilitate the pipe passing through floors and walls, etc. Copper pipes & fittings shall be provided by Contractor.

d. During installation the Copper pipe is to be cut to proper length with tube Cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer/inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional blow torch to melt solder wire. Contractor shall submit the joining procedure of Cu pipe & Fitting for approval or as per the instructions of EIC.

e. Contractor has to supply different types/sizes of approved clamps (PE 80/PVC) for fixing Copper pipes suiting to the site conditions. Contractor has to take prior approval of EIC for quality of the clamps, solder, flux, lacquer, thinner etc. The approval shall be taken for every fresh lot of clamps from EIC before installation at site.

f. All copper piping shall be clamped to the walls at intervals not exceeding 500 mm. The solder wire shall be of reputed company of diameter size 3.25mm, Lead free as per BS 29453:1994 (Soft solder alloys) and supplied in coils. The detail specification is attached in tender for reference. Solders for use with copper tube & fittings generally melt within the temperature range

180°C - 250°C. The contractor has to furnish the certificate of confirmation of standards before start of work.

14.2 Riser And Laterals Fabrication, Installation And Testing :-

Heavy class Galvanized Iron (GI) pipes, conforming to IS 1239- Part 1 duly Polyester powder Coated with 70 microns thickness and Wrought Steel fittings(Forged fittings) conforming to IS-1239 Part 2 shall be used for welded riser.

Powder and Galvanized (Zinc) coating shall be removed by light duty grinder or by any other suitable tool at both ends of riser pipe at about 25mm in length where welding is to be performed.

Pipe and required fittings shall be first coupled with threaded (NPT) joints. The threaded joints to be made using male tapered thread and female parallel thread fittings. Teflon/PTFE Tape or any other joining compound shall not be used in threaded joints for welded riser. Alternatively plain ended pipes and fitting can also be used for welding in welded riser.

The entire riser assembly shall be fabricated with socket welds both for threaded riser assembly and plain ended pipes. Threaded joints are permitted after first isolation valve on laterals on account of workability and future maintenance considerations.

The Welding electrodes shall confirm to the class AWS E 6013 of reputed make such as Lincoln, ESAB or equivalent.

Welding to be carried out in line with PQR / WPS approved by BGL. Welding to be done by qualified welders approved by BGL only.

A riser must not be constructed so that the laterals face directly into the wall from the riser. All laterals must extend a minimum of 400 mm from the riser.

Ventilation is provided to prevent gas leaks from causing the atmosphere to become unsafe.

Ventilation shall be natural. It is not permitted to use mechanical ventilation to achieve the required ventilation levels. Special Safety Harness and Protective equipments of PETZL / equivalent make are mandatory for riser installation. Details would be as per approved Safety Job Procedure. Ensure that all equipments and safety devices used are inspected, certified by competent authority & valid & suitable for use.

Plumber deployed for riser installation for high rise buildings shall be certified and prequalified with medical tests as per Safety Job Procedure.

14.3 Meter & Meter Regulator Positions

Meters will normally be located inside the property at approachable location. The kitchen / utility balcony is the preferred place to install the meter – thereby minimizing the length of the outlet pipe work.

The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

Meter Regulators will be installed as per enclosed drawing.

Only pretested riser shall be erected. Pretesting shall be done with compressed air @ 2 bar (g) for minimum duration of 30 minutes.

Risers and laterals up to Isolation Valves shall be Leak tested with compressed air @ 2 bar (g) for minimum 2 hrs.

Once testing is satisfactorily completed, uncoated portion (weldment) of risers and laterals shall be painted as per painting procedure.

For the laterals beyond G + 8, flexible Anaconda shall be used in compliance to the material specification of SS316, fittings shall be used with brass connections conforming to IS 319, in order to account for the temperature induced stresses.

14.4 Installation of Meter

Installation of domestic meters with associated inlet and outlet connections (GI/Brass fittings), on the wall with approved powder coated meter brackets and angles in new & existing gas charged areas.

The contractor shall supply approved powder coated meter brackets and angle brackets. A sketch of the brackets is referred from the enclosed drawing for reference. It is required that one sample of each type of bracket is approved before the work is started.

Firmly secure the meters on the wall with good quality Rawal Plugs, screws etc. In case the Rawal Plugs are not holding then wooden blocks or other fixing arrangements like cement etc. to be used for proper grouting.

The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

The contractor shall ensure that GI installations and rubber hoses shall not be exposed to direct heat of Gas burners. The installation should have minimum clearance of about 1 meter from electric point mains & switches. Minimum distance between Appliance Valve & Gas Burners shall be 0.3 Meters. The isolation valves shall be installed after entering the customer premises/kitchen but before the meter installation.

The above activities along with restoration of the area to original shall be carried out to the complete satisfaction of consumer and EIC.

14.5 Laterals

The lateral extending from the riser at right- angles must extend a minimum of 400 mm from the riser before passing through a wall.

14.6 Ventilation

Ventilation is provided to prevent gas leaks from causing the atmosphere to become unsafe. Ventilation shall be natural. It is not permitted to use mechanical ventilation to achieve the required ventilation levels.

14.7 Pipes Passing Through Walls

Where risers or laterals pass through walls the following requirements must be observed:

a. The pipe must be sleeved in a continuous non corrosive sleeve. Joints, or any other part of a joint shall not be enclosed within the sleeve.
b. Pre-sleeved wall pieces are the preferred method for passing through walls and floors.

14.8 Powder Coating / Painting of GI Pipes

Contractor shall install powder coated GI pipes in consultation with EIC. Contractor shall submit detailed procedure of powder coating for approval to Consultant prior to supply of powder coated GI pipes. After installation of the entire piping system, final touching with paint shall be done to the satisfaction of EIC.

Apart from above, Contractor shall install painted fittings after proper surface preparation as follows:

One coat of Primer Application (Appropriate Zinc based primer).

Two coats of synthetic enamel paint – canary yellow of minimum of 30 microns per coat of reputed make like Asian, Berger, Nerolac. (No other make shall be used for painting).

All painting materials including primers and thinners brought to site by contractor for application shall be procured directly from manufacturers/dealers as per specifications and shall be accompanied by manufacturer's test certificates. Paint formulations without certificates are not acceptable. The contractor shall ensure that smooth finish is attained after carrying out painting. Engineer-in-Charge at his discretion may call for test for paint formulations. Contractor shall arrange to have such tests performed including batch wise test of wet paints for physical and chemical analysis. All costs there shall be borne by the contractor.

The painting work shall be subject to inspection and certification by Engineer-in-Charge at all times. Painting of GI pipe shall be paid with installation of GI pipes.

After installation of the entire piping system, final touching shall be done to the satisfaction of EIC.

15.0 TESTING OF GI/COPPER INSTALLATION

a. Only pretested riser shall be erected. Pretesting shall be done with compressed air @ 2 bar (g) for minimum duration of 30 minutes.
b. Risers and laterals shall be Leak tested with compressed air @ 2 bar (g) for minimum 2 hrs.
c. Once testing is satisfactorily completed, uncoated portion (weldment) of risers and laterals shall be painted as per painting procedure.

d. The GI/Copper installation from lateral valve to appliance valve shall be tested at a pressure of 150 mbar (g) for a holding period of 15 minutes with no pressure drop. All the joints in the installation shall be checked with soap solution.

e. The contractor shall supply the Calibrated Pressure Gauges / Manometer / Diaphragm Gauges of suitable range for testing of GI/Copper Installations ranging from 0-4 bars/0-500 m bar respectively. The calibration certificate shall be submitted before the start of the execution work.

f. The pressure gauges shall be calibrated from time-to-time as desired by EIC but positively once in every six months.

g. The details of testing shall be properly recorded in the GI/Copper cards.

16.0 INSPECTION

The contractor to the entire satisfaction of EIC before proceeding further shall rectify any defect noticed during the various stages of inspection. Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract.

17.0 PURGING & COMMISSIONING

The rate for purging & commissioning shall be included in the GI/Cu installations.

Care shall be taken to ensure that the outlet is so located that vent gas cannot drift into buildings.

The commissioning of the GI installation should be performed as follows:

Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.

Ensure that all appliance connections are gas tight, all appliance gas valves are turned off and there are no open ends.

Where possible, select an appliance with an open burner at which to commence the purge i.e., a hotplate burner.

Ensure the area is well ventilated, and free from ignition sources.

Ensure branches that do not have an appliance connected are fitted with a plug or cap.

Turn on one burner control valve until the presence of gas is detected. A change in the audible tone and smell is a good indication that gas is at the burner. Let the gas flow for a few seconds longer, then turn off and allow sufficient time for any accumulated gas to disperse.

Turn on one gas control valve again and keep a continuous flame at the burner until the gas is alight and the flame is stable.

Continue to purge until gas is available at other appliances.

18.0 CONVERSION OF DOMESTIC APPLIANCES

The work in this section includes:

The changing of nozzles and associated controls in accordance with manufactures instructions for both domestic and imported burners/ovens/grills/hotplate.

The changing and handing over old appliance connection Reinforced rubber hoses and nozzles to Customers and re-greasing taps as necessary.

The contractor shall supply the Reinforced rubber hoses at the time of conversions.

The contractor has to supply all types of nozzles/jets required for all types of appliances including imported burners, Grills, Ovens.

Cleaning and performing minor maintenance of appliances.

Testing for gas escapes, soundness and performance of appliances.

Instructing the Customer for safe use of natural gas and for fixing of safety and conversion labels.

Contractor must attend the complaints regarding appliances, leakage, fire etc. till the total area is handed over to Owner's operation and maintenance.

All consumables (Nozzles, greases etc.) are in contractor's scope.

Changing or repairing of any items damaged during conversion are in Contractor's scope..

It may be noted that the rates of conversion will apply to conversion of all type of appliances under the rates, the contractor will have to provide both Pin gauges and standard sized nozzles. The payment shall be released only after submission of necessary documents i.e. RFC & JMR Card of the individual house.

19.0 RESTORATION

Contractor has to restore the area wherever he has carried out drilling, clamping etc. to its original condition to the satisfaction of the consumer and to ensure no passage to the premises and seepage. If the work was carried out in Govt. Flats (CPWD/ARMY/Institutional areas), contractor has to restore the area according to CPWD specifications and obtain a NOC / Clearance certificate from the concerned authorities maintaining the flats, after completion of the work.

The restored slabs or brickwork should match the surrounding surface levels. Joint widths should match the existing conditions and be filled with a dry or wet mix of mortar.

Wherever any items of the consumer is damaged/broken during working, the same will be made good or replace to the total satisfaction of the consumer.

The contractor will be responsible for the maintenance of all restoration carried out, for the duration of the contract guarantee period.

The contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose. Wherever the required standards are not achieved the contractor will be required to replace the defective reinstatement work.

Note that Payment for GI/Copper installation will be released only after satisfactory restoration and clearing of the sites of all surplus materials etc.

20.0 SUBMISSION OF FINAL RECORDS

Contractor shall submit three sets each of the following documents in hard & soft copy:

a) Total list of houses in the area allotted to him giving details of testing/ maintenance provided & reasons where testing/ maintenance could not be given / completed.

b) The details recorded in Job cards of every domestic house.

c) Details of houses where piping done along with materials used.

d) GIRM

e) Total material consumption report.

f) Material reconciliation with respect to the materials issued.

g) Test reports & calibration certificates of gauges etc.

h) Any other documents/records required.

ANNEXURE # 1

TOOLS & EQUIPMENT TO BE PROVIDED BY CONTRACTOR FOR GI/COPPER WORK

S.N0.	HAND TOOLS DESCRIPTION	PER TECHNICIAN	PER TEAM
1	Pipe wrench 250 mm	1	4
2	Pipe wrench 350 mm	1	4
3	Pipe wrench 450 mm	-	2
4	Adjustable spanner 50 mm	-	4
5	Adjustable spanner 150 mm	1	2
6	Adjustable spanner 250 mm	1	2
7	Set of combination spanner 3/16”-11/4” AF	1	1
8	Set of combination spanners 5mm - 30mm	1	1
9	Large tool boxes	1	2
10	Set flat-headed screw drivers	1	2
11	Set Philips screw drivers	1	2
12	Small hammer	1	2
13	Combination pliers/mole grips	1	2
14	Set of files	1	2
15	Drill bits for 1” pipe	-	2
16	Stocks and dies for NPT threading ½”, ¾”, GI Pipe	-	3
17	Blowtorch	-	1
18	Soldering iron	-	2
19	Copper Pipe Bending Machine	-	2
20	Hand drill 3/8” chuck	-	2
21	Portable electric drill 240V, heavy duty	-	2
22	Spare blades	4	4
23	Battery powered torches	2	2
24	Measuring tape 30 m	1	2
25	Wire brush	1	2
26	Portable pipe vice & tripod	-	2
27	Set steel twist drills 0.5-2.0 mm (for appliance conversion)	-	1

28	Set steel twist drills 1mm-10mm	-	2
29	Set masonry drills 1mm-10mm	1	2
30	Graphite based grease	As required	As required
S.N0.	**HAND TOOLS DESCRIPTION**	**PER TECHNICIAN**	**PER TEAM**
31	Lubricating oil	As required	As required
32	Hand cleaner	As required	As required
33	Copper pipe Cutter 12mm	-	4
34	GI Pipe Cutters ½" Gas Detection Equipment Power Generator 2.5 KVA Power Generator 5.0 KVA Pressure Gauge (0-10 bar) Pressure Gauge (0-4 bar) Diaphragm Gauge (0-400 m bar) Manometer (0-150 m bar)	- As required 1 -2 2 1 1	2 - - 1 4 8 2 1
35	Automatic Thread cutting machine	-	2
36	GI Pipe Cutter	-	2
37	Welding Equipment	01 set per site	01 set per site
38	Full Body Safety Harness like PETZL or Equivalent	03 set per site	03 set per site

BHAGYANAGAR GAS LTD.

CITY GAS DISTRIBUTION PROJECT

PTS - LINE PIPE (ASTM A106 GR.B)

TABLE OF CONTENTS

1.0 INTRODUCTION

This specification «Particular Technical Specification» describes the requirement of station pipe to be installed BHAGYANAGAR GAS LIMITED (BGL) under City Gas Distribution Project in Hyderabad and particularly in the Metering stations.

2.0 GENERAL

2.1 TERMS AND DEFINITIONS

PTS	means the present " Particular Technical Specification P.009355 D 11097 021 " and all its appendices, if any.
OWNER	Shall mean " BHAGYANAGAR GAS LTD. (BGL) ", being the Owner of Line Pipes.
CONTROL AUTHORITY	Owner / Owner representative or their Authorized Inspection Agency.
TPIA	means the Third Party Inspection Agency to be appointed by the Manufacturer.
MANUFACTURER	means the Manufacturer of the pipes as well as its sub-contractor(s).

2.2 REFERENCES

Codes, Norms and standards (latest revision); but not limited to:

ANSI B31.8	Gas transmission and distribution piping systems
ANSI B16.25	Butt welding ends
ANSI B36.10	Welded and seamless wrought steel pipe
ASTM A 106	Seamless Carbon steel pipe for High temperature service
ASTM A 370	Mechanical testing of steel products
ASTM E 112	Standard test methods for determining the average grain size
ASME	Boiler and Pressure Vessel code
EN 10204	Metallic Products : Type of Inspection Documents
ISO 9001	Quality management standard
ISO 148	Determine the impact strength of steel and energy absorbed by Charpy V-notch.

The present specification can confirm, complete or alter certain characteristics or tolerances of existing laws or specifications.

In his offer, the bidder shall specify all proposed modifications or alternatives to the present specification. In all cases, each modification has to be submitted to the Control Authority and the owner. The complete upgrading cycle shall be supervised by the Control Authority. All consequences

after eventual order for non respect of this obligation are at the manufacturer's charge and responsibility.

Before the order is placed, a technical audit could take place by the client.
The manufacturer's specification of the steel, the manufacturing procedure itself and the laboratories in which testing takes place, shall be approved and registered by the Control Authority. Valid approval certificates must be available.

The Control Authority shall verify the control equipment of the vendor, its calibration and the points at which it is located. If during the control of the pipes certain problems arise the Control Authority may demand supplementary tests.

At all times while work on the contract of the owner is being performed, the Control authority shall have free entry to all parts of the manufacturer's facilities and those of all subcontractors, who are involved in the manufacturing and testing of the pipes. All reasonable facilities shall be afforded to the Control authority to satisfy him that the product is being furnished in accordance with these specifications. All tests and inspections called for by these specifications will be made in the manufacturer's plant prior to shipment and at the manufacturer's expense, unless otherwise, and shall be conducted as not to interfere unnecessarily with the operations of the manufacturer's plant. The manufacturer shall notify the owner prior to completion or shipment of all requiring such inspection.

Eventual interpretations and deviations to this specification by the Manufacturer shall be requested by writing in his offer with detailed justification and approved by the Owner/Consultant and the Control Authority before eventual order to the Manufacturer. The latter is responsible and shall indemnify the Owner/Consultant for any damage resulting from the non-respect of this obligation.

An approval of documents can never be considered as an acceptance of deviations or relaxations to requirements. A deviation is only possible after specific request to the owner.

A valid copy of the ISO-9001 certificate shall be included in the offer.

The manufacturer shall inform the Control Authority MIN. 5 working days in advance of any control test or examination under the supervision of the control Authority required by this specification and shall send a copy (fax/E-mail) of it to the owner/consultant).

The Manufacturer shall send for approval a List of Operation in Manufacturing and Control to the Control Authority and Owner/consultant, TEN (10) working days before manufacturing. This list shall be in conformity with the Annexure 1 to this document. Before starting any manufacturing, the Manufacturer shall be in possession of this approved document, filled in with all intervention points.

3.0 DESIGN AND CONSTRUCTION

a) The pressure temperature ratings of the pipes are in accordance with B31.8; the dimension standard shall be in conformance to ANSI /ASME B 36.10.

b) The Pressure and temperature range are as follows :

Design Pressure	: 19 bar
Operating Temperature	: 10 – 50 °C
Maximum Design Temperature	: 60 °C

c) Wall thickness shall meet the following requirements:

- The maximum allowable stress in the base material shall be equal to fifty per cent (50%) of the minimum yield strength guaranteed by the specification of the steel used.

d) In specified pipe wall thickness no negative tolerances is permitted.

e) The design shall take into consideration performance requirements prescribed in paragraph 3.f.

f) All pipe under this specification shall be designed to withstand a field hydrostatic test pressure with non corrosive water, after installation, during 24 hours at a following pressure level :

Minimum: P = 1.4 MOP

Maximum: P = 1.5 MOP

Where:

P = hydrostatic test pressure, bar

MOP = maximum operating pressure = 19barg.

g) Properties of the Pipes

The Properties of Pipe manufactured as per this PTS, shall be as listed below :

Length of the Pipes : Single Random Length

Table: 1

Sr. No.	Outside Dia.	Material Grade	Min. Yield Strength (*)	Min. Ultimate Tensile Strength (*)	Minimum Wall thickness (mm)
1	1/2" (21.3 mm)	ASTM A106 GR-B	240 MPa	415 MPa	3.73
2	3/4" (26.7 mm)	ASTM A106 GR-B	240 MPa	415 MPa	3.91
3	1" (33.4 mm)	ASTM A106 GR-B	240 MPa	415 MPa	4.55
4	1-1/2" (48.3 mm)	ASTM A106 GR-B	240 MPa	415 MPa	5.08
5.	2" (60.3 mm)	ASTM A106 GR-B	240 MPa	415 MPa	5.54

4.0 MATERIALS

a) The steel used in the manufacture of pipe shall be in conformance to the ASTM standard.

b) The chemical composition of the steel shall meet the requirements of material specification.

c) The steel used has tensile properties conforming to the requirements prescribed in the ASTM standard.

d) The ratio of yield strength to tensile strength shall not exceed 0.85 for ASTM A106Gr.B Pipes.

e) The steel shall be fully killed, fine grain practice.

f) The steel used shall be suitable for field welding to other fittings, pipes, flanges, or valves manufactured under ASTM specifications A105, A234, A860 or API standards specifications 5L, 6D, 605 or MSS standards SP-44, SP-72, SP-75, EN10208-2in line with the Piping Specification attached with the tender document.

g) If preheating of the material is required to ensure proper weldability under normal field conditions, the manufacturer shall state so in the offer, specifying preheat requirements and if accepted by the purchaser, this shall be permanently indicated on the pipe.

h) The manufacturer of pipe shall submit MTC stating the quality, the mechanical properties (yield strength, tensile strength, percent elongation, impact test as per below table, the chemical analysis, the process of manufacture and the marking (for example the heat number of material) of the steel.

i) Chemical composition :

- For each heat the manufacturer shall check a chemical analysis of the steel.
- Check analysis : carbon equivalent shall be computed by the following equation :
- $$C.E.=C+\frac{Mn}{6}+\frac{Cr+Mo+V}{5}+\frac{Ni+Cu}{15}$$

And shall not exceed 0.43

5.0 INSPECTION TEST

Before NDT and Destructive tests, all pipes shall be Hydrostatically tested as per applicable code / standards as under.

Following tests shall be conducted on the pipes as per applicable ASTM specification by manufacturer**:**

TEST OF EXAMINATION	REFERENCE
Heat analysis	ASTM A 106, Cl. no. 7 & 8 & table 1
Tensile test	ASTM A 106, Cl. no. 10 & table 2
Bend Test	ASTM A 106, Cl. no. 11
Flattening test	ASTM A 106, Cl. no. 12
Impact test	PTS Cl. no. 5.2.2
Hydrostatic test	ASTM A 106, Cl. no. 13
Nondestructive Test	ASTM A 106, Cl. no. 14
Dimensional examination	ASTM A 106, Cl. no. 16
Length	ASTM A 106, Cl. no. 17
Workmanship, Finish and appearance	ASTM A 106, Cl. no. 18
Marking	ASTM A 106, Cl. no. 24

5.1. Visual and Dimensional Examination

Before any other testing, each pipe length shall successfully undergo a visual and dimensional examination.

The condition of the pipe shall be checked; particularly the external and internal surface aspects (cleanliness).

The dimensions shall be verified (thickness, diameters, out of roundness, straightness) and shall be within the tolerance of the specification.

5.2. Mechanical Testing

The mechanical properties shall be verified after acceptance of the pipes as pertaining from one same lot.

The procedure for mechanical testing needs to provide with the required quantities of pipes, as per material data sheets and as per prepared lot, the necessary over lengths for removal of testing specimens.

These over lengths are in no way included in the material data sheets.

The nature of mechanical tests to be performed is specified in the applicable ASTM specification. Number of tests shall be as per ASTM A106 specification.

Location and removal of specimens from pipe to be carried-out according to ASTM specification.

Test specimens may only be cut after a marking transfer by the Authorised Control Authority / TPIA.

The following mechanical tests shall be performed on material; the supervision of the Control Authority delegate and the certificates shall be added to the CMTR.

5.2.1. Tension test

Requirements

The material shall conform to ASTM standard and the ratio of yield strength to tensile strength shall not exceed 0.85 for ASTM A106 Gr. B Pipes.

Test specimen

The test specimen shall represent all pipes from the same lot.

Test locations and orientations

For base material, test specimens shall be orientated transversally and if this orientation is not feasible, it shall be orientated longitudinally.

Test method

Testing shall be performed in accordance with ASTM A370 standard rectangular plate type 1-1/2" wide (Fig. 4-A370) or standard round (Fig. 5 or Fig. 6-A370). Yield strength shall be determined either by the 0.2 % offset or the 0.5 % extension under load (EUL) method.

Retest

If the tension test specimen from any lot fails to conform to the requirements of the particular grade ordered, the manufacturer may elect to conduct retests on two additional pieces from the same lot, each of which shall conform to the requirements specified in the ASTM standard. If one or both of the retests fail to conform to the requirements, the whole lot of that specimen will be rejected.

5.2.2. Impact test

Requirements

CVN Impact test shall be carried out at 0ºC. For base material, one set of three specimens for each lot, shall be taken from coupon.

Acceptance Criteria (At 0°C):

The average value of a set of 3 specimens from a pipe length shall be an absolute value not less than 27J/cm^2. In addition, the lowest individual value of any one of the three specimens shall not be less than 80% of the specified average value (i.e. 22 J/cm^2).

Test specimen

The test specimen shall be machined from material obtained as in paragraph Test specimen for Tension test (par. 5.2.1.).

Flattening of test specimens are not allowed.

Number of tests and orientation

Three test specimens shall constitute one test set.

For pipes NPS 2 and greater, the following number of tests shall be performed:

- Base material: 2 test sets, one set shall be orientated longitudinally and another one transversally.

Test method

The notched bar impact test shall be made in accordance with ISO 148 - Charpy V - Notch.

If the wall thickness of the pipe or the coupon does not enable machining of full size specimens, the largest possible size must be used but not less than (10 x 5 mm). The axis of the notch shall be orientated through the wall thickness of the pipe.

5.2.3. Retreatment

If the result of the mechanical tests does not conform to the requirements specified in par. 5.2, the manufacturer, with the acceptance of the purchaser and the Control Authority, may retreat the pipes as applicable and repeat all the tests specified.

5.3. Chemical Analysis

For each lot/item a new chemical analysis of the steel shall be done.

The chemical analysis shall conform to the requirements material specification.

The carbon equivalent shall be computed by "check analysis": see par. 3.i.

C.E. □□0.43.

5.4. Non-destructive Testing

After the Hydro testing, all pipes must be checked with NDT over all the surface and bevels.

Eddy current must be performed as per ASTM A106.

6.0 INSPECTION BY CONTROL OPERATIONS: L.O.F.C.

Control and tests are carried out by the Piping Supplier under his responsibility and at his cost.

In order to ensure that material is in accordance with the applicable standard specification and with this specification, Supplier shall follow a program of inspection as set in the L.O.F.C. (List of Operations for Control).

The intended intervention points of the Control Authority and of Engineer's inspection are indicated in the L.O.F.C. form attached.

It is the responsibility of the Quality Control department to fill in the L.O.F.C. sheet with their intervention points.

Each operation step, after checking of execution, shall be signed by the responsible Q.C. Inspector.

Notification to the Control Authority for witnessing of testing operations, shall be done at least five (5) working days, by E-mail, prior to the date scheduled to perform the test.

Each pipe in which injurious defects are found after delivery shall be rejected. The vendor shall be notified. In this case, the pipe shall be replaced immediately by the vendor. All costs involved, including wages and travel expenses of the Control Authority / Consultant shall be borne by the manufacturer/ supplier.

7.0 MARKING

7.1 All pipes furnished under this specification shall be clearly identified on the O.D. with the following information marked with low stress die stamps or interrupted dot stamps as noted :

a) Manufacturer's name or trademark.

b) Heat code identity.

c) Pipe number: the pipe number shall be made up of six figures specified as follows: the item and his number specified in the purchase order.

d) The monogram of the Control Authority / TPIA. This marking shall only be applied after complete approval of the Certified Material Test Report.

7.2 In addition to the above, for NPS 2" and larger, it shall also include the following information :

Grade symbol: the grade symbol must designate the material of the pipe conforming to ASTM code.

7.3 Marking must be done prior to final inspection.

8.0 CORROSION PROTECTION

The corrosion protection will be applied by the vendor after final inspection by the Control Authority.

The corrosion protection shall be line sealed oil at the outside of the pipe.

This product shall meet the following criteria:

- Guarantee a corrosion protection for a storage period in open air for at least 6 months.
- Shall be easily removable by wire brushing or by grinding.
- Shall not produce toxic vapour or smoke when heated by blow troches or during welding.

The vendor shall deliver the necessary quantity of product (tri - chlore - ethylene) to remove this oil.

9.0 DOCUMENTATION AND CERTIFICATION

Inspection and certification shall be done by the Quality Control department of the pipe supplier and in presence of the Control Authority representative / TPIA and apply to:

- Identification of pipes with respect to mill certificates.
- Visual and dimensional inspection.
- Sampling preparation for testing: stamping of specimens.
- Testing (destructive and non-destructive).
- Hydrostatic test.
- Marking: all accepted pipe lengths shall be identified by Control Authority's representative / TPIA.

BHAGYANAGAR GAS LIMITED (BGL)

CITY GAS DISTRIBUTION PROJECT

PTS – C.S. FITTINGS (up to SIZE 2")

TABLE OF CONTENTS

1.0 INTRODUCTION & SCOPE

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Hyderabad. It supplies natural gas to domestic and commercial consumers in Hyderabad. The present document covers the technical specifications for the procurement of C S Fittings. C S Fittings shall be installed in natural gas pipelines and piping system.

2.0 DEFINITIONS

Owner	Shall mean BHAGYANAGAR GAS LTD. (BGL)
Manufacturer	Means the Manufacturer of the C.S. Fittings.
PTS	Means the present <<Particular Technical Specification>> and its entire appendix, if any.
Third Party Inspection Agency	Means the Third Party Inspection Agency to be appointed by the Manufacture.

3.0 SCOPE

This specification covers the minimum requirements for the design, manufacture and supply of following fittings in size up to NB 50 mm and higher to be installed in natural gas pipelines and piping system

Fittings such as tees, elbows, caps etc. shall conform to the requirements of MSS-SP-75, latest edition. Dimensions standard for Screwed/SW fittings shall be as per ANSI B16.11.

4.0 REFERENCE DOCUMENTS

4.1 Reference has also been made in this specification to the latest edition of the following codes, standards and specifications:

a) ASME B 31.8 : Gas Transmission and Distribution Piping System

b) ASME B 31.4 : Liquid transportation system for hydrocarbon liquid petroleum gas, anhydrous ammonia and alcohols

c) ANSI B 16.25 : Butt – Welding Ends

d) ASME B 16.9 : Factory made wrought steel butt welding fittings

e) ASME B 16.11 : Forged Steel Fittings, Socket Welding and Threaded

f) ASTM A 370 : Mechanical Testing of Steel Products

g) ASTM Part1 : Steel Piping, Tubing, Fittings

h) MSS-SP-25: Standard marking system for valves, fittings, flanges and unions.

i) MSS-SP-75 : Specification for High Test Wrought Welding Fittings

j) MSS-SP-97: Forged carbon steel branch outlet fittings – socket welding, threaded and butt welding ends.

In case of conflict between the requirement of MSSSP75, & above reference documents and this specification, the requirements of this specification shall govern.

5.0 MATERIAL

5.1 The basic material for fittings shall be ASTM A105/ WPB 234. Additionally; the material shall also meet the requirements specified hereinafter.

5.2 Steel used shall be fully killed.

5.3 Each heat of steel used for the manufacture of fittings shall have carbon equivalent (CE) not greater than 0.45 calculated from check analysis in accordance with the following formula:

$$\text{C.E.} = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

Carbon contents on check analysis shall not exceed 0.22%.

5.4 Unless specified otherwise, Charpy V notch test shall be conducted for each heat of steel, in accordance with the impact test provisions of ASTM A370 at temperature of 0ºC. The average absorbed impact energy values of three full-sized specimens shall be 35 joules.

The minimum impact energy value of any one specimen of the three specimens analyzed as above, shall not be less than 80% of the above mentioned average value.

5.5 Hardness testing shall be carried out by Manufacturer in accordance with applicable ASTM code. the maximum hardness shall not exceed 248 HV10.

6.0 DESIGN AND MANUFACTURE

6.1 Fittings such as tees, elbows and reducers shall be seamless type and shall conform to ASME B16.9 for sizes 50mm (2") NB and above ASME B16.11 for sizes below 50mm (2") NB.

6.2 Fittings such as weldolets, sockolets, etc. shall be manufactured in accordance with MSS-SP-97.

6.3 Stub in or pipe to pipe connection shall not be used in the manufacture of tees. Tees shall be manufactured by forging or extrusion methods. The longitudinal weld seam shall be kept at 90º from the extrusion. Fittings shall not have any circumferential joints.

6.4 All butt weld ends shall be beveled as per ASME B16.25.

6.5 Repair by welding on parent metal of the fittings is not allowed.

7.0 INSPECTION AND TESTS

7.1 The Manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant codes, prior to shipment, at his works. Such inspection and tests shall be, but not limited to the following:

7.1.1 Visual inspection.

7.1.2 Dimensional checks as per applicable standards.

7.1.3 Chemical composition, mechanical properties and hardness examination.

7.1.4 All finished wrought weld ends shall be 100% ultrasonically tested for lamination type defects. Any lamination larger than 6.35 mm shall not be acceptable.

7.1.5 All other tests not specifically listed but are required as per applicable standard/ specification.

7.2 Purchaser's Inspector may also perform stage wise inspection and witness tests at manufacturer's works prior to shipment. Manufacturer shall give reasonable notice of time and shall provide without charges reasonable access and facilities required for inspection to the Purchaser's Inspector

7.3 Inspection and tests performed/witnessed by Purchaser's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and test.

Note: Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

8.0 TEST CERTIFICATES

Manufacturer shall produce the certificates for all, including, but not limited, the following tests:

a) Certificates of chemical analysis and mechanical properties of the material used for construction as per this specification and relevant standards.

b) Certificates of required nondestructive tests inspections.

c) Certificates of all other tests as required in this specification.

9.0 PAINTING, MARKING AND SHIPMENT

9.1 All fittings shall be marked as per MSS-SP-25.

9.2 All loose material and foreign material i.e. rust, grease, etc. shall be removed from the inside and outside of the fittings.

9.3 Ends of all fittings shall be suitably protected to avoid any damage during transit. Each item shall be marked with indelible paint with the following data:

a) Manufacturer marking

b) Material Specification

c) Size & Sch.

d) Heat No.

9.4 Package shall be marked legibly with suitable marking ink to indicate the following:

a) Order Number

b) Package Number

c) Manufacturer's Name

d) Type of Fitting

e) Size (inches) and Wall Thickness (mm)

10.0 WARRANTY

Manufacturer will reimburse purchaser for any fitting furnished on this order that fails under field hydrostatic test if such failure is caused by a defect in the fitting, which is outside the acceptance limits of this specification. The reimbursement cost shall include fitting, labour and equipment rental for finding, excavation, cutting out and installation of replaced fitting in position. The field hydrostatic test pressure will not exceed that value which will cause a calculated hoop stress equivalent to 100% of specified minimum yield strength for the pipe with which the fitting is to be attached without impairing its serviceability.

11.0 DOCUMENTATION AND CERTIFICATION

Inspection and certification shall be done by the Quality Control department of the fittings supplier and in presence of the Control Authority representative / TPIA (if required) and apply to:

- Identification of Fittings with respect to MTC.
- Visual and dimensional inspection.
- Sampling preparation for testing: stamping of specimens.
- Testing (destructive and non-destructive).
- Hydrostatic test.
- Marking: all accepted fittings shall be identified by Control Authority's representative / TPIA.

BHAGYANAGAR GAS LTD (BGL)

CITY GAS DISTRIBUTION PROJECT

PTS - GI FITTINGS

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Hyderabad. It supplies natural gas to domestic and commercial consumers in Hyderabad.

This present document covers the technical specification for the procurement of GI fittings used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for Malleable Cast Iron Fittings unless modified by this specification, requirements of IS 1879 – latest edition shall be valid.

2.0 DEFINITIONS

Owner	Shall mean Bhagyanagar Gas Ltd. (BGL).
Manufacturer	Means the Manufacturer of the GI fittings.
PTS	Means the present <<Particular Technical Specification>>and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by BGL.
GTS	Means the present <<General Technical Specification>> and its entire appendix, if any.

3.0 MATERIAL

The material used for the manufacturing of GI fittings shall conform to ISI 14329 – 1995 with latest amendments Grade BM 300.

4.0 DIMENSIONS & DIMENSIONAL TOLERANCES

i. Dimensions of various types of fittings shall be as specified in sections 2 to 10 of IS 1879 – 1987 with latest amendments, as applicable.

ii. Wall thickness of fittings and tolerances on them shall be as given in Table 1.2 of S 1879 – 1987 with latest amendments,

iii. In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.

iv. Elbows, Tees, Sockets and caps shall be of reinforced type.

5.0 WEIGHT

Weights of various types of fittings shall be as specified in sections 2 to 10 of S 1879 – 1987 with latest amendments, as applicable.

6.0 THREADS

i. Threads shall be NPT type and conforming to ASME B1.20.1.

ii. Outlets of fittings shall be threaded to dimensions & the tolerances as specified in ASME B1.20.1.

iii. All internal & external threads shall be tapered.

iv. For checking conformity of threads gauging practice in accordance with ASME B1.20.1 shall be followed.

v. Chamfering: The outlet of fittings shall have chamfer.

7.0 FREEDOM FROM DEFECTS

On visual examination, the outside & inside surfaces of fittings shall be smooth & free from any defects such as cracks, injurious flaws, fine sand depth etc.

8.0 GALVANIZING

i. Fittings shall be galvanized to meet the requirement of IS: 4759 – 1996 with latest amendments.

ii. Zinc conforming to any grade specified in IS: 13229-1991 with latest amendments shall be used for the purpose of galvanizing.

iii. Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.

iv. Coating requirements: Mass of coating shall be 610 - 700 gms/m^2.

v. Freedom from defect: The zinc coating shall be uniform adhered, reasonably smooth & free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits & blisters.

vi. Samplings

a) All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be given in Table 2 of IS 4759 – latest edition.

b) The sample selected according to Column 1 & 2 of Table 2, IS: 4759 – latest edition shall be tested for visual requirements as per Clause 6.2 of IS:4759 – latest edition

c) The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 9.2 of IS: 4759 – latest edition.

d) Criteria for conformity: As per Clause 8.3 of IS: 4759-latest edition.

e) Test procedure shall be as per Clause 9 of IS: 4759-latest edition.

9.0 PRESSURE TEST

Vendor shall carry out pneumatic pressure test as per Clause 11.1b of 1879 – 1987 with latest amendments on each & every fittings. Vendor to submit the Internal Quality control certificate for the same. Owner shall witness pneumatic testing as per the sampling procedure specified in 1879 – 1987 with latest amendments.

10.0 COMPRESSION TEST

This test shall be conducted to judge the malleability of the pipe fittings & shall be carried out as per Clause 12 of 1879 – 1987 with latest amendments.

11.0 SAMPLING

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per clause 14 of 1879 – 1987 with latest amendments. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

12.0 MARKING

Each fitting shall be embossed with BGL's logo, manufacturer's name or trademark and the size designation.

Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

a. Manufacturer's name or trade mark.

b. Designation of fittings.

c. Lot number.

Each fitting conforming to this standard shall also be marked with BIS standard mark.

13.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

14.0 INSPECTION / DOCUMENTS

i. Inspection shall be carried out as per Owner Technical Specification.

ii. Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

iii. Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Owner Tech Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

iv. Even after third party inspection, Owner reserves the rights to select a sample of fittings randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the rights to reject all production supplied from the batch.

BHAGYANAGAR GAS LTD.

CITY GAS DISTRIBUTION PROJECT

PTS – FORGED FITTINGS (WROUGHT STEEL FITTINGS) FOR USE AT PRESSURE UP TO 100 MBAR (G)

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE

BHAGYANAGAR GAS LTD. (BGL) plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the city of Hyderabad.
This specification covers the requirements for Wrought Steel Fittings for Natural Gas for use at pressures up to 100 mbar (g). Unless modified by this specification, all the requirements of IS 1239 Part 2: 1992 and the latest editions of the standards mentioned herein this specification, including all revisions, shall apply.

2.0 DEFINITIONS

Owner	Shall mean Bhagyanagar Gas Ltd. (BGL).
Manufacturer	Means the Manufacturer of the GI fittings.
PTS	Means the present <<Particular Technical Specification>>and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by BGL.
GTS	Means the present <<General Technical Specification>> and its entire appendix, if any.

3.0 MATERIAL

The material used for the manufacturing of wrought steel fittings shall confirm to IS 1387: 1967 generally, and IS 1239 Part 2: 1992.

4.0 DIMENSIONS & DIMENSIONAL TOLERANCES

I. Dimensions of various types of fittings shall be as specified in the table 1 to 31 of IS 1239 Part 2: 1992.

II. Wall thickness on fittings & tolerances on them shall be as given in table 1 to 31 of IS 1239 Part 2: 1992.

III. In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.

5.0 THREADS

i. Threads shall be NPT type and conforming to ANSI/ASME B1.20.1.

ii. Outlets of fittings shall be threaded to dimensions & the tolerances as specified in ANSI/ASME B1.20.1.

iii. All internal & external threads shall be tapered.

iv. For checking conformity of threads gauging practice in accordance with ASME B1.20.1 shall be followed.

v. Chamfering: The outlet of fittings shall have chamfer.

6.0 FREEDOM FROM DEFECTS

On visual examination the outside & inside surfaces of fittings shall be smooth & free from defects such as cracks, injurious flows, fine sand depth, etc. Other workmanship shall be as per Clause 14 of IS 1239 Part 2: 1992.

7.0 GALVANIZING

1. Fittings shall be galvanized to meet the requirements of IS 4759: 1996.

2. Zinc conforming to any grade specified in IS 209: 1992 or IS 13229: 1991 shall be used for the purpose of galvanizing.

3. **Galvanized Bath:** The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.

4. **Coating requirements:** Mass of coating shall be 610 gms/m^2. In case of pipe nipples (manufactured in accordance with the requirements of IS 1239 Part 1: 2004), the mass of coating of 400 gms/m^2 shall also be acceptable.

5. **Freedom from defects:** The zinc coating shall be uniformly adhered, reasonably smooth & free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness runs, rust strains, bulky white deposits & blisters; otherwise the fittings shall be liable for rejection.

6. **Sampling Plan for galvanizing**

a. All materials of the same type in a coating bath having uniform coating characteristics shall be grouped together to constitute a lot. Each lot shall be tested separately for the various requirements of the specification.
b. The number of units to be selected from each lot for this purpose shall be as given in Table 2 of IS 4759: 1996.
c. The sample selected according to Column 1 & 2 of Table 2, IS 4759: 1996 shall be tested for visual requirements as per Para 8 of IS 4759: 1996. Vendor shall have appropriate correspondence between galvanizing lot number and fittings manufacturing lot number for identification / traceability.
d. The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 9.2 of IS 4759: 1996.
e. Criteria for conformity: As per Clause 8.3 of IS 4759: 1996.
f. Test procedure shall be as per Clause 9 of IS 4759: 1996. All galvanizing test results shall be included in the Manufacturer's Test Certificate.

8.0 PRESSURE TEST

Pneumatic pressure test shall be carried out on each & every fittings as per procedure given in IS 1239 Part 2: 1992.

9.0 COMPRESSION TEST

As per IS 1239 Part 2: 1992.

10.0 SAMPLING

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per procedure for sampling plan given in IS 4711: 1974. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

11.0 MARKING

Each fitting shall be embossed with BGL's logo, manufacturer's name or trademark and the size designation.

Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

a. Manufacturer's name or trade mark.

b. Designation of fittings.

c. Lot number.

Each fitting conforming to this standard shall also be marked with BIS standard mark.

12.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

13.0 INSPECTION / DOCUMENTS

i. Inspection shall be carried out as per Owner Technical Specification.

ii. Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

iii. Vendor shall furnish all the material test certificates, proof of approval / licence from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Owner Tech Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

iv. Even after third party inspection, Owner reserves the rights to select a sample of fittings randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the rights to reject all production supplied from the batch.

BHAGYANAGAR GAS LIMITED

CITY GAS DISTRIBUTION PROJECT

PTS - COPPER TUBE

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Hyderabad. It supplies natural gas to domestic and commercial consumers in Hyderabad.

This specification covers the requirements for 12 mm OD X 0.6 mm wall thickness Copper tube, Half Hard. Unless modified by this specification, requirement of BS EN 1057 (latest), Half Hard, shall be valid, with the recommended changes in physical properties to suit wrinkle free bend ability.

2.0 MATERIAL

The material used for the manufacturer of Copper tube shall confirm to BS EN 1057(latest), Grade Cu - DHP or CW024A.

a. Mechanical Properties:

i. Ultimate Tensile Strength – 250 N/ sq.mm (min)

ii. Elongation – 30% (min)

iii. Hardness - 75 to 100 on HV scale.

b. Chemical Properties:

In Each heat one no. of the copper tube will be tested for chemical properties to confirm to non-arsenical Cu - DHP / CW024A as per BS EN 1057 to have the following chemical composition:

Copper Percentage including silver	:	Min 99.9%
Phosphorus Percentage	:	0.015 to 0.040%

3.0 DIMENSIONAL TOLERANCES

The mean outside Diameter of the tube shall not vary from the specified outside diameter by more than the amount of tolerances specified in table 4 of BS EN 1057. The tolerance on the wall thickness shall be as specified in table 5 of BS EN 1057.

The length of the tube shall be 3 m. Allowable tolerance shall be (-0, +0.5 mm).

4.0 MANUFACTURE

The tubes shall be solid drawn by the process of melting, extrusion and thereafter Bright annealing. The ends shall be cut clean & square with the axis of the tube in no case shall tubes be redrawn from old or used tubes.

5.0 FREEDOM FROM DEFECTS

a. The tubes shall be free from internal & external fins, flaws, skin defects, blow holes etc. or other irregularities which might restrict the free flow of fluid and shall be so designed that resistance to the flow of fluid through the tubes is minimized.

b. All tubes will be supplied 100% Eddy Current tested as per ASTM E243 and BS EN 1057. Eddy Current testing is a computer aided test, wherein the tube passes through a probe & an electro magnetic field is created around the peripheral of the tube to detect any flaw or blow hole which may not be visible to the naked eye. The manufacturer must have in-house Eddy Current testing facilities to supply to BGL. BGL reserves the right to witness the Eddy Current facility at the manufacturer's factory premises.

6.0 HYDROSTATIC TEST

Hydrostatic test shall be carried out minimum 35 bar pressure for a period of 10 second as per EN 1057 (latest).

7.0 DRIFT EXPANDING TEST

Drift expanding test shall be carried out as per EN 1057. The O.D. of the tube end shall be expanded by 30% using a conical mandrel (at angle 45º) with no wrinkles, cracks, break or any form of defect should occur on the tube during & after the test.

8.0 CARBON FILM TEST

Copper tubes to be tested for carbon film test & the manufacturer will certify that the tubes meet the requirement of clause 8.5 of BS EN 1057

9.0 CARBON CONTENT TEST

Copper tubes to be tested for carbon content test to ensure a carbon level to avoid the formation of carbon film during installation. Max. Carbon level shall be permitted as per clause 6.5 of BS EN 1057.

10.0 MARKING

Each tube shall be permanently marked every meter with BGL's Logo, manufactures name & size and specification of the tube.

Each packing containing tubes shall carry the following, stamped or written in indelible ink.

a) Manufacturers name or trade mark

b) Designation of tubes (OD x wall thk)

c) Lot number.

d) No. of the standard (EN 1057)

11.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

12.0 INSPECTION / DOCUMENTS

i. Inspection shall be carried out as per BGL Technical Specifications, relevant codes/standard and Inspection Plan/ QAP. Vendor to prepare detailed QAP and submit the same for approval of BGL / BGL's Authorized Representative.

ii. Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

iii. Vendor shall furnish all the material test certificates, proof of approval/ licence from specified authority as per specified standard, if relevant, internal test/ inspection reports as per BGL Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

iv. Even after third party inspection, BGL reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in BGL Technical specification, then BGL reserves the rights to reject all production supplied from the batch.

v. For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date & place along with production schedule.

BHAGYANAGAR GAS LIMITED (BGL)

CITY GAS DISTRIBUTION PROJECT

PTS - BRASS FITTINGS

TABLE OF CONTENTS

1.0 SCOPE

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Hyderabad. It supplies natural gas to domestic and commercial consumers in Hyderabad.

This specification covers the requirements for Brass Capillary fittings (End feed fittings). Unless modified by this specification, requirement of BS 864 / EN 1254 Part 1 shall be valid.

2.0 MATERIAL

i. The material used for the manufacturer of Brass Capillary Fittings shall conform to EN 1254-1 (latest), Half Hard.

ii Material used for the solder should conform to BS EN 29453 and should be lead free. Solder material shall be generally melting within the temperature range 180 ° C to 250 ° C.

iii Threading on the Brass fittings shall be done as per BS 21.

3.0 DIMENSIONAL TOLERANCES

Dimensions tolerances of various types of brass capillary fittings (End feed fittings). shall be as per EN 1254 Part 1 .

The tolerances at the end shall be as per EN 1254 Part I in nominal diameter which are as follows (Ref. table 2)

Nominal Diameter	Tolerance on the mean diameter with respect to the nominal diameter		Resulting Diametrical difference	
D	Outside Dia of male end (mm)	Inside Dia of socket (mm)	Max (mm)	Min (mm)
12 mm	+.0.04 -.0.05	+ 0.15 +0.06	0.20	0.02

The minimum wall thickness of a fitting shall be in accordance as given below (Ref Table 3 of EN 1254 Part 1)

Nominal Dia mm, D	Minimum wall thickness (mm) Brass
12	1.1

4.0 END CONNECTION

End connection of the fitting must be capable of end feeding to the NPT x 12 mm. Internal solder ring type fitting is not acceptable.

5.0 CHEMICAL PROPERTIES

Chemical composition of Brass shall be as mentioned in EN 1254 PART I. Dezincification-resistant brass material CuZn36Pb2As or CW602N.

Cu 61.0-63.0 %

Pb 01.7-02.8 %

As 0.02 -0.15%

Remaining is zinc.

6.0 CARBON IN BORE

The internal surface of brass capillary fittings for soldering or brazing shall not contain any detrimental film nor present a carbon level high enough to allow the formation of such a film during installation. The maximum total carbon level on internal surfaces shall not exceed 1.0 mg/dm^2 when tested in accordance with the specification. This test shall be carried out as per clause no. 5.4 of EN 1254 -1.

7.0 RESISTANCE TO DEZINCIFICATION

The fittings shall be manufactured from alloys containing more than 10% Zinc. So fittings shall be required to be resistant to dezincification. It shall be carried out as per Cl. 5.5 of EN 1254 -1.

8.0 STRESS CORROSION RESISTANCE TEST

A stress corrosion resistance is to be carried out as per method defined in ISO 6957 using test solution of pH 9.5 but without pickling.

9.0 FREEDOM FROM DEFECT

The fittings shall be free from internal fins, blow holes, skin defects etc. or other irregularities which might restrict the free flow of fluid, and shall be designed that resistance to the flow of fluid through the fittings is minimized.

10.0 HYDROSTATIC PRESSURE TEST

All fittings shall be leak tightness tested at 1.5x25 bars for a period of 15 minutes and no leakage is permitted. This test shall be performed on each size of the fittings.

11.0 PNEUMATIC PRESSURE TEST

All fittings shall be leak tested at 6 bars for a period of 10 seconds and no leakage is permitted.

12.0 MARKING

Each fittings shall be embossed with BGL' s logo, manufacturers name and trade mark BS 864 / EN 1254 Part – I and designation of fittings.

Each packing containing fittings shall carry the following stamped or written in indelible ink.

a) Manufacturer's name or trade mark.

b) Designation of fittings.

c) Month and year of manufacturing

13.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

14.0 INSPECTION / DOCUMENTS

i. Inspection shall be carried out as per design codes/standards, BGL Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.

ii. Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

iii. Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per BGL Technical Specification, at the time of final inspection of each supply lot of material.

iv. Even after third party inspection, BGL reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in BGL Technical specification, then BGL reserves the rights to reject all production supplied from the batch.

v. Vendor shall prepare and submit the detail drawings of required brass fitting for approval by BGL before starting production.

vi. For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

BHAGYANAGAR GAS LIMITED (BGL)

CITY GAS DISTRIBUTION PROJECT

PTS – WARNING MAT

TABLE OF CONTENTS

1.0 INTRODUCTION & SCOPE

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Hyderabad. It supplies natural gas to domestic and commercial consumers in Hyderabad

The present document covers the technical specifications for the procurement of Warning Mat. Warning Mats shall be laid in the ground above the gas main line in order to indicate their presence.

2.0 DEFINITIONS

Owner	Shall mean BHAGYANAGAR GAS LTD. (BGL)
Manufacturer	Means the Manufacturer of the Warning Mat / Warning Grid / Warning Net / Warning Tape.
PTS	Means the present <<Particular Technical Specification>> and its entire appendix, if any.
Third Party Inspection Agency	Means the Third Party Inspection Agency to be appointed by the Owner.

3.0 REFERENCE CODE

EN 12613 – Plastics warning devices for underground cables and pipelines with visual characteristics

4.0 FEATURES

4.1. Material

Warning Tape, Type 1 as per EN 12613 shall be used for the present project.

The material grade of Warning Mat shall be Virgin Low density polyethylene (PE) material with warning sticker / stamp. The material shall be having the density between 0.913 to 0.923 g/cc at 27 deg. Celsius as per IS 2508.

The tape shall be uniform in colour, texture and finish and shall be free from holes and foreign materials.

Rodent repellent chemicals to be added to the plastic master batch for protection against rodents.

The material and colour, if used, for printing shall have no detrimental effects on the environment.

4.2. Mechanical properties

Mechanical properties of the Warning Mat (Type I) shall be in accordance with the code EN 12613.

Minimum tensile withstand load in longitudinal direction shall not be less than 200 N. The test piece shall not exhibit a reduction of more than 20% of its width after removal of the specified load.

4.3. Colour

The Warning Mat shall be of bright golden yellow colour. This colour must not take any alteration in the course of time.

4.4. Dimensions

Warning Mat shall have following dimensions:

Width 300 ± 2 mm

Thickness 1.0 mm (Minimum)

Negative tolerance on the thickness is not allowed.

4.5. Marking

4.5.1. The warning mat shall be marked at intervals not exceeding 1 meter. Marking on the mat shall be approved by owner. The marking shall be legible and durable. The warning mat must be printed with "Caution: High Pressure Gas Pipeline Below" in both English and Hindi, Chainage marking along with BGL's logo and BGL's 24 Hours Emergency Number **-1800-599-6992 & 3 (Hyderabad), at** a frequency of every meter. In addition, name or trademark of the manufacturer, year of manufacture and reference of code of manufacture of warning mat shall be included in the marking.

4.5.2. Vendor shall submit proposed Artwork to be marked on the Warning Mat for approval from Owner / Owner's representative.

4.6. Tests

All the tests and test procedures for Warning Mats shall be as per EN 12613 or as per required National/ International standards mentioned in EN 12613. In addition, all requirements pertaining to statutory requirements, if any, as specified from time to time shall be complied.

The required tests are briefed as below:

4.6.1. **Coloring**

Three separate tests shall be carried out in accordance with:

- As per normative annexure B of EN 12613, using 20% ammonium sulphide.
- As per EN ISO 175, using 10% nitric acid & 20% sodium carbonate solution.

The tests shall be repeated for each colour (if any).

There shall be no discolouration or change of the initial colour of the warning tape after the tests.

4.6.2. Tensile Withstand Strength

The test sample shall be selected as per mentioned in EN 12613. The test samples shall be preconditioned for not less than 12 h at 23±2 °C. Static loads shall be carried out to the samples over a period of 10 s.

After the test, the test piece shall withstand without starting to separate at weak points (if any) for not less than 5 minutes. Also it should no exhibit a reduction of more than 20% of its width after removal of specified load.

The minimum tensile withstand load for the warning mat in the longitudinal direction shall be not less than 200 N.

4.6.3. Visual Warning Characteristics

The test shall be carried out in accordance with normative annexure A of EN 12613.

4.6.4. Permanence of Printing

The test shall be performed as per CL. 9.3 of IEC 60898:1995.

The test is made by rubbing the marking by hand for 15 sec with a piece of cotton soaked with water and again for 15 sec with a piece of cotton soaked with aliphatic solvent hexane with a content of aromatics of max. 0.1% by volume, a kauributanol value of 29, an initial boiling point value of approx. 65 ^{o}C, a dry point of approx. 69 ^{o}C and a density of approx. 0.68 gm/cm^3.

After the test, the marking shall be easily legible.

4.6.5. Test of laying Characteristics

The test is for the assessment of transverse rigidity of the warning mats.

The test shall be performed as per EN 12613.

4.6.6. Warning Mat Virginity Test

Differential Scanning Calorimeter (DSC) Scan test along with the temperature of melting (T_m) shall be performed for the Warning Mat and its raw polymer i.e. virgin low density polyethylene (LDPE).

The Differential Scanning Calorimeter (DSC) Scan curve of the Warning Mat obtained from its DSC Scan test along with its Temperature of Melting (T_m) shall then be compared with the DSC Scan curve and the Temperature of Melting (T_m) of its raw polymer (i.e. virgin LDPE).

To ensure the virginity of the Warning mat, the DSC Scan curve and T_m of the Warning Mat (finished product manufactured from the raw polymer) shall match on overlapping with its corresponding raw polymer's DSC Scan curve and T_m.

4.7. Packing

The warning mat shall be delivered in rolls of minimum 50 meters. Packing size to be mentioned to ensure uniformity in delivery conditions of the materials being procured. Bidder shall submit the packing details during offer and also compiled with at the time of delivery. Packaging of the Warning Mat shall be such that there won't be any deterioration due to Ultraviolet (UV) effect during transportation and storage of the Warning Taps prior to use.

5.0 QUALITY ASSURANCE (QA)

Manufacturer shall prepare detailed QAP and submit for the approval from Owner / Owner's representative.

Note: Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

6.0 DEFECT LIABILITY

Defect liability period shall be as per the commercial volume I of II.

7.0 RECOMMENDED MANUFACTURER FOR RAW MATERIAL

1. SOLVAY
2. BOREALIS
3. TOTAL PETROCHEMICALS
4. DOW
5. ELENAC
6. RELIANCE
7. GAIL
8. HALDIA

However any other reputed national or international Manufacturer may also be consider for supply of Raw material with approval of Owner / Owner's representative.

BHAGYANAGAR GAS LIMITED

CITY GAS DISTRIBUTION PROJECT

PTS - STEEL REINFORCED RUBBER HOSE

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Kakinada. It supplies natural gas to domestic and commercial consumers in Hyderabad.

This present document covers the technical specification for the procurement of steel reinforced rubber hose, Type 4 used in distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for steel reinforced rubber hose unless modified by this specification, requirements of IS: 9573 shall be valid.

2.0 DEFINITIONS

Owner	Shall mean Bhagyanagar Gas Ltd. (BGL).
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
PTS	Means the present <<Particular Technical Specification>>and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by BGL.
Type 4	Wire Reinforced hose for domestic / commercial installations

3.0 MATERIAL

i. Lining: - It shall be nitrile – butadiene rubber (NBR) or chloroprene rubber (CR) compound. It shall be smooth in bore, uniform in thickness and free from air blisters, porosity and splits.

ii Reinforcement material :- It shall have wire reinforcement in braided form in between the lining & cover.

iii Cover :- It shall be manufactured out of synthetic rubber compound resistant to abrasion, weather and natural gas. The cover color shall be orange.

iv. The whole shall be consolidated by wrapping or any other suitable method and uniformly vulcanized to give good adhesion between reinforcement plies and the rubber lining of the cover.

4.0 DIMENSIONS & TOLERANCES

i. Bore size

Nominal size (mm)	Minimum base diameter (mm)	Minimum bend radius (mm)
8 mm	7.9	95

The Nominal bore size of the hose shall be accordance to table # 1 of IS 9573 : 1998 shall be as given above table. It shall be tested/ checked as method defined in IS 4143

ii. The Minimum thickness of lining & cover shall be 2 mm & 1 mm respectively.

ii. Length of hose shall be as defined in M.R. & the tolerances on length shall be permitted ± 1%.

5.0 FEATURES

5.1 Mechanical properties

Tensile strength (Lining & cover) at break - 10 MPa (minimum)

Elongation (Lining & cover) in at break (%) - 200 & 250 respectively (minimum)

5.2 Resistance of Lining to n-pentane

The n-pentane absorbed and the n-pentane extractable matter as determined Clause no. 5.4.3.2 of IS 9573: 1998 shall not exceed 10% & 5% respectively to the initial mass of lining.

5.3 Adhesion

The minimum adhesion between rubber lining & reinforcement, between layers of reinforcement and between reinforcement & cover shall be 2KN/m.

5.4 Low temperature flexibility

Flexible hose is conditioned at -40 ° C for at least 5 hrs. and then bent at 180° around a mandrel with a diameter 12 times the nominal bore diameter of the hose, no cracks or breaks shall be shown.

5.5 Flexibility of Hose

The hose shall be capable of being bent empty to the radius 95 mm without flattening and suffering structural damages.

5.6 Ozone resistance

It shall be carried out as per clause no. 5.5.of IS 9573: 1978

5.7 Hydrostatic test

All hoses shall be leak tightness tested at 2 Mpa for a period of 1 minutes and no leakage is permitted. This test shall be performed on each size of the hoses as per clause no. 5.5.5.1 of IS 9573: 1978.

5.8 Bursting pressure

It shall be carried out as per Clause 5.5.2 of IS 9573. The minimum burst pressure shall be 5 Mpa.

5.9 Grip strength test

The hose shall comply to the requirement of Clause no. 5.5.7 of IS 9573.

5.10 Burning behaviour

The burning test shall be carried out on hose as per clause no. 5.5.8 of IS 9573. The hose at least shall not burn till 45 second.

6.0 MARKING

Each hose shall be indelibly marked as follows:

a) Manufacturer's name or trade mark., if any

b) Nominal bore

c) Batch no. / Lot no.

d) Month and year of manufacturer

e) Type of hose i.e Type 4

f) BIS marking

7.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

8.0 INSPECTION / DOCUMENTS

i. Inspection shall be carried out as per design codes/standards, BGL Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.

ii. For all tests purposes, the minimum time between vulcanization & testing shall be 16 h.

iii. Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

iv. Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per BGL Technical Specification, at the time of final inspection of each supply lot of material.

v. Even after third party inspection, BGL reserves the right to select a sample of hose randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in BGL Technical specification, then BGL reserves the rights to reject all production supplied from the batch.

vi. Vendor shall prepare and submit the detail drawings of required steel reinforced rubber hose for approval by BGL before starting production.

vii. For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

BHAGYANAGAR GAS LIMITED

CITY GAS DISTRIBUTION PROJECT

PTS - COPPER FITTINGS

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Hyderabad. It supplies natural gas to domestic and commercial consumers in Hyderabad.

This specification covers the requirements for Copper Capillary fittings (End feed fittings) unless modified by this specification, requirement of EN 1254 Part I shall be valid.

2.0 MATERIAL

The material used for the manufacturer of Copper Capillary Fittings shall conform to BS EN 1254-1(latest), Half Hard

3.0 DIMENSIONAL TOLERANCES

Dimensions tolerances of various types of copper capillary fittings shall be as per EN 1254 part I (Open tolerances on dimensions shall be +/- 0.1 mm).

The tolerances as specified in EN 1254 Part I in nominal diameter are as follows (Ref Table 2).

Nominal Diameter	Tolerance on the mean diameter with respect to the nominal diameter		Resulting Diametrical difference	
D	Outside Dia of male end (mm)	Inside Dia of socket (mm)	Max (mm)	Min (mm)
12 mm	+.0.04 -.0.05	+ 0.15 +0.06	0.20	0.02

The minimum wall thickness of a fitting shall be in accordance as given below (Ref Table 5 of EN 1254 Part I)

Nominal Dia mm, D	Minimum wall thickness (mm) Coppers
12	0.6

4.0 END CONNECTION

End connection of the fitting must be capable of end feeding. Internal solder ring type fitting is not acceptable.

5.0 CARBON IN BORE

The internal surface of copper capillary fittings for soldering or brazing shall not contain any detrimental film nor present a carbon level high enough to allow the formation of such a film during installation. The maximum total carbon level on internal surfaces shall not exceed 1.0 mg/dm^2 when tested in accordance with the specification.

6.0 CHEMICAL PROPERTIES

The composition shall confirm to the following requirement

Cu + Ag min. 99.90%

$0.015\% \leq P \leq 0.040\%$.

This copper grade is designated either Cu - DHP or CW024A.

7.0 STRESS CORROSION RESISTANCE TEST

A stress corrosion resistance is to be carried out as per method defined in ISO 6957 using test solution of pH 9.5 but without pickling.

8.0 FREEDOM FROM DEFECT

The fittings shall be free from internal fins, blow holes, skin defects etc. or other irregularities which might restrict the free flow of fluid, and shall be designed that resistance to the flow of fluid through the fittings is minimized.

9.0 HYDROSTATIC PRESSURE TEST

All fittings shall be leak tightness tested at 1.5x25 bars for a period of 15 minutes and no leakage is permitted. This test shall be performed on each size of the fittings.

10.0 PNEUMATIC PRESSURE TEST

All fittings shall be leak tested at 6 bars for a period of 10 seconds and no leakage is permitted.

11.0 MARKING

Each tube shall be embossed with BGL's logo, manufacturers name or trade mark EN 1254 Part I and designation of fittings.

Each packing containing fittings shall carry the following stamped or written in indelible ink.

a) Manufacturer's name or trade mark.

b) Designation of fittings.

c) Lots no.

d) Month and year of manufacture

12.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

13.0 INSPECTION / DOCUMENTS

i) Inspect shall be carried out as per B GL Technical Specification, relevant codes/standards and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.

ii) Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

iii) Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per BGL , technical Specification, at the time of final inspection of each supply lot of material.

iv) Even after third party inspection, BGL reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in BGL Technical specification, ten BGL reserves the rights to reject all production supplied from the batch.

v) Vendor shall prepare and submit the detail drawings of required copper fittings for approval by BGL /TECPL before starting production.

vi) For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date & place along with production schedule.

BHAGYANAGAR GAS LTD.

CITY GAS DISTRIBUTION PROJECT

PTS - GI PIPES

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Hyderabad. it supplies natural gas to domestic and commercial consumers in Hyderabad.

This present document covers the technical specification for the procurement of GI Pipes used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for GI pipes of heavy steel tube. Unless modified by this specification, requirements of IS 1239 (Part-I): 2004 (Latest edition) shall be valid.

2.0 DEFINITIONS

Owner	Shall mean Bhagyanagar Gas Ltd. (BGL).
Manufacturer	Means the Manufacturer of the GI pipe.
PTS	Means the present <<Particular Technical Specification>>and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by BGL.
GTS	Means the present <<General Technical Specification>> and its entire appendix, if any.

3.0 MATERIAL

The material used for the manufacturing of GI pipes confirming to IS 1239 (Part -1): 2004 (Latest edition).

4.0 DIMENSIONS, THICKNESS & DIMENSIONAL TOLERANCES

The dimensions & nominal mass of tubes shall be in accordance with Table 5 subject to the tolerances permitted in CL.8.1 & 9 of IS 1239 (Part-I) : 2004 (Latest edition). Length of each pipe shall be 6 mtrs with. + 6, - 0 mm tolerance.

Nominal Diameter DN	15 mm	20 mm	25 mm	40 mm	50 mm
Grade	Heavy	Heavy	Heavy	Heavy	Heavy
Outer Dia. (Max. / Min.)	21.8 mm / 21.0 mm	27.3 mm / 26.5 mm	34.2 mm / 33.3 mm	47.9 mm / 48.8 mm	60.8 mm / 59.7 mm
Thickness (mm)	3.2	3.2	4.00	4.00	4.5
Nominal weight (Kg / m)	1.44	1.87	2.93	4.37	6.19

5.0 END CONNECTION OF PIPE

GI Pipes shall be supplied with plain end.

6.0 FREEDOM FROM DEFECTS

On visual examination the outside & inside surfaces of pipes shall be smooth & free from defects such as cracks etc.

7.0 GALVANIZING

i. Pipes shall be galvanized to meet the requirement of IS: 4736 – 1986 with latest amendment.

ii. Zinc conforming to any grade specified in IS: 13229- 1991 with latest amendment shall be used for the purpose of galvanizing.

iii. Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.

iv. Mass of zinc coating: Minimum mass of zinc coating determined as per IS: 6745 shall be 360 gms/m^2

v. Uniformity of galvanized coating: The galvanized coating when determined on a 100 mm long test piece in accordance with IS 2633: 1986 with latest amendment shall withstand 5 one – minute dips.

vi. Freedom from defect: The zinc coating on internal & external surfaces shall be uniform adhered, reasonably smooth & free from such imperfections as flux, ash & drop inclusions, bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits & blisters. Rejection & acceptance for these defects shall be as per Appendix - A of IS 2629: 1985 with latest amendments.

vii. Samplings

a) All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be IS: 4711 1995 with latest amendment.

b) The sample selected according to Clause 6.1 & 6.2 of IS: 4736 – latest edition.

c) The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 5.1 of IS: 4736 – 1986 with latest amendment.

d) Criteria for conformity: As per IS: 4736 – 1986 with latest amendments.

8.0 PRESSURE TEST

Hydrostatic pressure test shall be carried out at a pressure of 5 Mpa for the duration of at least 3 second and shall not show any leakage in the pipe. Vendor to submit the internal pressure test certificate for the same. Owner Representative or Third party Inspection Agency appointed by Owner shall witness finish goods testing as per the sample procedure specified in IS: 1239 (Part-1) – latest edition.

9.0 MARKING

Each pipe shall be embossed with BGL's logo, manufacturer's name or trademark, size designation, class of pipe at the interval of not more than 1 meters.

Each packing containing pipes shall carry the following embossed, stamped or written by indelible ink.

a) Manufacturers name or trademark.

b) Class of pipe – Heavy

c) Indian standard mark (ISI)

d) Lot number / Batch no. of production

Each pipe conforming to this standard shall also be marked with BIS standard mark.

10.0 INSPECTION / DOCUMENTS

Inspection shall be carried out as per Owner Technical Specification.

Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

The manufacturer shall have a valid license to use ISI monogram for manufacturing of pipe in accordance with the requirement of IS:1239.

Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / inspection reports as per Owner Tech. Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

For any control, test or examination required under the supervision of TPIA/Owner/Owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date and place along with production schedule.

Even after third party inspection, Owner reserves the right to select a sample of pipes randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the right to reject all production supplied from the batch.

11.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

BHAGYANAGAR GAS LIMITED

CITY GAS DISTRIBUTION PROJECT

PTS – POWDER COATING

TABLE OF CONTENTS

1.0 INTRODUCTION

BHAGYANAGAR GAS LTD. (BGL) provides service support to existing customers spread over Hyderabad. It supplies natural gas to domestic and commercial consumers in Hyderabad.
This present document covers the technical specification for the Powder Coating of GI Pipes used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which needs to be fulfilled.

This specification covers the requirements of powder coatings for GI pipes of heavy steel tube. Unless modified by this specification, requirements of IS 13871: 1993 (Latest edition) shall be valid.

2.0 SPECIFICATION

Powder Material : Pure Polyester

Application : Electrostatic Spraying (40-90 KV Manual Automatic)

Backing Schedule : 180□□C to 200□□C for 10 MM (Metal Temp.)

Coating Thickness: 60- 70 Microns

3.0 TESTING

Film Type	Glossy / Satin
Gloss 60 º (ASTM D-523-60)	86 – 95%
Cross Hatch Adhesion (ASTM D-5870)	GT = 0/100
Cylindrical bending Test (ASTM D 522) 5 mm Rod dia	Passes
Enrichsen Cuppinng (min)	8 Passes
Pencil Hardness (min)	2H
Scratch Resistance (Kg Min)	3
Impact Resistance	Direct 150
Kg. Min (ASTM D-2794)	Indirect 150
Salt Spray Resistance ASTM B-117)	1000 hrs (min)
Porosity (DIN-53161)	Passes
Humidity Resistance (ASTM D-2247)	1000 Hrs (min)
Weathering Gloss retention after 1000 Hrs (sun test with water immersion, Xenon 150 K.lux)	60 – 70%
Colour	Canary Yellow

4.0 INSPECTION

Inspection shall be carried out as per Owner Technical Specification.

Owner Representative or BGL approved Third Party Inspection Agency appointed by Owner/ vendor shall carry out stage wise inspection during manufacturing / final inspection.

The manufacturer shall have a valid license for Powder coatings of pipe in accordance with the requirement of IS:13871.

Vendor shall furnish all the material test certificates, proof of approval / licence from specified authority as per specified standard, if relevant, internal test / inspection reports as per Owner Tech. Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

For any control, test or examination required under the supervision of TPIA/Owner/Owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date and place along with production schedule.

Even after third party inspection, Owner reserves the right to select a sample of pipes randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the right to reject all production supplied from the batch.

BHAGYANAGAR GAS LIMITED

CITY GAS DISTRIBUTION PROJECT

HEALTH, SAFETY AND ENVIRONMENTAL ASPECTS

1.0 HEALTH, SAFETY AND ENVIRONMENTAL ASPECTS (HSE)

1.1 Scope / General Specific to the Bidder

1.1.1 This specification establishes the Health, Safety and Environment (HSE) management requirement to be complied with by the BIDDER throughout the tenure of the contract by stipulating the relevant Act(s) / legislations and technical specifications.

1.1.2 The safety policy and guideline is prepared to direct & appraise BIDDER's personnel about the safety aspects involve in the job. The document deals with basic rules to be followed therein. However, BIDDER shall comply the HSE plan that addresses the HSE risks specific through mobilization, execution and demobilization at each location, where the work to be performed (Office, Factory, Fabrication Yard, Construction Site, inside the House, Kitchen (customer premises), Vessel, etc.), and the management of controls to eliminate / reduce or mitigate these risks.

1.1.3 OWNER reserves the right at all the time to audit and review the BIDDER's facilities, services, and / or performance of its activities in respect to the compliance of his HSE plan.

1.1.4 OWNER reserves the right to suspend the work or any part thereof, if BIDDER does not comply with HSE policy. Before any work is suspended OWNER shall liaise with BIDDER to allow him the opportunity to rectify any non-conformances within an acceptable timescale. BIDDER may at any time suspend the work for HSE reasons; in such event, however, he shall immediately inform OWNER in writing of those reasons, and details of actions taken.

1.1.5 Leadership & Accountability

a. It is OWNER's policy to protect the health, safety and security of its employees, to minimize the risk to the public from them and to protect the natural environment. BIDDER shall ensure that all his employees are briefed in, understood and strictly adhere to the OWNER's policies and directives on Health, Safety and Environmental aspects.

b. BIDDER shall demonstrate leadership and commitment through actively participating in all aspects of HSE, supporting open dialogue and by allocating sufficient resources.

c. BIDDER shall ensure that HSE responsibilities, authorities, accountabilities and competencies are clearly defined, documented, communicated and exercised at all levels.

d. BIDDER shall ensure that individual and team contributions to HSE performance are recognized and considered during performance appraisals. Also, shall set clear goals, objectives and targets and performance are evaluated against them.

1.1.6 Organization, Responsibilities, Resources and Documentation

a. Organization

BIDDER shall provide sufficient and appropriate manpower and supervision in his organization; with clear responsibilities and reporting structure to ensure that HSE performance is not compromised.

b. Employee Orientation Program

i. BIDDER shall provide, for all his personnel involved in the work, an orientation training program to the site and all requirements of the HSE plan.

ii. BIDDER shall ensure that no individual works unless he has been fully inducted.

c. HSE Competence Requirements

BIDDER shall ensure that his personnel are;

i. Medically, physically and mentally fit to carry out the duties to which they are assigned in respect of the work.

ii. Aged eighteen years or above.

iii. Technically competent and experienced in the tasks assigned to them.

d. HSE Training

BIDDER shall be responsible for, and implement, competency based HSE training of his personnel as may be organized / advised from time to time.

e. HSE Promotion and Awareness

BIDDER shall establish a mechanism for communication and feedback of HSE issues and performance among his personnel on the site and to OWNER's representatives.

f. Sub-Contractors

BIDDER shall ensure that all his sub-contractors, if any, receive a copy of, and comply with the requirements of the HSE plan and are provided with a copy of this document.

g. HSE Communication

i. BIDDER, where applicable, ensure before commencing operations pursuant to the contract that all companies, organizations and communities that could potentially be affected by such operations have been notified. At the work site, BIDDER shall also ensure that effective toolbox talks are undertaken.

ii. Where applicable, BIDDER's arrangement for emergency communications shall be integrated with the requirements of the work.

h. HSE Meetings Program

BIDDER shall establish an effective structure and schedule for HSE meetings involving all personnel assigned to the work, to promote communication and involvement in HSE matters.

i. HSE Legislation

BIDDER shall comply with, and shall be able to demonstrate compliance with;

i. Relevant and applicable Health, Safety, Environmental legislation for all places, where work is performed,

ii. OWNER's Policy, Procedures and Standards,

iii. BIDDER's corporate and project specific policies and procedures.

1.1.7 Evaluation & Risk Management

a. BIDDER shall ensure that, for all activities, a documented risk assessment procedure and risk register is in place and operating. This risk assessment procedure shall be suitable and sufficient to appropriately assess the health, safety and environmental risks involved. A copy shall be issued to the OWNER.

b. BIDDER shall be responsible for ensuring timely delivery of the risk assessment of all activities, covered in the scope of work, in order to meet the work schedule, the OWNER HSE plan and regulatory requirements.

1.1.8 Planning & Procedures

a. HSE Procedures

i. BIDDER shall provide written HSE procedures to cover hazardous operations. Method statements in case of major erection, construction and O&M work to be prepared in advance and approval obtained from the Owner or Owner Representative. These will be available to all personnel in their working language. A copy shall be provided to the OWNER.

ii. BIDDER shall abide by the OWNER permit to work system at sites.

b. Emergency Response Procedures

i. BIDDER shall be responsible for the establishment and implementation of emergency procedures related to the work. BIDDER shall consult with OWNER to ensure appropriate interface with the procedures.

ii. BIDDER shall submit OWNER, within 30 days from the date of commencement of contract, the details of its provisions and procedures for proposed actions in the event of;

An incident involving serious injury or death to any member of the team.

A major incident involving third party equipment.

Any release of chemicals or hydrocarbons to the local environment.

iii. BIDDER shall ensure competency of his personnel in its emergency response procedures through a programme of drills and testing and shall submit the report to OWNER.

iv. BIDDER shall participate in an emergency response exercise, whenever required.

c. Equipment & Inspection

OWNER shall at any time during the tenure of the contract conduct the audit for all the tools, appliances, machines, vehicles, equipments, etc…for their safe working condition includes documents. Also, BIDDER shall ensure that they should be used only by authorized and competent persons and inspected periodically.

d. Environment

i. BIDDER shall protect environmental resources by applying best available techniques not entailing excessive cost, to preferably eliminate or minimize any direct or indirect impact from operations.

ii. BIDDER shall ensure that all activities are planned in a manner that will not create unnecessary danger, disturbance or effects on the environment or to other users.

iii. BIDDER shall minimize nuisance, disturbance or interference to the community, their activities, and other users of the environment.

iv. BIDDER shall unless otherwise directed by OWNER, avoid conducting activities in protected areas or where there is an unacceptable risk of damage to sensitive environmental resources.

v. BIDDER shall ensure that fishing, hunting and gathering of flora and fauna or any other environmental resources are strictly prohibited within the area impacted by the work.

vi. BIDDER shall where applicable be responsible for restoration of any land used or affected by BIDDER's activities under the Contract (Restoration of top soil in case of major excavation jobs is a must). This will include removal of BIDDER's equipment, surplus materials and waste to the satisfaction of OWNER's representative.

vii. BIDDER shall coordinate & carry out the disposal of any waste produced or occurring as a consequence of its operations pursuant to the contract, all such disposals shall be in accordance with all legislation, OWNER's norms and best practices, whether that shall be for hazardous waste or non-hazardous waste. BIDDER shall ensure that all necessary approvals or licenses are obtained and that any subcontractors utilized for this purpose fully comply with such requirements. BIDDER shall record & provide OWNER with a copy of each waste transfer / disposal report / note.

viii. BIDDER shall prepare & notify OWNER in writing of the method for managing disposal of all hazardous waste and gain approval therefore before commencing such disposal. The water de-watered from the valve pits shall not be discharged hitherto and thitherto. Used transformer oil shall be collected in a container and submitted to OWNER's stores.

1.1.9 Implementation & Performance Monitoring

a. General

i. BIDDER shall establish an HSE performance monitoring programme and provide reports as per MIS to OWNER.

ii. BIDDER shall report all incidents in accordance with the requirements.

iii. BIDDER shall provide a report of fatal accident, Lost Time Injuries (LTI), Restricted Work Day Cases (RWDC), Medical Treatment Cases (MTC), Medical Evacuations, First Aid Cases (FAC), Near Miss Reports and Frequency of Hazardous Occurrence (numbers of hazardous situations without details) for the entire work, if required by OWNER from time to time.

iv. We shall, where applicable, maintain a waste / disposal log book.

b. Incident Investigation

i. BIDDER shall interface with OWNER's Incident Investigation and Reporting requirements.

ii. BIDDER shall document and report immediately to OWNER for any incidents or event, which could have led to environmental damage, uncontrolled release or hydrocarbons, breaches or potential breaches of environmental regulations or complaint from local groups, organizations including enforcement agencies or individuals.

1.1.10 Auditing & Review

a. BIDDER shall establish a schedule for HSE audit / inspection for its activities & submit to OWNER.

b. BIDDER shall provide all input and support as OWNER deems necessary to ensure all HSE activities that OWNER's initiates are successfully carried out and the actions arising are closed out to OWNER's satisfaction. OWNER's personnel shall be available for interview as part of audits and reviews.

c. Before commencement of the work, OWNER may conduct an audit to satisfy itself of BIDDER's arrangements regarding Health, Safety and environmental aspects. BIDDER shall co-operate fully with the audit team and rectify / correct any agreed deficiency observed without undue delay and in any event before work commences.

d. BIDDER shall submit / provide a report on HSE performance during the contract, as part of the contract close-out documentation.

1.2 Instructions / Guidelines

Following recommended safe practices / instructions should be observed when performing operations and maintenance activities;

1.2.1 Work Permit / Cold Permit

Prior to starting the work, BIDDER must have a valid work permit;

i. Either in the form of an order or work assignment supplemented by written work permits of the OWNER for operations in natural gas stations /site.

ii. Or in the form of an order or work assignment for work at or in the vicinity of existing installations and pressurized pipelines, which are not located in natural gas stations.

iii. OWNER's work permit must be issued / obtained for a well-defined working area and to be requested prior to commencing the work. All special instructions stipulated in the permits must be strictly observed.

Carrying out work without a valid work permit or outside the working area as described in the permit will be considered as a serious breach of the safety rules.

1.2.2 Fire Permit / Hot Permit

Prior to starting work with a naked flame, BIDDER must ensure, if Fire / Hot work permit in areas, where the risks of fire and explosion cannot be ruled out / likely hood or having severe consequences;

a. Either in the form of a written fire permit issued by the OWNER for work with a naked flame in operational natural gas stations / sites.

b. Or in the form of continuous supervision by OWNER's representative for work with a naked flame at or in the vicinity of an underground pressurized gas pipeline / station.

c. Prior to obtaining a fire permit, BIDDER must have at least a valid work permit.

d. Work with a naked flame is defined as,

i. All welding, grinding and cutting work by electrical or thermal means. All work with burners for, among other things, cladding or pre-heating of welds.

ii. All work with electrical hand tools which are not explosion-proof.

iii. In general, all work whereby a naked flame or a spark may be created.

iv. All machines or vehicles with an internal combustion engine.

v. OWNER's fire work permits are issued for a clearly defined working area and must be requested and renewed daily. All particular instructions stipulated in the permit must be strictly followed.

vi. The issuance of a fire work permit does not preclude the need for a ban on smoking.

vii. Performance of work with a naked flame without a valid fire permit or outside the working area as described in the permit will be considered as a serious breach of the safety rules.

viii. BIDDER must in all cases install essential and suitable fire-fighting equipment in the immediate vicinity of the works, when work with a naked flame is being carried out.

1.2.3 Ban On Alcohol And Drugs

Employees must not bring on to site or consume any liquid substance containing narcotics substances or alcohol beverages between the hours of starting and finishing work and must not drive a company vehicle, if affected by alcohol or drugs. A total ban on alcoholic beverages and drugs applies on all sites belonging to OWNER. Non-observance of the ban on alcohol & drugs shall be considered as serious breach of safety rules and will result in the immediate expulsion of the person enlisted from their job.

1.2.4 Ban On Smoking

Smoking is prohibited at any of OWNER's facilities or vehicles. Smoking is also prohibited within a work site (i.e. within public warning signs), including the right of way. Specific site conditions and rules must be always observed and due recognition given to any gas leak. Non-observance of the ban on smoking at work site shall be considered as serious breach of safety rules.

1.2.5 Speed Limits For Vehicle On / Near Worksite

As per statutory / Safety requirement.

1.2.6 Safety Torches

Only approved / fire proof / intrinsically safe torches shall be used for pipeline patrolling / gas leakage survey / any operation & maintenance related activities.

1.2.7 Two-Way Radios / Wireless Phones

Two-way Radios should be left turned on during all normal operations. However, if there is a significant gas leak in the vicinity, the user shall remove the radio to a safe location.

Note: intrinsically safe walkie-talkies can be used within stations.

Mobile Phones **shall not be used** within the Stations or within the vicinity of a live gas operation.

1.2.8 Incidents / Accidents

a. All accidents involving injury to a person or damage to property must be reported immediately to the OWNER's representative, within specified time limits / norms.

b. Incidents involving an unusual occurrence, failure of a procedure or equipment must also be reported. Any apparent fault in a safety system or equipment must be reported even if the incident was not considered significant at that time.

1.2.9 Checking For Leaks

a. Checking for leaks may only be carried out visually, by use of a gas detector or with soapy water. **Naked flames must never be used / allowed to locate gas leaks**. The natural gas in the transmission pipeline / system does not contain odorant and can therefore not be detected by smell.

b. Before removing plugs, caps or blind flanges from vents, drains and other connections, etc…, ensure all necessary valves are closed.

c. Care must be taken when removing plugs or caps from vents, drains and other connections, etc..., in case there is a build-up of pressure behind it.

1.2.10 Precautions To Be Taken Before Gas Venting

a. Before venting of gas from a section, the isolation of the section should be confirmed and the all isolation valves involved should be greased and roused to prevent minor passing of the valve.

b. Ensure that no source of ignition like overhead live electrical cables, sparks, etc…are not present at least within 15 Mtrs. radius. Depressurizing should be confirmed by opening another vent (if any) or pressure gauge, if fitted. No smoking or open flame should be ensured in vicinity of the nearby area.

c. The vent pipe should be of proper length (minimum 3 Mtrs.) for the protection to person operating valves in the chamber and for easy dissipation. Wind direction & velocity should be ensured & monitored continuously.

d. Venting area should be cordoned off and person with adequate PPE's (Methnometer / Pulsecometer) should be posted at the cordoned boundary in down wind direction to monitor the percentage of methane in the atmosphere, which should not concentrate as per specified limit / range or increase more than 2.0%. If indicates more than 2.0 % then venting should be stopped intermittently to give more time for gas dispersion.

e. Gas venting should be stopped intermittently when the vehicle passes near the spot, while venting operation is being done on traffic roads.

f. Whenever NG is required to be vented, the venting shall be done in a controlled manner as specified by the engineer in-charge to ensure minimal release of the gas to the atmosphere.

1.2.11 Human Failures

The major factors of human failures reasonable for an accident are the following;

a. NEGATIVE OR INDIFFERENT ATTITUDE: This is the neglect or carelessness by a person towards considering and eliminating all major and minor factors leading to an unsafe condition or unsafe act. The negative or different attitude of a person may be the result of overconfidence & lack of safety awareness.

b. LACK OF SKILL: If a person doing a job is not having the required skill for performing that job; it can be lead to an accident. Hence selecting the best skilled person for particular job is a must.

c. LACK OF KNOWLEDGE: the person doing a job is expected to have enough knowledge of the job and safe condition to be preserved while performing that job.

1.2.12 Bypassing Safety Equipment

No person shall interfere with, remove, displace or render ineffective any safeguard, safety device, personal protective equipment or any other appliance provided for health and safety purposes, except when necessary as part of an approved maintenance or repair procedure.

1.3 Protective Measures

Personnel performing any gas or health hazardous operation must wear Safety Helmets, Safety / Gum Shoes, Approved Clothing, Protective Footwear and Safety Goggles, Safety Harness, Ear Protection, Nose Masks, Hand Gloves, Breathing Apparatus, High visibility vest or reflective bands on coverall, Safety Guard / Belt / Fall Arrester, Face Shield, Special Equipment for Hazardous / Unusual activity, etc…in adequate numbers & suitably. Personnel must observe the safety rules for on-site and off-site operations as well.

1.3.1 Ignition Sources

Match boxes, cigarette lighters, calculators, cameras or other sparking devices must not be carried on for all facilities (refer Table - 1 given below);

TABLE – 1

SOURCES OF IGNITION

Sr. No.	Ignition Source	Precautions
1.	Internal combustion engines of buses, cars, tractors, digging and combustion equipment, portable pumps, generators, welding equipment, etc…	Only diesel powered internal combustion equipment to be used in the vicinity of an escape of gas and the following precautions are recommended; Fit a spark arrestor to the engine exhaust. Do not operate the engine starter in a gaseous atmosphere. **Generally, vehicles should not be taken near to**
2.	Passing motorists or pedestrians carelessly throwing lighted matches boxes, cigars or cigarettes into the work area, and pedestrians smoking in the work area	Properly display warning signs and place barricades around the work area to prevent such an occurrence. If necessary divert traffic and / or place a watchman to warn pedestrians against smoking in the area.
3.	Cigarettes, cigars, pipes, match, open fires	Do not allow smoking, match boxes, cigarette lighters and open fire, in the hazardous work area.
4.	Sparks from hand tools, removal of manhole covers, etc…	Work carefully, removing sources of such sparking (stone, paving blocks, etc...) from the work area as job progresses. Use proper tools when removing manhole covers. Use tools carefully to avoid glancing blows on minerals and concrete. Area to be dampened and maintained damp. Grinders and friction cutting tools shall not
5.	Sparks from electrical switches, relays, telephones, electric motors, power generation, cameras, and calculators, mobile phones	In potentially explosive atmosphere, do not operate any electrical device. If a switch is on do not switch off, unless there is no other quick means of isolating a sparking device such as an electric
6.	Stray electrical currents on main or service when damaged of cut ends of pipe are separated	Never cut or separate ends of pipe unless proper bonding is done with jumper leads across the point of separation.
7.	Static electricity	Where gas is escaping from a plastic pipe, wet down the plastic pipe and surrounding work area. Discharge static charge by grounding metal main on service pipe. Discharge the static charge on the person by touching an earlier state, or alternatively provide protection by wearing rubber gloves. Avoid impingement of gas stream on clothing.
8.	Traffic lighting control boxes, power cables, railway and telephone cables, etc…	Request appropriate authority to temporarily disconnect, or shut down, if these structures are causing a hazardous situation.
9.	Appliance pilot lights	Shut off service valves.
10.	Welding torches, arc welding, and heater torch	This equipment is not to be used until the area has been declared safe.

11.	Lighting, lanterns, flashing lights	Only suitable equipment should be used in a hazardous area.
12.	Other potential ignition sources inside structures, building, and confined areas	Request appropriate Authority to temporarily disconnect or shut down, and take other action as necessary.

1.4 First Aid

1.4.1 Information Support Services / Hospitals / Doctors / First Aid

a. BIDDER must include in his HSE plan a detailed list with the particulars of the eye specialists, general practitioners and hospitals nearest to the site.

b. Prior to the start of the work, BIDDER must agree with these persons and services on the fastest ways to treat emergency cases.

c. At least one competent first aider must be available at site. This person must be easily accessible through an efficient communication channel of which the particulars are included in the list of support services.

d. All OWNER's / BIDDER's vehicles and worksites shall be provided with a first-aid kit. The kits are to be kept clean and properly stocked as per the prescription and nature of business at BIDDER's cost / risk. A record must be kept of all injuries, no matter, how minor. All injuries must be reported to the OWNER's representative without delay.

e. The contractor shall provide the first aid box at all the sites. The content of the first aid box shall include the following items:

a. Twenty-four small sterilized dressings.
b. Twelve medium size sterilized dressings.
c. Twelve large size sterilized dressings.
d. Twelve large size sterilized burn dressings.
e. Twelve (15 gin) packets of sterilized cotton wool.
f. One (200 ml) bottle of certified solution (1 per cent) or a suitable antiseptic solution.
g. One (200 ml) bottle of mercurochrome (2 per cent) solution in water. (viii) One (200 ml) bottle of sal-volatile having the dose and mode of administration indicated on the label.
h. One pair of scissors
i. One roll of adhesive plaster (6 cm x 1 in).
j. Two rolls of adhesive plaster (2 cm. x 1 in).
k. Twelve pieces of sterilized eye pads in separate sealed packets.
l. One polythene wash bottle (500 cc) for washing eyes.
m. Twelve roller bandages 10 cm. wide.
n. Twelve roller bandages 5 cm wide.
o. Six triangular bandages.
p. One tourniquet.
q. A supply of suitable splints.
r. Two packets of safety pins.
s. Kidney tray.
t. One copy of first-aid leaflet issued by the Directorate General of Factory Advice Service and Labour Institutes, Government of India, Bombay.

All the content shall be kept in clearly marked and easy to remove cartons stored in such a manner that there is no rattling or spilling over even when the container is being moved Whenever applicable the cartons shall bear instructions for use, dosage etc.

1.5 Fire Safety

a. BIDDER must ensure the installation and maintenance of adequate equipments, material and devices for fire-fighting. However, periodic refilling, testing & calibration of such equipments owned by OWNER shall be carried out at his cost & risk.

b. On each site, there must be sufficient fire-fighting equipment, both in the central construction site installations and on the site itself. Particularly in places, where work is being carried out with an increased fire hazard, such as welding and grinding work, cladding work or the use of inflammable products, particular attention must be given to installing fire-fighting equipment beforehand.

c. All fire-fighting equipment must be in good condition and must always bear a valid inspection stamp. Any fire-fighting equipment that fails to meet these conditions must be removed immediately from the site. The approval of fire-fighting equipment is to be renewed each year, unless otherwise indicated by the Recognized Inspection Organization.

d. All fire-fighting equipment must always be located at immediately accessible place in case of incident. The storage of material and equipment or the parking of vehicles or placing of installations in front of fire-fighting equipment is therefore strictly forbidden.

e. All vehicles shall be fitted with an approved (and regularly serviced) fire extinguisher. Fire extinguishers are located at OWNER's strategic points. All personnel must ensure that they have access to a suitable fire extinguisher before beginning an operation. All personnel must be familiar with the use / operation of fire fighting equipment. No vehicle must be allowed in vicinity of the hazardous area, and if so, suitable spark / flame arrester must be ensured.

f. In fire-hazard areas, all detonation sources must be avoided, unless, specifically agreed by OWNER and / or its representative, the use of radios, cameras and video cameras is expressly forbidden.

g. At the end of work, the site must be checked for possible fire-hazard situations.

h. BIDDER shall ensure that a trained fire fighting personnel is available at site.

1.6 Scaffoldings / Ladders

a. Before using any scaffoldings / ladders, BIDDER must submit a copy of the valid inspection certificate. Scaffoldings / ladders to be built on the site must be inspected by the Recognized Inspection Organization prior to use on the construction site and at the cost of the BIDDER. They must also be checked periodically in conformity with the prevailing regulations; a copy of the inspection report must be submitted to the OWNER without any remarks.

b. All scaffoldings must be checked by the BIDDER for their stability before they are used. At least once a week the scaffolding must be checked by a qualified representative of the BIDDER.

c. Mobile scaffoldings must be anchored before they can be used. Moving mobile scaffoldings is strictly forbidden if any persons, material or equipment are present on the scaffolding.

d. Scaffoldings must not be constructed in the vicinity of electrical installations, they must be properly earthed prior to use.

1.7 Construction / O&M Site

a. The construction site plan must be included in the HSE plan and must contain at least an overview of the access roads, traffic direction and parking lots and the location of utility pipelines, first-aid unit, stores, site offices, canteens and sanitary installations.

b. Such structures may only be installed on the construction site in accordance with the provisions of the construction site plan.

c. For storing large quantities of fuel, gas bottles and small hazardous waste, a permit must be obtained from the competent authorities.

d. BIDDER must place the legally provided health installations in conformity with the prevailing norms at the disposal of his personnel and maintain them daily. Meals may only be eaten in buildings specially provided for this purpose.

1.7.1 Warning Signs

Site must have a warning sign at entrances, exits and at any crossings with public, main / private roads, premises, stations, etc…, bearing the words "ENTRY STRICTLY PROHIBITED / RESTRICTED" or "NO ENTRY", "NO SMOKING", "ASSEMBLY POINTS", "NO PARKING", "WORK IN PROGRESS", "NO OPEN / NAKED FLAMES", etc…. Wherever practically possible, BIDDER must fence-off / cordon-off the site with a physical enclosure, where necessary with entrances that can be locked, such as at the natural gas stations / chambers / sites and isolation valve chambers.

1.7.2 Access Roads And Escape Roads

a. Construction site must be provided with a sufficient number of access roads and escape roads. Each physically enclosed site must have at least two diagonally opposed entrances and exits.

b. The access roads and escape roads must remain completely free and adequately accessible under all circumstances. Therefore, any storage of materials or parking of vehicles in these areas is strictly forbidden.

1.7.3 Means of Communication

Site must have sufficient means of communication to allow the OWNER and / or support services to be immediately informed in case of incident.

1.7.4 Lighting / Illumination

If works have to be carried out under circumstances of insufficient daylight, such as during overtime or in winter, BIDDER must furnish and maintain the required adequate lighting on the site in conformity with the prevailing legislation (Lighting should be intrinsically safe, flame proof type).

1.7.5 Stability of Equipment

All equipments such as site sheds, material containers, generators, distribution cabinets, dewatering pumps, welding machines, electrical equipments / installations, etc… must always be erected in such a way as to ensure maximum stability.

1.7.6 Noise Pollution of Equipment

a. All construction machines, including welding units, compressors and generators must comply with the prevailing enforced standards (db level monitoring) on measures to fight noise pollution caused by equipments / machines.

b. For this reason, in the vicinity of residential centres, machines will be used that are connected to the electrical mains.

1.7.7 Signposting and Pegging-Out

a. BIDDER must submit in his HSE plan a copy of the signposting plan approved by the local authorities.

b. Work may only start after following approval by the OWNER and / or its representative of the signposting plan and after installation of the signposts described in the plan.

c. BIDDER is responsible for the installation and the maintenance of these signposts throughout the duration of the works as well as for all damage and problems arising directly or indirectly from shortcomings in the signposting. The approval by the OWNER of the signposting plan does not in any way diminish the BIDDER's responsibility.

d. BIDDER must place a sign at each local signpost with the particulars of the person responsible who must be reachable 24 hours a day. This sign must be placed in the direction of traffic and preferably at the end of the working area.

1.7.8 Monitoring of Site

BIDDER must guarantee the monitoring of the construction site 24 hours a day in order to be able to intervene immediately and efficiently in any situation which may arise. During pipeline works, he must put together an emergency team and keep them at the ready with sufficient resources / material to be able to attend any emergency / problems.

1.7.9 Tool Box Talks.

Contractor's Site Supervisor for specific work location shall conduct a tool box at the commencement of work on daily basis. If different team is working in different area, separate tool box talk covering location and hazard involved shall be carried out.

Each toolbox meeting shall cover the following agenda:

a. Discuss safety issues of previous day

b. Brief description of activities planned for the day & associated hazard

c. Information & resources required to put controls in place

d. Location specific hazard and instructions

e. Requirement of PPEs

It is the responsibility of supervisor to convey PPE requirement to all workers and ensure compliance of the same and shall be checked during tool box talk before embarking on work.

Tool box talk report shall be prepared and kept at site within one hour of talk and it must be signed by all attendee to ensure participation of all in the talk. Tool box report shall be submitted to CONSULTANT/ OWNER

1.7.10 Personnel Protective Equipments

The contractors shall provide sufficient numbers of following personnel protective equipments (PPEs) to workmen and supervisors/engineers to use them properly at work site.

Following five numbers of Personnel protective equipments are identified as MANDATORY for all.

- Safety Helmet
- Coverall
- Safety shoes/footwear
- Safety Glasses
- Hand Gloves (as per job requirement)

Other PPEs shall be as per job requirement like

Work at height- Full body harness with Life line/rope (Petzl, Sparrow, Karam or equivalent make), Safety Net, scaffolding etc.

Arc Welding – Welding face shield

Grinding – Grinding face shield

Height work – Full Body harness (above 1.5 meters)

Contractor to ensure proper use and selection of protective clothing / equipment for specialized jobs

PPE's to be used shall be as per following Specification:

IS : 2925 – 1984	:	Industrial Safety Helmets.

IS : 4770 – 1968	:	Rubber gloves for electrical purposes
IS : 6994 – 1973 (Part – I)	:	Industrial Safety Gloves (Leather & Cotton)
IS : 1989 – 1986 (Part – I & III)	:	Leather safety boots and shoes
IS : 3738 – 1975	:	Rubber knee boots
IS : 5557 – 1969	:	Industrial and Safety rubber knee boots
IS : 6519 – 1971	:	Code of practice for selection, care and repair of Safety footwear
IS : 11226 – 1985	:	Leather Safety footwear having direct moulding sole
IS : 5983 – 1978	:	Eye protectors
IS : 9167 – 1979	:	Ear protectors.
IS : 3521 – 1983	:	Industrial Safety belts and harness

1.7.11 HSE Requirements at site

- Contractor may conduct survey to assess the requirement of GI riser.
  For Work at Height: Contractor shall provide PETZL, Sparrow, Karam or equivalent system/metallic scaffolding as a working platform and full body harness with self locking arrangement. Full body harness with self locking arrangement shall be used for ascending/descending/work rest.

  PETZL system, Sparrow, Karam or equivalent system/ metallic scaffold should comply with relevant IS/EN/BS standard.

  Only certified trained plumber undergone practical training on work at height shall be deployed.

  Any working at height related activities has to be carried out with Permit system.

1.7.12 Work at Height

Working at Height is performing work at height where workers can fall 1.5m or more from where they stand or sit to perform work. This includes gaining access to working at height if there is a risk of falling 1.5m or more.

Examples of Working at Height are:

a. Working on temporary platform more than 1.5m high

b. Working on top of vehicles/tankers or building more than 1.5 m high

c. Risk of Working at Height
d. Fall from height

e. Falling objects

Safety net, fall arrest system and two lanyard full body harness when working at height

While working at height, all loose tools shall be kept inside a container and good housekeeping shall be maintained.

All Working at Height shall comply with Working at Height Procedures

1.7.13 Safety Net System

"Safety net systems" Safety net systems and their use shall comply with the following provisions:

Safety nets shall be installed as close as practicable under the walking/working surface on which workers are working, but in no case more than 30 feet (9.1 m) below such level. When nets are used on bridges or similar kind, the potential fall area from the walking/working surface to the net shall be unobstructed.

Vertical distance from working level to horizontal plan of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet
More than 5 feet up to 10 feet	10 feet.
More than 10 feet	13 feet

a. Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force.
b. Safety nets and safety net installations shall be drop-tested at the jobsite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. If drop test not possible designated competent person shall certify that the net and net installation is in compliance with the requirement by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the jobsite for inspection.
c. Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.

d. Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.
e. The maximum size of each safety net mesh opening shall not exceed 36 square inches (230 cm) nor be longer than 6 inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening.
f. Each safety net (or section of it) shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds (22.2 kN).
g. Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches (15 cm) apart.

1.7.14 Life Line/ Rope

Horizontal or vertical life line (of make Petzl, Sparrow, Karam or equivalent) shall be used while working on suspended platform or similar type of platform or working at the roof/edge

Horizontal/Vertical lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds (22.2 kN).

When vertical lifelines are used, each worker shall be attached to a separate lifeline.

1.7.15 Full Body Harness

Ensure that the full body harness (of make Petzl, Sparrow, Karam or equivalent) must be inspected prior to use.

Ensure that full body harness must be worn by the workmen while working at height.

Full body harness lanyard must be anchored with a strong member.

While climbing up or climbing down, one of the hooks of lanyard must be locked alternatively all the time.

1.7.16 Working Platform

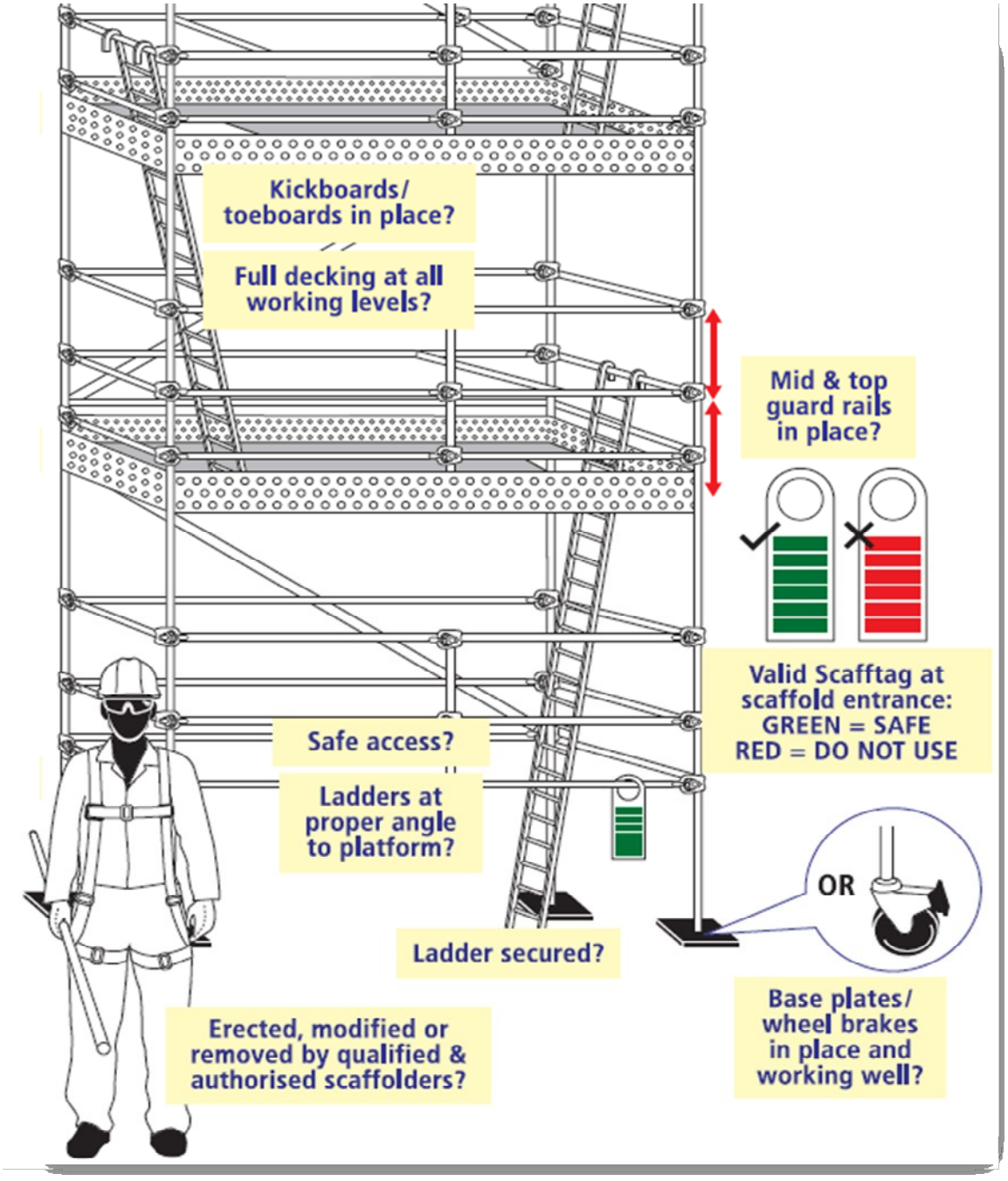
Every Working platform more than 1.5 mtr. High from which a person is likely to fall shall be of steel plates/planks/cage and shall be:

a. Closely boarded, planked or plated.
b. At least 700 mm wide if the platform is used as a footing only and not for the deposit/ keeping of materials.
c. At least 900 mm wide if the platform is used for the deposit of materials.
d. At least 1100 mm wide if the platform is used for the support of higher platform.

Two metal/planks shall not have 25 mm gap between them the distance between two consecutive transoms or other supports on which a platform rests shall be fixed with due regards to the anticipated load and the nature of platform flooring. As a general rule such transoms shall not be placed more than 1.0 mtr apart.

1.7.17 Scaffold

1.7.17.1 Scaffold Inspector (Project Field Officer)



This is the competent individual who shall inspect scaffolding prior to each use and perform full inspections as per the Inspection procedure. He will accept the Scaffold after ensuring the followings;

a. The scaffold erected complies with legislation.

b. The permissible loads per deck and the working distance between the scaffold and the work surface are examined.

c. Materials used for the scaffold are in a proper condition and in throughout the time it is in place.

d. Existence and proper installation of collective protective equipment and means of access.

e. Clear display of details of permissible loads on the scaffold.

f. Acceptance is carried out prior to the scaffold being made available for the first time and is repeated after any alterations. Inspection is repeated at the frequency of 7 days. Issue scaffold tag (Green Tag) before its first use **Scaffold Contractor**

g. This refers to the company involved in the installation (erection, dismantling and alteration) and/or design of the scaffolding on behalf of CONTRACTOR.

h. The erection contractor shall ensure that the scaffolding is erected in compliance with the OHSAS/IS standards. Worksite specifications and considerations shall be incorporated into any such plan.

i. Ensure availability of competent staff and certified material all the time.

j. Scaffolding may be erected, dismantled or altered only under the supervision of a competent individual who has received adequate specific training for the intended operations, specifically including the following:

k. Understanding the erection, dismantling and alteration plans for the scaffolding

   a. Ensure PPEs and Safety at work during erection, dismantling and alteration of the scaffolding.

   b. Measures designed to prevent the risk of falling persons and objects.

   c. Safety measures applicable in the event of a change in weather conditions.

   d. Permissible structural load criteria.

   e. Any other risk that may be entailed by erection, dismantling and alteration operations.

   f. Scaffold material: Safe handling, and storage.

1.7.17.2 Scaffold User

i. The User shall ensure that acceptance of the scaffold has been properly carried out; green Tag is issued and provide notification of any alterations. Work from tagged scaffolds only. Comply with special conditions/additional controls noted on the access tag.
ii. It shall observe all restrictions on use (particularly permissible loads). Its requirements should be taken into consideration in the specifications during erection.
iii. Use scaffolds only for their intended purpose.
iv. Do not use unstable objects or makeshift devices to increase the working height of the scaffolds.
v. Use portable ladders as a means of increasing the working height only after the competent person has determined that the stability of the structure has not been compromised, and adequate fall protection is in place.
vi. Do not straddles, stand on, or work outside of the guardrail.
vii. Use designed access means to descend or ascend a scaffold (stairs, attached ladder, or specially designed end frames). Do not uses cross bracing or side rail

viii. Keep only the tools and materials on the platform that are necessary to perform the task. Control all slipping and tripping hazards by removing or securing the tools/materials.
ix. Do not modify or remove a scaffold system/component or status tag.
x. Notify supervision immediately if a scaffold is damaged, weakened, or otherwise deficient.
xi. Scaffold users/ Scaffold erectors shall use IS and EN standard double lanyard safety harness with absorbent.

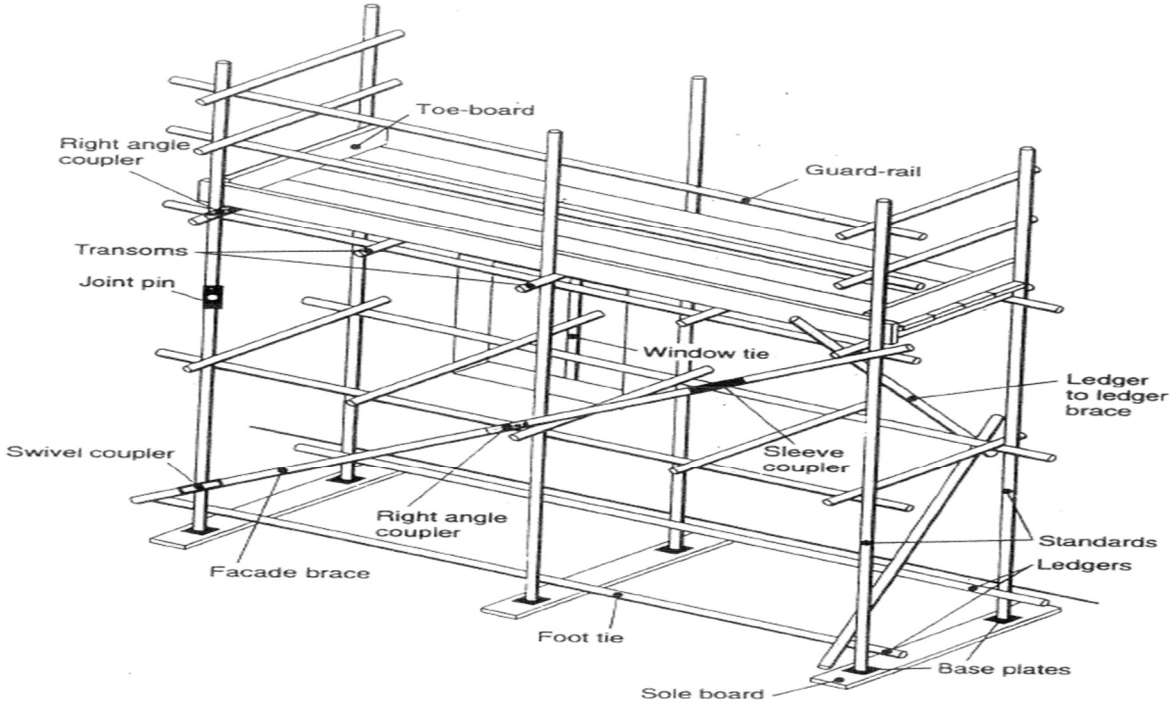
1.7.17.3 Inspection Points

To ensure the integrity and proper installation of scaffolding, a certain number of points shall be inspected. Inspection of these points ensures a basic level of safety. Following fundamental inspection points are as follows:

- Environment and location
- Supports and soleplates
- Structure and posts
- Decks
- Scaffold Capacity Standards
- Working levels
- Access
- Signs and signage

1.7.17.4 Mobile Scaffolding

a. Mobile scaffolds are identical in design to fixed scaffolds, except that their tubular structure is lighter and in terms of support, the wheels do not offer the same load-bearing area as footplates on fixed scaffolds.
b. Erection is simple and shall be carried out using personal protective equipment. Lastly, during erection, dismantling and use, the brakes shall also be applied. Care should be taken to ensure that mobile scaffolds are installed on flat surfaces.
c. Mobile scaffolds are highly practical for short jobs at relatively low heights.
d. Acceptance is carried out after erection has been completed.
e. They are moved as the work being carried out progresses.
f. No fresh acceptance is required after each move, but the workstation shall be verified (working distance, brakes applied)
g. A freestanding scaffold shall be considered safe when the total height is equal to or less than four times the minimum or least base dimension.
h. Rules for use
i. Do not extend the base to increase the height.
j. Brace each frame level as per the manufacturer's instructions.
k. Do not raise work surfaces by placing decks on rails or mid rails.
l. Do not climb on the guardrails or other structural components.
m. Observe the manufacturer's guidelines governing the installation of brackets, material hoists, etc.
n. Stay clear of power lines and observe safety distances. (If any)



1.7.17.5 Scaffold Safety

The following safety tips are as guidelines in avoiding job-site situations that could prove dangerous to scaffold workmen.

a. The Scaffold to the Building: Scaffolding should be tied to the structure using heavy wire or tie-in devices. The first vertical tie should be at the maximum height of 4 times the narrowest base dimension. Additional ties are not to exceed 26 feet vertically. Maximum horizontal distance between ties is not to exceed 30 feet.
b. Don't Overload Scaffolding: Follow the safe load capacities as given by the scaffold manufacturer. There's a limit even to what steel can support. A 4-to-1-safety factor must be figured on scaffolding.
c. Use Metal Catwalks, Platforms; where available. If wood plank is used, it must be scaffold grade or better. Inspect thoroughly before every job to make sure it is free from breaks, knots, and cracks or warp age. Decking should be full width.
d. All working platform must be constructed with the specific requirement of job.
e. If the working platform is not permanent then safety belt must be used.
f. There shall be firm foundation for all scaffoldings.
g. All scaffolding shall be made of sound material.
h. Scaffolding material shall be inspected and used, only if found in good condition.
i. Provide metal base plate is used under all upright or standard scaffoldings. Correct type of couplers shall be used for all connections.
j. Plumb and level scaffoldings as erection proceeds, so that braces will fit without forcing. Fasten all braces securely.
k. Working platforms shall be provided with guards. This should consist of top rail, mid rail, and toe board. The toe board shall be of minimum height 100 mm, while the mid rail and top rail shall be at heights of 600 mm and 1200 mm respectively.
l. Do not use ladders or makeshift devices on top of scaffoldings to increase the height.

m. Shall be placed at least 75 deg. to the floor.
n. Fall arrestor to be used where ever applicable.

The following safety tips are as guidelines in avoiding job-site situations that could prove dangerous to scaffold workmen.

a. Don't Ride Moving Scaffold; and remember scaffold units are limited in height to 4* times their narrowest base dimension (unless base is widened by outriggers, or more end frames; or tied into building.) Always keep casters locked. (except to re-spot)
b. Don't Climb Braces: Use the steps provided on most steel scaffolds to climb up to or down from work levels. Use scaffold climbing ladders where required.
c. Protect Working Levels: Use overhead canopies to protect workers on lower work levels when work is being done overhead. Rope off unsafe areas underneath scaffold or provide wire mesh around work area.
d. Use Double Guard Rails; and toe boards on exposed sides at platform heights of 1.8 meter or more.

1.7.17.6 Illustration of a Sample Independent Scaffold

1.7.18 Ladders

i. Fall protection is not needed when climbing up or down ladders less than 20 feet/6.1 meters, using 3 points of contacts.
ii. Portable ladders, steps and trestles should only be used for light duties of short duration. Otherwise, properly constructed means of access should be provided.
iii. Aluminum ladders can generate sparks when struck against rusty iron, so it must be used in Hazardous Areas with special care.
iv. Aluminum ladders must not be used in areas where they might be splashed with acids or alkalis; e.g. Utilities Area.
v. Ladders with metal reinforced, Damaged or rotten stiles, Missed footing on ladder rungs must not be used.
vi. Over-reaching and over-balancing is not allowed.
vii. Every time before use, the user will carry out inspection of ladder.
viii. If the work to be done necessitates the use of both hands, a safety belt must be used.
ix. Tools and materials must not be hand carried by persons ascending or descending ladders. Where applicable light tools should be carried in pockets, tool belts or shoulder bags, provided they do not impair movement and are held securely.
x. Rungs, stiles, or treads to be checked for bending, twisting or signs of abuse or undue wear.
xi. Feet to be fitted with various types of bases and in good order.
xii. Synthetic non-slip, wooden or metal.
xiii. Non-slip stair treads mats of stepladders, should be fitted and in good condition.
xiv. In case of moving ladders fitted with wheels, Hinges and locking devices to be secure and in good working order.
xv. All portable ladders must be in good condition as per the site norms.
xvi. Ladder shall extend 3' to 4' above the point of Landing and topmost 3 rungs shall not be used.
xvii. Ladder is checked visually for defects before every use.
xviii. Ladders shall not be used in a horizontal position as runways or scaffoldings.
xix. Ladders shall not be placed in front of a door that opens toward the ladder unless the door is locked, blocked or guarded.

1.7.19 User Ladder Safety Check List

The following check list specifies the main points to remember when using ladders:

a. Do not erect:
b. On sloping ground
c. On top of movable objects
d. In high a wind
e. Infront of a door which may be opened
f. Against a slippery or unstable surface
g. At a shallow angle, or use horizontally as a plank or bridge
h. Leaning to one side

1.7.20 Do not

i. Drop things from a ladder
ii. Straddle from the ladder to a nearby foothold
iii. Allow more than one person up a ladder at a time
iv. Use a ladder which is too short
v. Use a makeshift or 'home-made' ladder
vi. Over-reach (generally always keep hips within the stiles)
vii. Overload a ladder or support it with a plank bearing on a rung
viii. Slide down a ladder
ix. No ladder should be used if it has: A missing, loose or defective rung or tread
x. A defective stile side member
xi. A defective rope or associated fitting (rope operated extension ladders)
xii. Any sign of warping
xiii. Missing fastenings or rivets, guide or latching hooks
xiv. Always Return ladders to store as soon as they are finished with
xv. Inspect a ladder immediately after any fall or overload

1.7.21 Activities Allowed on Ladder

a. A ladder is considered to be suitable for access of personnel to an elevated area only. No significant works may be carried out from a ladder. In particular, activities such as those below may not be carried out on a ladder:
b. Carrying tools (other than those which might clip onto a tool belt) up to an elevated level.
c. Activities involving heavy manual labor.
d. Activities requiring reaching or stretching such that the body is no longer centered over the ladder.
e. For these types of jobs, a work platform such as a scaffold is required. The safe working position from a ladder is to have both thighs and hips within the styles.

1.7.22 Colour code and inspection

- Colour code of the year shall be painted on one style only and equal to one rung spacing.

1.7.23 Roof work

a. All roof-work operations should be pre-planned and properly supervised.
b. Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.

c. Work on roofs shouldn't be carried on in weather conditions that threaten the safety of workers.
d. Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.
e. Roofing brackets should fit the slope of the roof and be securely supported. Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.
f. On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.
g. All covers for openings in roofs should be of substantial construction and be secured in position
h. Roofs with a pitch of more than 10 should be treated as sloping.
i. When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured in position.
j. During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off the roof.
k. Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and
l. When spanning across the supports for the roof covering to support those workers.
m. A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

1.7.24 Electrical Safety

a. Only authorized electrical engineer / electricians are permitted to do the electrical work.
b. Do not use extension cords or electric hand tools with exposed wires.
c. To switch-off electrical supply in case of an emergency must be enabled at all times.
d. All temporary electrical installations carried out on the site must be in accordance with the local regulations and specifications.
e. The installations must be inspected regularly by a competent person (e.g. electrical engineer/supervisor) to ensure that they are in safe condition and working faultlessly.
f. Each electrical power tools and electrical equipment must be under protection of earth leakage/residual current protective device (ELCB/RCCB).
g. Portable power tools used on site must have protective insulation ("double insulation").
h. All electrical machines, tools and appliances must be inspected by a competent person (e.g. electrician) to ensure that all equipments are in safe condition and working faultlessly. To confirm that the inspection was conducted the equipment must be labelled or marked clearly and registered. The documentation must be submitted to TE for records.
i. Assume hat all circuits are live until they have been thoroughly checked and proven dead. Never work on a live circuit.
j. When using electrical equipment in an environment with electrical conductivity (e.g. in confined spaces like case pipes, containers, towers) the voltage used may at maximum be 24 Volt AC. (fed from a safety low voltage transformer)

k. Never use a fuse heavier than the capacity of the circuit. Also never attempt to bridge a fuse.

l. Never tamper with any electrical wiring or apparatus.

m. Do the cable laying as per standard specifications and requirement; do not lay down power cables adjacent to secondary cables of welding machine.

n. Assess overhead power line hazard and keep safe distance from it.

o. All electrical equipments, motors, transformers, welding machines, etc to be provided with earth connections.

1.7.25 Power & Hand Tool Operation

a. All portable tools are to be connected through control bus with ELCB.
b. All contractors should ensure proper Earthing of all electrical equipments used by them. Suitable earthing pits must be made if required.
c. Examine electric cable for defects before use.
d. Do not ever insert free ends of wires into sockets and hold them in place with matchsticks / other means. Always use industrial three pin plugs.
e. Check the RPM rating of grinding wheels. The RPM rating must be greater than or same to that of the driver. Wheel guard should be used in proper position before grinding. Also proper PPEs must be ensured (goggles & hand gloves).
f. Do not tie electric cords to metal rods or nails.
g. No cable should run under the ground. It must run overhead at a 2 m height to avoid pinch point and creating trip hazard
h. All tools and Tackles must be examined daily before commencing work and record to be maintained.
i. Defective tools are to return to store.
j. All electrical tools must be inspected at regular intervals by an authorized electrical person and record to be maintained.
k. The weight, size & type of tool should be selected to suit the job carried out.
l. The handles of tools should be intact and properly tightened. Split handles should be replaced. To avoid slippage, grease and oil should be wiped off.
m. Insulated and non-conducting tools shall be tested for electrical resistance.
n. Wrenches should not be pushed but pulled. Chisels struck by others should be held by tongs and not by hands.
o. Chipping should always be done away from self.
p. Hand tools should not be allowed to lie down on benches, scaffoldings etc. from where they can fall. They should be properly stored.

PPEs:

- Use of helmet, face shield or safety goggles (where face shield is not possible.) and hand gloves.

1.7.26 Use of Power Tools and Cables

a) All electrical equipment and tools used by the contractors and their employees shall be properly checked by contractor's supervisor before use.

b) All power tools must have proper guard at all time.

c) Leads /cables must be placed so that they do not create a tripping hazard.

1.7.27 Pressure / Leak Testing

Hydrostatic and Pneumatic Test

Access to the test area shall be limited to essential personnel only. before the test commences compliance is required with the following points:

i. Persons supervising pressure or leak tests must have sufficient knowledge and experience of testing to fully understand the hazards of the activity and the precaution, which must be taken.
ii. Effective communication, including formal procedures, must be established between sites whenever the test envelope extends beyond one site, for example, pipelines.
iii. The area shall be cordoned off (using tape, shields or barriers, etc) at an adequate distance from the equipment to be tested, as specified on the Permit to Work
iv. Warning signs shall be posted at access ways, at other strategic positions, and on the equipment to be tested (including the doors of test workshops or other designated areas
v. Pressuring equipment shall be provided with suitably calibrated pressure control / regulator devices.
vi. Pressuring equipment shall not be left unattended at any time during the test.
vii. Pressuring equipment shall be isolated from the equipment under test and where practicable disconnected, when the test pressure has been reached.
viii. Care must be taken to ensure that materials of construction have the required ductility at the test temperature to prevent brittle fracture.
ix. A safety valve should be fitted to the equipment/system being tested, set to relieve at a pressure that will prevent over pressurization.
x. Sufficient venting / draining points shall be provided in order to prevent trapping of pressurizing medium behind non-return valves, check valves, between isolation valves, or within dead legs of the pressure envelope.
xi. The equipment/plant to be pressure tested must be subjected to thorough examination prior to
xii. testing. It may be necessary to 100% inspect all welds using visual, radiographic or other NDT techniques.
xiii. The gas supply must be isolated when test pressure has been achieved.
xiv. The pressure envelope must contain sufficient vents, to a safe location.
xv. De-pressurization after pneumatic testing must be gradual.

1.7.28 Basic Safety Rules For The Construction Site

i. The construction site shall be considered a restricted area and unauthorized entry into the site is strictly prohibited. Anyone found trespassing should be asked to leave the site immediately.
ii. All persons of CLIENT/Consultant/Contractor shall be responsible for their own safety in plant or work sites.
iii. Nobody authorized to touch any valve, switch, or interfere with plant / site activities.
iv. Children below 18 years are not allowed inside plant / work site.
v. Never walk on the pipes, equipment, structures etc.
vi. Always use stairs, handrails & walkover platforms.
vii. Never carry sharp or pointed tools in pockets.
viii. Alcoholic beverages will not be consumed, brought into, or manufactured on the work sites or inside the plant.
ix. Drugs /intoxicant substances will not be used, brought into, or manufactured on the site or plant.
x. Cigarette, beedi smoking is not allowed except in the designated smoking booths.
xi. Firearms, explosives, knives or other types of weapons will not be allowed on the site.
xii. Gambling or any other form of betting games is prohibited.
xiii. Discrimination on the basis of race, sex or national origin is prohibited.

xiv. Horseplay, Fight, Practical jokes, Aggressive or abnormal behaviour is prohibited.
xv. Individuals under the influence of alcohol or drugs will not be permitted entry to the site.
xvi. Safety helmet, safety shoes, ear plug or ear muff, hand gloves, safety goggles, safety harness & clothing for body protection are mandatory in the plant or work site.
xvii. Use other personal protective equipment as displayed in plan / site.
xviii. It is strictly not allowed to use non-intrinsically safe equipment or instruments in the operational area of site.
xix. All vehicles for use on the site shall conform to the requirements of the Vehicle Entry Permit. Maximum Speed limit inside complex is 10 km/Hr.
xx. In case of Emergency dial appropriate agency like Fire, Hospital, Security etc as displayed.

Violation of the Rules and Regulations might result in removing the person(s) concerned from the premises and denying the person(s) concerned from any future access to the site. The site in-charge will judge whether permanent removal of the individual from the premises is justified depending on the seriousness of the violation(s). All Indian laws shall be complied with at all the time.

1.7.29 Site Emergency Preparedness and Response

The CONTRACTOR shall establish, what are the arrangements in the event of an emergency.

The CONTRACTOR shall ensure that their Personnel are familiar with the essential emergency equipment, the use of which shall be demonstrated and practiced in drills.

The CONTRACTOR shall check the emergency procedures and the location and condition of the emergency equipment.

The CONTRACTOR personnel will be instructed of the actions to take in the event of serious personal injury, gas or toxic release, fire, explosion, heavy rains, wind storms, chemical spillage, land slide, scaffolding or structure collapse, critical damage to operating equipment, etc. and other emergency situations during the induction training and other ongoing training sessions.

These situations may demand adequate rescue and relief measure to handle such events quickly and effectively.

In an emergency, or on hearing the alarm, every supervisor shall ensure the following;

a. All work is stopped at once.
b. All equipment vehicles and tools are shut down (all sources of ignition).
c. All men are evacuated to a pre-determined Muster point.
d. A roll call is taken and every man is accounted for.
e. No one is permitted to return to work until notification has been received from the CONTRACTOR representative that it is safe to do so.

1.7.30 Emergency Preparedness

The basic and essential features of any emergency Preparedness are to analyses and plan for the potential risk. This includes;

a. Establishing and maintaining effective communications.
b. Liaison with local emergency services and authorities.
c. Action Procedure (evacuation routes and assembly points etc.).

d. Appointment of key personnel and specifying their duties and responsibility.

e. Emergency Response Drills

1.7.31 Emergency Response Drills

Effectiveness and comprehensiveness of Emergency Response Plan must be tested on a regular basis. Drills which reflect the conditions induced from the more likely emergency occurrences must be conducted. CONTRACTOR should conduct such drill on periodic basis. All emergency drills, exercises and responses to actual incidents shall be fully documented and followed by a complete review and when necessary, procedure revision process.
Initiate any required procedural changes, and initiate the dissemination of any lessons learned through the Site HSE communication system.

1.7.32 Road Safety Norms

i. For roadside working site to be barricaded..
ii. Only eligible driver can drive required vehicle inside site
iii. Speed limit norms of site must be followed
iv. No riding or travelling on the back of open end vehicle, fork lift or trailers should be done.

1.7.33 Environment

The CONTRACTOR shall pay due regard to the environment by preserving air, water, soil, animal and plant life from adverse effects of the CONTRACTOR's activities and minimizing any nuisance which may arise from such operations.

All waste generated by the CONTRACTOR shall be contained and disposed off in accordance with the legal requirement on waste management.

1.7.34 Labour Welfare & Legal Requirement

a. All mandatory provisions with regard to safety as prescribed under contract Labour (Abolition & Regulation) Act 1970 and Rules made there under are applicable.

b. Workmen compensation insurance and registration under ESI should be maintained.
c. Time to time, all rules and regulations suggested by safety committee of site must be followed and implemented

1.8 Cleanliness / Housekeeping

a. BIDDER shall ensure the discharge of the various waste waters in accordance with the prevailing norms.

b. BIDDER shall upkeep & maintains the facility of Toilets, Offices / Premises, Stations, Sites, Water storage tanks, etc…in hygiene condition on daily basis.

c. Depending on the type of waste materials (household waste, industrial waste, small hazardous waste, etc...), BIDDER shall submit the documentary proof for the removal of these materials to an authorized / recognized dumping / disposal site in accordance with the prevailing norms.

d. The disposal / dumping of waste materials of any kind in the trenches / working pit is strictly prohibited. All environmental pollution must be prevented and BIDDER will take all the measures necessary to avoid polluting the soil, the air and the water in accordance with the stipulations of the prevailing norms.

e. BIDDER shall be responsible for the cleanliness of any public and private roads, which become soiled because of the work. They must at all times be free of obstacles and hindrances.

f. All damages and costs resulting either directly or indirectly from the non-observance of these stipulations, or failure to observe them sufficiently, shall be borne by the BIDDER.

1.9 Excavation Work

1.9.1 Pegging-Off, Trial Trenches And Soundings

Prior to starting excavation works, a detailed investigation must be carried out into the possible existence of underground installations / utilities, etc...This investigation must be carried out taking into account surface indications, available plans, soundings of the subsoil and manual excavation of trial trenches.

1.9.2 Type, Condition, Nature And Equipment Of Machines

Each excavation machine brought to the site must,

i. Be suitable for the work envisaged,

ii. Be in impeccable condition,

iii. Have the correct size / capacity for the work to be performed,
iv. Be fitted with the necessary equipment to make the use of the machine as safe as possible.

In order to reduce to a minimum risk of damage to BIDDER's / OWNER's property, the capacity of the machines for operation in the vicinity of the installations must be limited according to the mechanical strength of the installation.

1.9.3 Machine Operators

a. BIDDER should ensure that all machine operators have sufficient knowledge, experience and ability to be able to drive / perform on the machines / equipments safely & efficiently.

b. If the OWNER deems that the operator of an excavation machine / equipment does not have the necessary abilities, BIDDER must, upon simple request by the OWNER, assign the person in question to another task or, where necessary, remove him from the site. The OWNER's representatives do not need to justify their decision in the matter.

1.9.4 Minimum Distance To The Working Pits

a. Prior to the excavation of pits and trenches, a safe distance must always be maintained between the edge of the excavation and the support surfaces of the machine. This distance must be adjusted to the stability of the subsoil and must, under optimum conditions, be at least equal to the depth of the excavation.

b. BIDDER is fully responsible for observing the instructions and the evaluation of the prevailing conditions. Any deviations from this rule may only be permitted if the BIDDER can prove safety by means of the necessary calculations.

1.9.5 Margin To Existing Installations

Mechanical excavation up to a safe / appropriate distance from existing installations during excavations in the vicinity of such installations is only permitted after determining the exact position by means of soundings. Any excavations within the distance must be carried out entirely manually.

Exceptions to this rule may be made when;

i. OWNER has given his explicit approval,

ii. The capacity of the machine is suited to the mechanical strength of the OWNER installation,

iii. The machine is equipped with a non-toothed shovel,

iv. The excavation machine is accompanied by a labourer in the trench or pit,

v. For each excavation of a layer manual soundings are carried out,

vi. There is continuous supervision by OWNER's representative.

Any non-observance of these rules will be considered as a serious breach of the safety instructions and will result in the immediate exclusion of the persons concerned.

1.9.6 Support And Enclosure Of Existing Installations

Existing installations that become visible during the performance of the excavations must be properly supported and enclosed for the entire duration of the works in order to avoid sagging or damage.

1.10 Working Pits and Trenches

1.10.1 Shoring Up and Forming Banks

a. Earthworks, both for raising and excavating, must be carried out in such a way that collapsing is prevented.

b. The stability of the pit or trench walls should be ensured by installing a bank profile or shoring, as the excavation work demands. A construction drawing with calculations shall be submitted to the OWNER and / or its representative upon simple request.

c. The condition of the walls and any shoring must be checked on a daily basis, in any case on every occasion before work activities begin in the pit or the trench.

d. Suitable materials must be used for the shoring of walls with regard to both mechanical strength and resistance to seepage. The use of compressed fibre plates is strictly forbidden for the shoring of excavation walls.

e. It is also strictly forbidden to use the trestles of the shoring walls for hanging or supporting equipment or material.

1.10.2 Opportunities for Escape

a. Any excavation of a pit or trench with a depth of more than 1.5 metres and in which work will be carried out should be provided with a sufficient number of ladders to offer the personnel working in the excavation the possibility of rapid evacuation.

b. In working pits and trenches that are deeper than 4 metres, no work may be carried out without continuous supervision from outside the pit or trench. In these cases, continuous measurement of oxygen levels and harmful substances is required.

1.10.3 Minimum Dimensions of Working Pits

Each pit, in which people have to work, will comply with the minimum dimensions defined in the OWNER's Particular Technical Specifications.

1.10.4 Pegs and Railings

a. Throughout the work, excavation openings will be screened off by means of pegs and black / yellow warning tape, railings or covering plates around the edges to warn or protect personnel.

b. Also, strong railings will be erected on the edges of working pits with a depth of more than 1.5 metres and in all hazardous areas and maintained in good condition.

1.10.5 Sand Buffer for Working Pits on Main Roads

a. In the event that digging work is carried out on or next to the main roads and on private roads, a sand buffer shall be placed in the direction of the traffic prior to the digging work so that no vehicle can fall into the pit.

b. This sand buffer can be made either with excavated material or with imported sand that is then used as backfill.

1.10.6 Catwaks Over Pits And Trenches

a. BIDDER shall install the necessary catwalks in all places where people have to cross over the excavations. The strength of these walkways must be calculated in accordance with the loads they will be used to carry and will be equipped with regulation railings.

b. In places, where work will not be performed immediately, pits and trenches will be solidly screened off with strong fences or, better still, covered over with plates that are of sufficient strength.

c. BIDDER shall submit the necessary calculations for the stability and strength of these catwalks and covering plates upon simple request by the OWNER and / or its representative.

1.10.7 Water Evacuation And Working Floor

Any excavation, in which, people will be working should be kept dry and provided with a working floor of sufficient hardness. Where necessary, dewatering equipment will be set in place for this purpose and the working floors may be covered with gravel or wooden boards. BIDDER shall ensure that rainwater and water coming from the dewatering equipment is removed according to regulations and that no erosion is caused thereby.

1.11 Electricity

1.11.1 Inspection

a. Every electrical installation on the site, including generators, distribution cabinets, etc…, will be inspected on site by a Recognised Inspection Organisation, before it is brought into service. Any defect must be reported immediately.

b. BIDDER will attach a copy of the inspection report to his HSE plan and hand it over to the OWNER and / or its representative.

1.11.2 Cables And Connections

a. Distribution panels must remain closed at all times during use. The connection to distribution panels may only be made using approved and waterproof plugs.

b. The electrical cables for connection to the various users of site electricity shall be in impeccable condition and shall be protected in a sufficient manner. In places where traffic must run over the connecting cables, they must be buried with a protective sleeve. The same rules apply for the connections of the cables. Furthermore, they must be watertight.

c. All connections must be at least suitable for use in humid conditions.

1.11.3 Earthing

a. Both the central electrical site installation and any stand-alone generators will be fitted with proper earthing of which the earthing resistance will be checked before use as well as periodically.

b. Metal site sheds and material containers will each be properly earthed to rule out the possibility of the structure becoming live.

c. The central electrical site installation will be equipped with a suitable earth switch with circuit-breaker. Also, the pipeline to be earthed to prevent the static effect.

1.11.4 Electrical Tools

a. Electrical hand-tools must conform to the stipulations of the regulations of the prevailing norms, be in impeccable condition and be suitable for the work to be carried out. They must be properly earthed or double-insulated.

b. Welding transformers, generators, machine must be equipped with a power limiter that will guarantee the prescribed safety current.

c. In closed areas, tunnels, deep construction pits and damp crawling spaces, only tools with safety current may be used.

d. Only explosion-proof electrical equipment shall be used in classified hazardous area. BIDDER shall ensure to adhere to the hazardous area classifications.

1.11.5 Protection Against Electrical Hazards

Followings are some of the keys for protection against electrical hazards such as Insulations Ground Wires, Fuses and Circuit Breakers, Double Insulated Tools, Ground Fault Circuit Interrupter, Recognition of Hazardous Situations and Preventive Maintenance;

a. Fire may arise from faulty or over load electrical installation or as a result of accidental short circuits. Result flash over may ignite combustible material.

b. The above dangers can be prevented in respect of electrical system by paying attention to the following points;

i. Proper design including current specifications of all components.

ii. Correct installation, Recognition of Hazardous situations..

iii. Correct use including preventive maintenance.

1.12 Hoisting Work

1.12.1 Hoisting Gear And Hoisting Material

a. All machines brought to the site and which can be used as hoisting gear must be provided with a valid certificate (Third party Inspection)of approval. If no certificate is available, BIDDER will have an

inspection carried out before bringing the machine onto the site. All certificates of approval for machines on the site will be listed by the BIDDER in his HSE plan.

b. Each hoisting device must be suitable for the work to be carried out, both as regards the type and the characteristics. Hoisting devices must be properly maintained and exhibit no obvious defects.

c. Hoisting equipment such as hoisting straps, chains, steel ropes, hooks and clamps must be suitable for the work to be carried out, as regards both the type and the characteristics. Furthermore, all hoisting equipment must bear a valid inspection stamp, be in impeccable condition and exhibit no obvious defects. The inspection certificates for the hoisting equipment will also be listed in the HSE plan.

d. When hoisting work is being carried out, special attention will be paid to the placing and stabilization of the hoisting gear. If a hoisting device is provided with stabilizing feet, these must be used for every hoisting operation. If the stability of the subsoil is insufficient, supporting feet or plates will be used to ensure the safe installation of the hoisting devices.

e. Hoisting buckets will always be used for hoisting loose materials and gas cylinders. The hoisting of persons will only be permitted by means of an approved hoisting cage. All hoisting equipment will be stored in a clean, dry place immediately after use.

1.12.2 Personnel And Organization

a. All personnel involved in carrying out hoisting work - in particular the operators of the hoisting gear and the riggers - must be properly trained to carry out this work in a manner that is efficient and safe. Crane operators must be in possession of a certificate of qualification issued by an authorized institution.

b. For large and difficult loads, such as loads with an awkward shape, a hoisting plan will be drawn up before carrying out the hoisting operation. This hoisting plan will define the center of gravity of the construction and the hoisting equipment to be used.

c. For very large loads a calculation will be submitted upon simple request by the OWNER and / or its representative.

d. Wherever necessary, such as in hoisting operations in existing installations above ground, the load must be guided by one or more persons and the circuit along which the load may be moved will be determined beforehand in consultation with the OWNER and / or its representative.

e. During hoisting, no-one may stand under the load-bearing arm or the load itself.

f. Moving a load with more than one crane is only permitted after permission has been obtained from the OWNER and provided a hoisting plan has been submitted.

1.13 Material Storage And Handling

1.13.1 General

a. A clear storage plan will be drawn up in advance, both for the central site equipment and the storage areas along the perimeter of the site. For storage areas along public or private roads, this plan must be approved beforehand by the parties involved.

b. BIDDER is responsible for drawing up and adhering to these storage plans. He will ensure that the storage areas are always left in a clean and orderly condition and that they are clearly marked out and signposted.

c. All materials must be stacked in a stable manner and protected against the weather.

1.13.2 Hazardous Products

a. All hazardous products such as Gases, Odorant, Fuels, Paints and Poisonous and aggressive products will be stored in clearly separated areas and provided with leakage trays as required. The storage of such products will be specially indicated on the building site plan listed in the HSE plan. A copy of the safety and health cards(MSDS) for the products used must be attached to the HSE plan.

b. Gas Cylinders should be stored separately on a firm base and provided with a suitable protective cover over the connector tap during storage and transport. They may never be left unattended or laid flat on the ground.

c. Products must never be siphoned over into Cylinders / Bottles / Vessels / Canisters that were originally used for foodstuffs.

d. All products on the sites must be labelled according to regulations. Each label must describe the properties and risks of the relevant product, the precautionary measures to be taken and the actions to be taken in case of accident (MSDS).

e. When storing hazardous products, sufficient and suitable fire-fighting equipment must be on hand. The location of this fire-fighting equipment must be such that it can be used immediately in the event of an incident.

f. The storage of hazardous products must arranged in such a way that the various products can easily be isolated.

g. Relevant / necessary statutory approvals should be obtained for the storage, removal / handling, transfer / transportation, disposal, etc…in accordance with the prevailing norms.

h. In works, where harmful or poisonous vapours are released / generated, measures must be taken to remove them efficiently.

1.13.3 Handling Of Hazardous Materials

a. All personnel must be familiar with the Material Safety Data Sheet (MSDS) for a particular material like odorant (Ethyl Mercaptan) before handling the same.

b. Container should be kept tightly closed and stored in well ventilated cool & dark area. To prevent, the physical damage to the container protective container shall be used.

c. The person handling the hazardous material like Ethyl Mercaptan should wear suitable & adequate personnel protective equipment (PPE's) such as rubber gloves, filter respirator guard, plain goggles & self contained breathing apparatus, etc…

1.14 Acetylene Welding And Cutting Equipment, Butane And Propane Burners

a. The welding vehicles for acetylene welding and cutting equipment must be constructed and set up in a stable manner. The oxygen and fuel gas cylinders will be placed vertically or at an angle of at least 35° during use. They must be mounted on a stable trolley.

b. Gas cylinders for butane or propane burners and for heating devices for site sheds must be set up in a stable manner. They will be properly secured to prevent them from tipping over.

c. Any installation for acetylene welding and cutting must be equipped with a sufficient number of blow-back protection devices. These devices should preferably be located as close as possible to the tools.

d. The gas hoses and manometers must be in impeccable condition and of the correct type. They will always be protected against damage and immediately stored again after use.

e. After use, the cylinders should be closed and the pressure shall be released from the hoses. When working with a naked flame, adequate / suitable fire extinguishers must be available on site as per work permit. Proper & necessary caution should be marked. After completion of work, house keeping should be carried out at site.

1.15 Compressed Air / Gas Installations

1.15.1 Equipment

All Compressed Air / Gas Equipments, such as Compressors, Hoses, Couplings, Tools/Tackles, etc…will be kept in impeccable condition. Equipment with visible defects or which is unsuitable / non-compatible for the work will be immediately replaced.

1.15.2 Use

Only authorised personnel may use Compressed Air / Gas Equipments. After use, the pressure will be released from each installations / equipments.

1.16 Radioactive Sources

1.16.1 Use

Only personnel from the Recognised Inspection Organization are authorized to use or transport radioactive sources for testing purposes.

1.16.2 Warning Signs

When transporting or storing such sources, standardised warning signs must be posted in the vehicle or in the storage room. These signs must be removed when there are no longer any radioactive sources in the vehicle or in the storage premises.

1.16.3 Marking Out Of The Test Area

The areas where radioactive sources are being used must be clearly marked out by means of yellow / black warning tape and standardised pictograms with the words “No Entry - Radiation Hazard”.

1.16.4 Safety Guard at the Test Area

Throughout the duration of testing with radioactive sources, a safety guard will be posted, in addition to the warning signs. The decisions and orders of these safety guards must be strictly adhered to at all times.

1.17 Pressure Tests

1.17.1 Inspection of Test Equipment

All the equipments to be used for carrying out pressure tests, such as hoses, couplings, testing heads, etc…, will be inspected in advance by a Recognized Inspection Organization. A copy of the inspection certificates shall be enclosed with the HSE plan by the BIDDER.

1.17.2 Marking Out And Screening Off The Test Area

a. The areas, where pressure tests are to be carried out will be clearly marked out by means of black / yellow warning tape and a warning sign with the words "No Entry - Installation under Pressure".

b. Where possible, the areas where the likelihood of pressure escaping is highest will be screened off by means of boards / plates or an earthen wall. While tests are being carried out on pipelines / cylinders or vessels / installations / equipments, all activities at and in the vicinity of the same will be brought to a halt.

1.17.3 Presence of Personnel

All the personnel, who are not strictly needed for carrying out pressure tests, will be evacuated from the test area. The personnel responsible for monitoring the pressure tests will be responsible for refusing admittance to the test area to unauthorised persons.

1.18 Personnel Behaviour

a. Every person working on the site must behave correctly and with the necessary courtesy towards his colleagues, employees of other contracting parties / subcontractors, representatives of the OWNER and third parties. Any improper conduct may be restrained by the OWNER by removing the persons involved from the site.

b. All unsafe situations and actions must immediately be reported to the OWNER and / or BIDDER. The instructions given by OWNER's representative must be complied with strictly and immediately.

c. The use of the available means of protection is compulsory and must be strictly adhered to at all times.

d. It is forbidden to operate the existing installations of the OWNER or of third parties; such operations may only be carried out only by authorized persons.

e. Entry into existing installations / premises / sites owned by the OWNER or third parties is completely forbidden unless this is strictly necessary for carrying out work and the permission of the OWNER has been secured.

1.19 Safety Precautions For Gas Distribution / O&M

1.19.1 General / Industrial Safety

a. Human beings and all living creatures have an in-built consciousness of safety. This consciousness tempts them to protect themselves from accidents in general life. The level of this

consciousness varies from person to person and creature to creature. This variation has much effect on the causes and number of accidents. Usually, this consciousness is being used incidentally when we face any unexpected physical trouble in general life.

b. Apart from the general consciousness of safety, a planned programme is required to preserve and upgrade the safe conditions and safe activities at Industries. This is because, here the human beings has to work with machines, materials and environment, which involve different type of risks and hazards which are not common in general life. This planned programme of safety recommends the type / quality of man, machines / materials to be used, working / operating procedures, condition to be observed, precautions to be taken and methods of handling emergencies. This programme also covers training on these wide areas, to develop the employees to operate the Industry in ultimate Safety. The result of this programme is termed as Industrial Safety.

1.19.2 Safety Precautions While Doing Jobs In Valve Chambers / Pits

a. Leak Test / Cleaning / Painting

i. Extra care to be taken while lifting the sleepers from chamber.

ii. Detect Gas leak (if any) in the chamber, before starting any activity in the chamber / making entry in the chamber.

iii. Do not start any job, if there is any gas leakage in the chamber. Arrest / Repair the leak first and check again by the detector /soap solution.

iv. In no case smoking and naked flames shall be allowed near the open valve chamber.

v. Minimum one person must be posted outside the chamber for keeping watch inside the chamber.

vi. Open valve chamber must be cordoned off and warning sign boards placed.

vii. Keep contact with wireless communication with nearest Control Room.

viii. Before closing valve chamber, do final check inside the chamber. Do not leave paper rag and other combustible.

b. Demolishing of Valve Chamber & Removal of Valve Assembly for Live Network

Demolishing

i. Install caution boards at both sides of valve chamber at safe distance of minimum 5 Mtrs. each from valve chamber.

ii. Locate Fire Extinguishers at a suitable place with a trained person, to operate on emergency.

iii. Shift the chamber covers to a distant and suitable place.

iv. Check the inside of valve chamber for any sharp materials or creatures. Pump our water, if there in water inside.

v. Take care test and ensure no leakage.

vi. Clean / remove all unwanted materials from 2 Mtrs. surroundings of the valve chamber.

vii. Only one worker should get inside the chamber at a time, to break the chamber. Pipe valve to be protected and should be covered.

viii. Break the walls from inside the chamber to outside so that the bricks would not fall inside and bit / damage the valve assembly.

ix. The bricks nearer to the pipeline should be taken out one by one to avoid any damage to the pipeline.

x. Remove all the broken materials from the chamber and surroundings.

xi. If the concrete / cement floor of the chamber is required to be broken, it should be done only after isolating and venting out NG from the pipelines section.

Removal

i. Isolate the section including the valve assembly by closing nearest isolation valves or squeezing at nearest point.

ii. Vent out NG from the section using vent pipes after ensuring no source of fire at the surroundings. Take case of traffic / vehicles.

iii. In case of MS network, do purging with Nitrogen / inert gases and ensure the Methane content is less than 2%.

1.19.3 Safe Route Selection Procedure For U/G Pipeline Work

a. The Safety and life of a gas distribution network is highly depending upon the selection of the route of the network. A proper route selection;

i. Facilitates easy laying of the pipeline,

ii. Eliminates hazardous areas / identifies the type of protection to be provided.

iii. Minimizes the changes of damage to pipeline by other U/G utility agencies.

iv. Confirm proper location of valves / venting / LPT & Maintenance can be safe and unpopulated area.

b. Following are some of the guidelines for route selection of U/G pipeline network;

i. A visual survey of the alternative route should be made and note down all apparent physical obstacles, natural or constructed, that may affect the conduct or the work.

ii. Details should be obtained from concerned agency / ROU holder that may affect the conduct of the work.

iii. Local authorities should be contacted to obtain any available information on the construction of adjacent buildings and other structures and future planning / proposals. Account must be taken of any stray current that may exist in the vicinity.

iv. Wherever possible the route should be chosen so as to avoid locations where the proposed pipelines could be subjected to abnormal mechanical loading or other adverse condition which may lead to accelerated deterioration.

c. Avoid laying in the following areas;

i. Areas already congested with underground plant / utilities.

ii. In proximity to unstable structures or walls retaining material above the ground level.

iii. Areas, where there has been recent infill especially within the last two years.

iv. Ground liable to subsidence or side slip.

v. Areas of known or suspected corrosion activity.

d. Following additional care should be taken for laying;

i. If the pipes are laid in areas, where future maintenance would result in no damage to structures or plant of third party.

ii. Main pipes should be laid as far away from a building as is practicable and in any event not closer that would subject the pipes to structure loads from the building.

iii. Ensure that branch lines dedicated to direct supply to customers are preferably routed in land for public use.

iv. Trial pit may be necessary, particularly at road crossings, culverts and bridges to prove the route and the type of ground.

v. Special drawings will be required for certain crossing e.g. Culverts, bridges, etc...

vi. A plan of the proposed route of the main must be prepared. Design of the pipe size should be considering future extensions.

vii. Use proper pipes which has proper diameter and thickness.

viii. Lay pipes in open areas so that in case of gas leakages it would easily disperse in the atmosphere.

ix. Ensure no source of ignition close to the pipeline from surrounding.

x. Location of isolation valves should be in unpopulated / isolated areas and be at a reasonable distance from the roads, so that it would not be damaged by vehicles and maintenance / testing jobs could be carried out safely.

xi. Take care that isolation valves should not be in parking areas and just under electrical cable / nearby electrical installations like transformer, etc...

1.19.4 Safety in Commissioning / Charging Industry / Commercial

Safety checks / precautions to be observed before and during commissioning of Gas inside an Industry are as follows;

a. Ensure that all items like pipes, valves, fittings are of standard Quality supplied / certified by OWNER. Also, ensure approval of PRS & its installation / equipments including vent line prior to commissioning.

b. Ensure that standard fabrication, welding inspection and installation methods are followed.

c. Check the layout of gas train and equipment / valves used in gas train.

d. Check the electrical items used in gas train are of flame proof type.

e. After pre-commissioning check, all pipeline section / equipment should be Nitrogen purged to minimize the Oxygen percentage below 2.

f. After successful purging, charge the pipeline and equipment in following sequence;

i. Gas charging in the supply line.

ii. Gas charging in PRS.

iii. Gas charging in Internal Piping.

iv. Gas charging in Gas train / Burner.

g. Before charging the burner, take dry-run of the burner, i.e. switch on the burner without gas and check the sequence controller as well as flame failure safety interlocks.

1.19.5 Precaution Before Doing Hot Work On Gas Line

a. Ensure that a work permit is taken for the job to be executed well in advance.

b. Ensure all Safety Equipments adequate & suitable Fire Extinguishers, Personnel Protective Equipments, etc…are available at the site of work.

c. Establish wireless / telecommunication with the control room before starting the job.

d. Grease the main Isolation valve at Valve chamber / Metering platform before job.

e. Pre-purge the section for hot work with nitrogen and check methane percentage at any of the tapping point / pressure gauge point with suitable analyzer / detector, it should be zero.

f. Repeat the pre-purge operation if methane percentage is detected until zero percentage is achieved.

g. Do the actual gas cutting / welding work on the line once zero methane percentage is achieved.

h. Use Personal Protective Equipments while doing the Gas Venting, Cutting, Welding and Grinding Operations.

i. After finishing of the job test pipeline section with Nitrogen at recommended test pressure with soap solution and lock pressure test.

j. After confirmation of testing, Post purging of the section should be done and Oxygen percentage should be checked at the farthest point which be minimum 2%.

k. Before charging NG following pre-commissioning checks should be done;

i. Inspection of the job done.

ii. Ensure all drain valves, Pressure gauge tapings are in closed condition.

iii. All tools tackles & equipment not required should be removed from the site.

iv. All activities should be stopped.

v. Only required personnel should be present at the site.

l. Inform all concerned before charging NG in the section including control room.

m. While recharging, always crack & gradual open the inlet valves.

n. Vent the gas from all farthest points to remove Nitrogen percent if present. Check that Methane percentage is more than 5%.

1.19.6 Safety Guideline For Plumbing Installation

a. Route Selection

i. Underground Tapping Line.

ii. Location of tapping saddle should be at a free place away from other utilities, electric posts, septic tanks etc.

iii. Length of U/G piping in customers' premises should be as minimum as possible. The U/G pipeline should not cross any U/G tanks or open trenches.

iv. Riser pipe should be provided on a wall having enough space to install Audco valves, Pressure regulator, Meter etc.

v. In parking area / boundary wall A/G piping should be avoided or minimized.

vi. Height of the A/G horizontal pipe should be in such a way that children cannot use it for climbing or jumping.

vii. Wherever possible; initial rise / elevation to the piping should be given inside the boundary wall to avoid any vehicular accident / foul play by outsiders.

viii. Pipeline routing should be in such a way that door / window / any similar moving parts should not hit the gas pipe, valve, meter and regulator.

ix. Ensure that electric cables do not come in physical contact with gas line. It is recommended to keep a minimum distance of 1.5 feet between gas pipeline and electrical lights, cables / installation.

x. Isolation / Control valves, meter, regulator and any other joint should not be provided nearest to electric lights, switch boards etc. install single pipes without joints as a minimum distance of 1.5 feet at these points.

xi. Location of gas tap should be at enough distance from the hot plates / burners so that the gas tap & rubber tube do not get heated up.

xii. Gas tape should be at convenient height not less than 4 feet. In special cases, if the gas taps a re to be installed further below an extra isolation / control valve should be provided on the tapping pipe. Gas taps should not be provided in closed cabinets.

xiii. Individual control valve should be installed for each connection outside the house at a height of 6 feet. For apartments one main control valve should be installed at a convenient height on the main riser pipe; in addition to individual valves.

b. Installation

i. RCC guard should be provided where A/G & U/G piping join each other.

ii. Clamping / Supports should be provided at both sides of gas meter.

iii. Clamping / Supports should be provided at a distance of at least 1 Meter.

iv. Proper & firm supports should be provided for riser and branches to avoid direct load on fittings, valves, regulators, etc...

v. Minimize the number of joints as much as possible inside the house.

vi. Avoid the A/G gas pipe crossing other pipelines, wires, etc...

vii. In case of large size installations union joints to be provided for easy dismantling and repairs.

viii. Avoid bending of GI pipes more than 45 degrees.

ix. Pipeline should not be installed hanging between pillars of any projections on walls.

x. No gas tap should be left without connecting to a burner. In such cases the gas point should be kept closed by and end cap.

c. Ground Connection

i. Pressure test to be confirmed before giving ground connection.

ii. Do the ground connection after charging of PE network.

iii. Before ground connection; check all plumbing network. Entire network should be completed up to gas tap with proper supporting work.

iv. All extra gas taps should be plugged.

v. Soap solution test of the Ground Connection should be done up to Saddle / Tee joint.

vi. Do not connect, if regulator is not provided.

d. Testing

i. Only inspected / calibrated Pressure Gauges should be used.

ii. Pump cylinder to be dismantled and line should be plugged after achieving required pressure. At farthest end i.e. at gas tap; pressure to be checked and confirmed for at least 1 hrs. All joints should be checked with soap solution.

e. Conversion

i. Pressure test report to be confirmed.

ii. Uncompleted work should be checked (i.e. any open ends, gas taps, plugs, etc...)

iii. Soap solution test to be carried out, after removing spool piece & installation of meter, regulator, unions, connectors, etc...

iv. Do not charge if there is any leakage.

v. All wall openings & supports should be well completed before conversion.

1.19.7 Conditions To Be Observed Prior To Start Work On Gas Installation

a. All required sizes of valve keys, wheels are available and placed nearest to their application place.

b. Minimum 2 nos. suitable (DCP) Fire Extinguishers should be available at each site.

c. Continuous wireless communication between site and control room and between sites must be established, immediately on reaching the sites and before staring any activity.

d. No smoking should be done in the 15 Mtrs. radius of site.

e. Only intrinsically safe / flame proof / explosion proof electrical equipments / items should be used.

f. No source of ignition / spark should be present within 15 Mtrs. radius of site.

g. Check wind direction and position the diesel fired / electrical items accordingly keep it 15 Mtrs. away from the site.

h. Wherever possible work should be done during the slack hours of traffic and gas consumption.

i. Measuring instruments must be in good working condition (Oxygen Analyzers, Gas Detectors, Gas Surveyor, Flame Ionization Detector, etc…)

j. Use calibrated Pressure gauges only.

k. Only 24 volt D.C. supply is to be used for transmitter calibration work.

l. For Venting out gas locate / choose safe place considering;

i. Open ventilated place available.

ii. Overhead Electrical Wires / Installations.

iii. Vehicular Traffic.

iv. No smoking zone – non populated area.

v. Always vent – Gas at height by providing minimum 3 Mtrs. long pipe to vent pipe.

1.19.8 Guideline For Working In Confined Space

a. Definitions

In general industry terms a confined space means a space in any vat, vessel, tank, container, silo, valve pit / chamber, trenches, odorant storage, receptacle, underground sewer, shaft, well, tunnel or other similar enclosed or partly enclosed structures, when the space is;

i. Intended or likely to be entered by any person, and

ii. Has a limited or restricted entry and exit, and

iii. Intended to be at normal atmospheric pressure while a person is in that space, and

iv. Contains, or is intended to contain, an atmosphere that has a harmful level of contaminants or an unsafe oxygen level.

b. In terms of gas distribution, defined spaces may include regulator or valve pit, meter rooms, trenches or excavations, odorant facility, drainage or other pits of other utilities.

c. Hazards in Confined Spaces

A hazard is a potential source of harm or injury. A risk is the likelihood of being affected by a particular hazard. Thus "hazard" and "risk" have different meanings. Hazards encountered in confined spaces include oxygen deficiency, oxygen enrichment, flammable gases, toxic gases, noise, dust, smoke, fumes, heat stress, and mechanical hazards.

Oxygen - Deficiency or Enrichment

i. The minimum oxygen content in air should be 19.5% by volume under normal atmospheric pressure. The usual oxygen level in outdoor air is 20.9%.

ii. Oxygen enrichment, greater than 23.5%, is associates with increased fire hazards in that lower than usual concentrations of flammable gases or other combustible materials will burn because of the higher oxygen level.

Flammable Gases

i. The presence of a flammable gas in concentrations between its lower (LEL) and upper (LEL) explosive limits can produce a potentially explosive atmosphere. A source of

ignition, such as a flame or spark can cause an atmosphere to explode causing injury, death and property damage.

ii. Other flammable gases and vapors include petrol, kerosene, ammonia, benzene, toluene and xylene. There are hundreds of other compounds which could be included in this list.

Toxic Gases

Exposure to toxic gases can result in widespread effects ranging from local irritation of the airways and eyes through to wide ranging effects throughout the body including death. The following provides information about two commonly found toxic gases;

Carbon Monoxide, is a colorless, odorless gas which is impossible to detect by the normal senses. It is a product of incomplete combustion. This can be in an internal combustion engine, whether petrol, diesel or LPG, such as chain saws, motor mowers, or petrol driven pumps, etc. Nearly all fires produce some carbon monoxide. Carbon monoxide inactivates the oxygen carrying compound of the blood preventing sufficient oxygen reaching the brain. It takes about three to five minutes for an Oxygen starved brain to suffer irreversible damage and death results in about ten minutes.

Hydrogen Sulphide, commonly known as "rotten egg gas" for an obvious reason, results from the action of microbes in a variety of conditions, e.g. in sewage and rotting animal and vegetable matter. While hydrogen Sulphide is easily recognized by its smell, anyone exposed to even low levels of the gas will soon develop "olfactory fatigue".

This means that although it is still present in the air the sense of smell becomes less sensitive. This could result in death if the concentration suddenly increases to a toxic level, as the person exposed will not notice this increase. Hydrogen Sulphide may irritate the eyes and airways and affect many body functions.

Dust, smoke and fumes

Some dusts, once they become airborne, can result in an explosive atmosphere but this is not common in confined spaces. Airborne dust, also referred to as particulates, is measured in milligrams per cubic meter ($mg/m^{3)}$ of air sampled. Dust has a health consideration as well. Breathing of dust particles, depending upon the material from which they came and their size can cause any or a combination of;

i. Pneumoconiosis

ii. Emphysema

iii. Silicosis asbestosis

1.19.9 Precautions For Geyser

Installation

The balance flue type gas geyser is the safest one, but as it is not available in India and it will take some time to develop the same. We can continue using flue type gas geyser safely by taking following precautions;

i. As far as possible install gas geyser in well ventilated bathroom only, and this ventilation should remain effective even after the bathroom door is closed.

ii. If you are in a bathroom, with a gas geyser on, and if you start feeling certain abnormalities like, deep breathing. Fast breathing, headache, etc…open the door immediately and come out of the bathroom at once.

iii. To be sure safe, store the hot water by switching on the gas geyser, but keeping bathroom door and ventilators open. After storing the required hot water, shut off the geyser and take a bath even after closing the door.

Four Steps for Safe Operation of a Gas Geyser

i. First open the gas tap.

ii. Ignite the pilot flame-either with inbuilt ignition system or with a match-stick.

iii. Observe the pilot flame and make sure it is stable.

iv. Lastly open the water valve.

Never Open Water Valve Prior To Opening of a Gas Tap

i. This will open the main gas regulator, resulting in to gas coming out of the geyser combustion chamber, which may cause fire flames outside the combustion area of geyser. And in this condition, if ignition is delayed by any reason, than good amount of gas may accumulate in the bathroom, which may cause explosion.

ii. Never encourage children to operate the geyser; gas tap should be located at 6" height, beyond the reach of children.

iii. Never keep clothes and hair loose, while operating geysers, and never operate geysers, very closely.

1.19.10 Others

a. **VENTILATION:** Before installing the gas connection / gas geyser, adequate & proper (cross) ventilation should be ensured. Generally, a standard bathroom, kitchen does not comprise any cross ventilation. Hence, all the installation must be carried out based on the OWNER's / statutory norms. Since, the natural gas replaces the air contains oxygen very quickly & so oxygen required for human being deficits, cause human fatality, too. Also, it the likely hood of fire & explosion increases. Every person working on the site must behave correctly and with the necessary courtesy towards his colleagues, employees of other contracting parties / subcontractors, representatives of the OWNER and third parties. Any improper conduct may be restrained by the OWNER by removing the persons involved from the site. Also, in the bathroom, there are chances of producing Carbon dioxides & monoxides from geyser & human taking bath therein, which are also having potential hazards of an accident.

b. **ROAD SAFETY:** Considering, Indian road conditions & human tendency, road safety is required during performing the work on the main roads, pipeline routes, patrolling, monitoring, complaint attendance, emergency call, etc…Defensive driving plays major role in this issue, hence, driver should be well trained, accountable towards the specified responsibility, having valid license for the particular vehicle, renewal from time to time, should be trained for hazardous goods transportation (TREM CARD is required in such cases). Emergency Vehicle should be given utmost importance in terms of operability, statutory aspects, maintenance, spark arrestor (exhaust muffler), etc…The work to be carried out in dark / night hours should also be given substantial importance by following best engineering practices.

ANNEXURES

ANNEXURE – A

RELEVANT IS-CODES FOR PERSONNEL PROTECTION

IS : 2925 – 1984

IS : 4770 – 1968

IS : 6994 – 1973 (Part – I)

IS : 1989 – 1986 (Part – I & III)

IS : 3738 – 1975

IS : 5557 – 1969

IS : 6519 – 1971

IS : 11226 – 1985

IS : 5983 – 1978

IS : 9167 – 1979

IS : 3521 – 1983

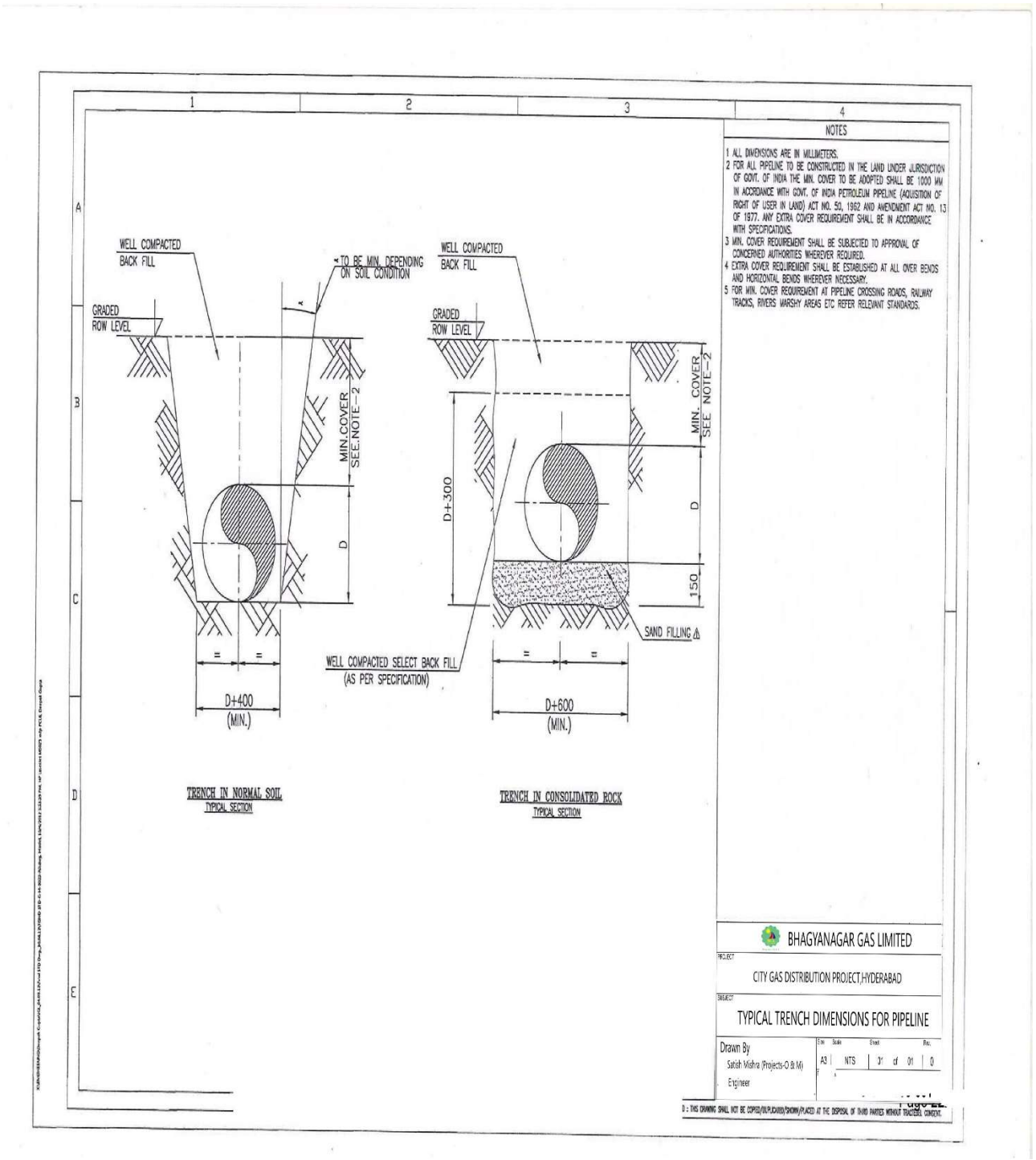
TECHNICAL SPECIFICATIONS OF SUPPLY ITEMS

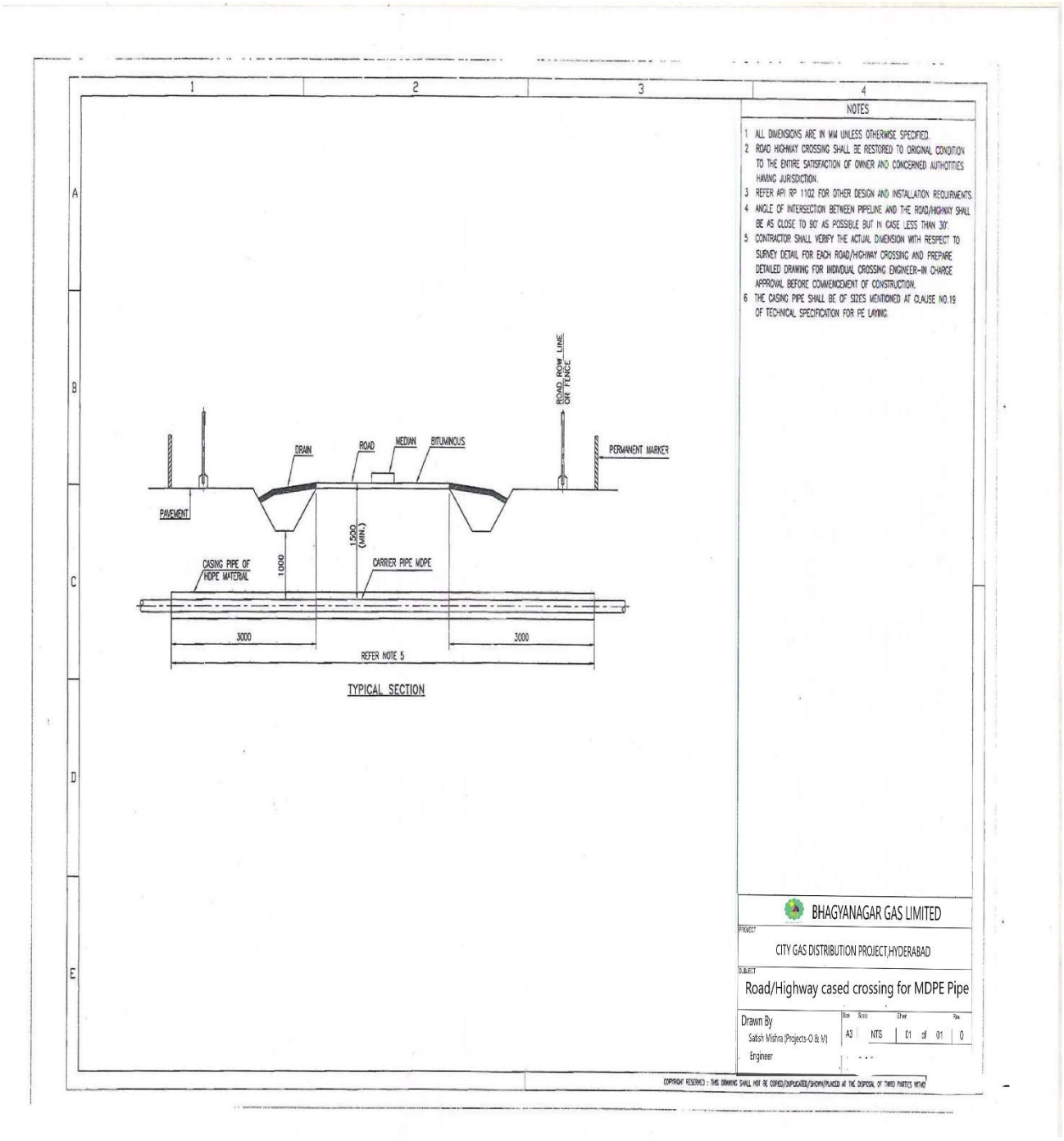
S.No	SOR Item No.	Description	Specifications
1.	17(a)	Rubber hose pipe	IS 9573 Type II, Wire Reinforced Hose for Domestic/ Commercial Installation, synthetic rubber like acrylonitrile-butadiene rubber (NBR), blends of NBR-Polyvinyl chloride (NBR-PVC) or chloroprene rubber (CR) compound.
2.	23 A	Pressure gauge	General/Baumer/Nirmal or equivalent or any other CGD approved make. SS 316 Bayonet Type, SS 316 Bourdon Tube, 1/2″ BSP M / NPT, Bottom/Back Connection, Panel Mounted. **BS EN 837 –1, IS-3624.** Weather proof IP-67.
3.	23 B	Temperature gauge	General/Baumer/Nirmal or equivalent or any other CGD approved make, SS 316 Bayonet Type ,1/2″ BSP M / NPT, Bottom/Back Connection, Panel Mounted. ASMEB 40.200, EN 13190, Weatherproof IP – 67.
4.	38	Chain link fencing	Tata or any other CGD approved make. (50x50) mm diamond shaped, post vertical maximum 2.00 meter distance centre along with crossed brasing of 3.15 mm thick wire, Galvanised , surface Polished.
5.	47	SS Tubing	Sandvick/Tubacex/swagelock or any other CGD approved make. Materials: SS 304/304L and SS 316/316L stainless steel.
6.	50	UPS	APC or Microtek make, 1KVA, Input voltage: 140-300V AC, Sealed Lead Acid, with warranty.
7.	51	MCCB/MCB	L&T ,Havells, LeGrand or any other CGD approved make. Confirms to IEC60947-2, EN60947-2, IS/IEC60947-2.
8.	53	MDPE Fittings	GF+/ Kimplas or any other CGD approved make. EN1555-Part 3,GIS/PL2 Part 4,ISO 4437.
9.	54	MDPE squeezers	Kimplas make Trustlene Brand , or any CGD approved make.GIS/PL2-7:2006

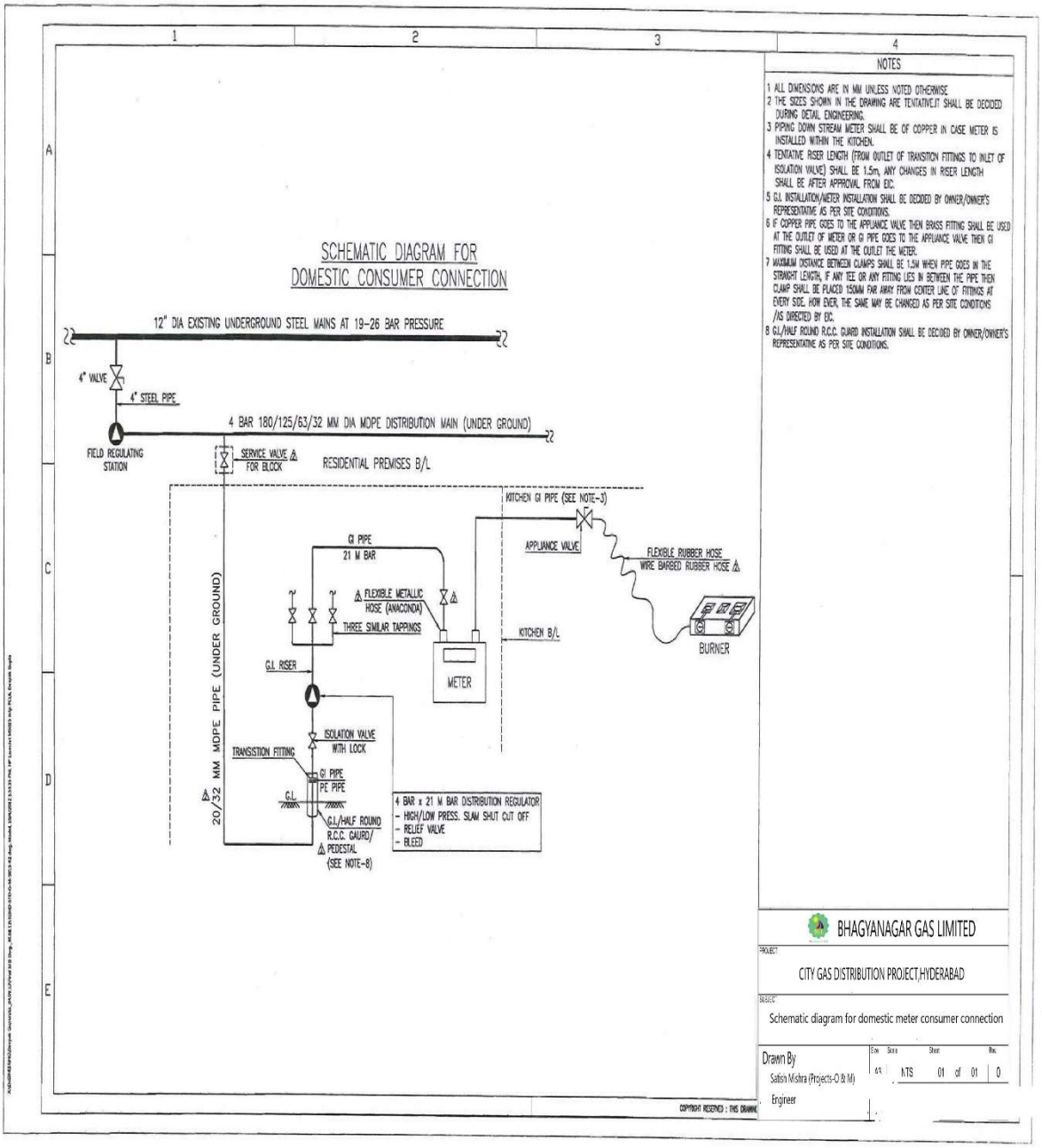
Note: 1. Test and calibration certificates are mandatory.

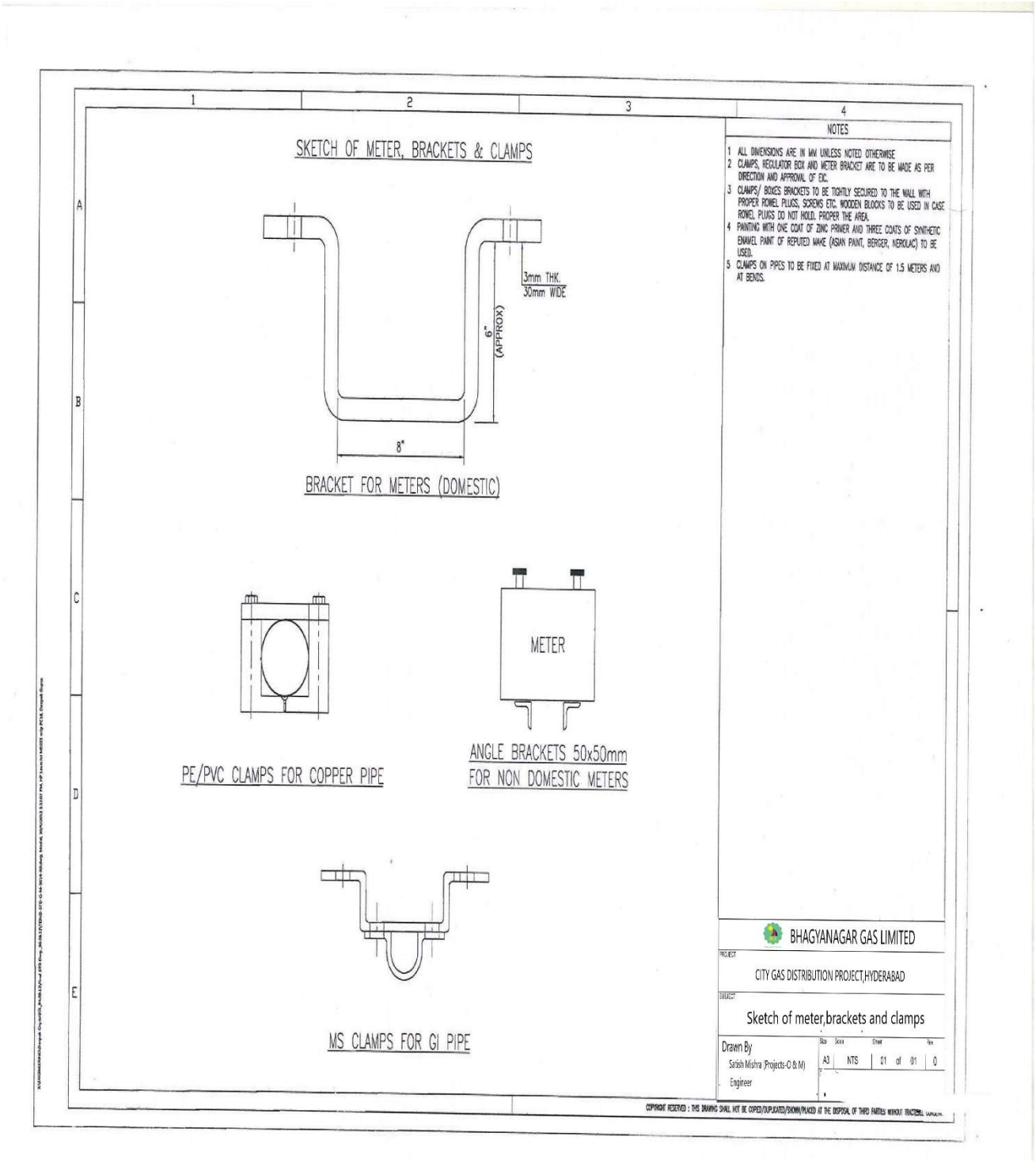
2Any other CGD Make with BGL approval.

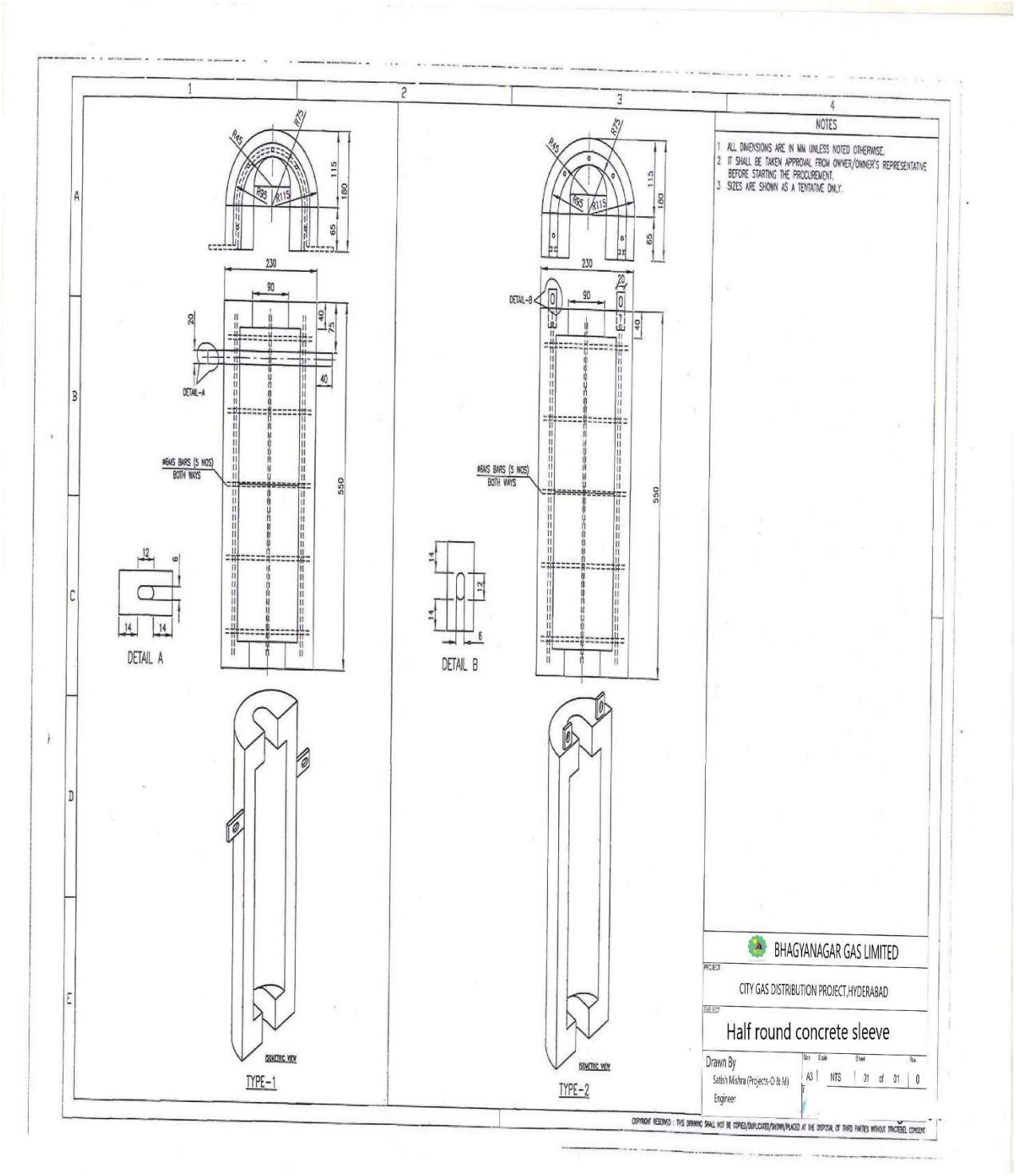
DRAWINGS

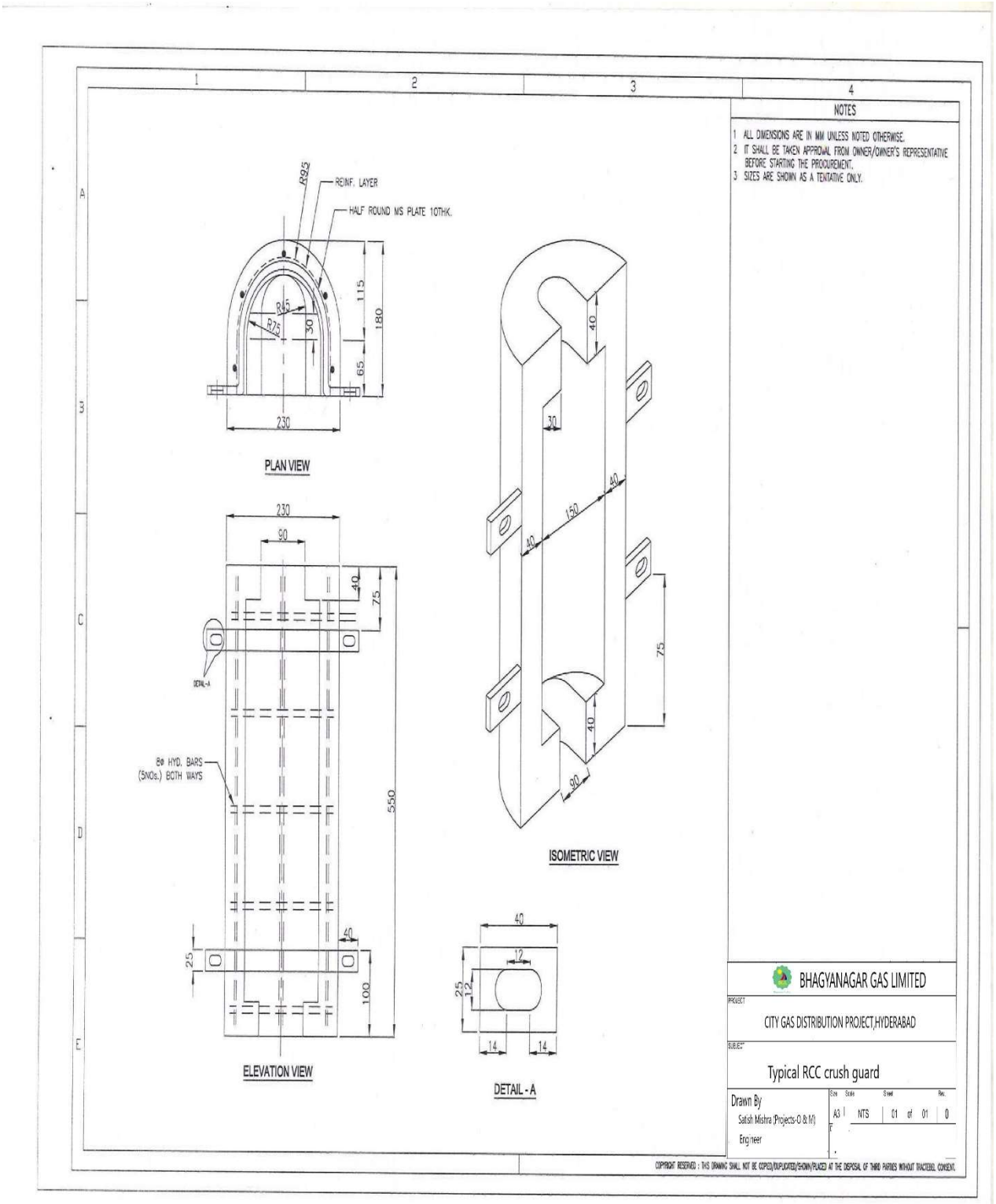


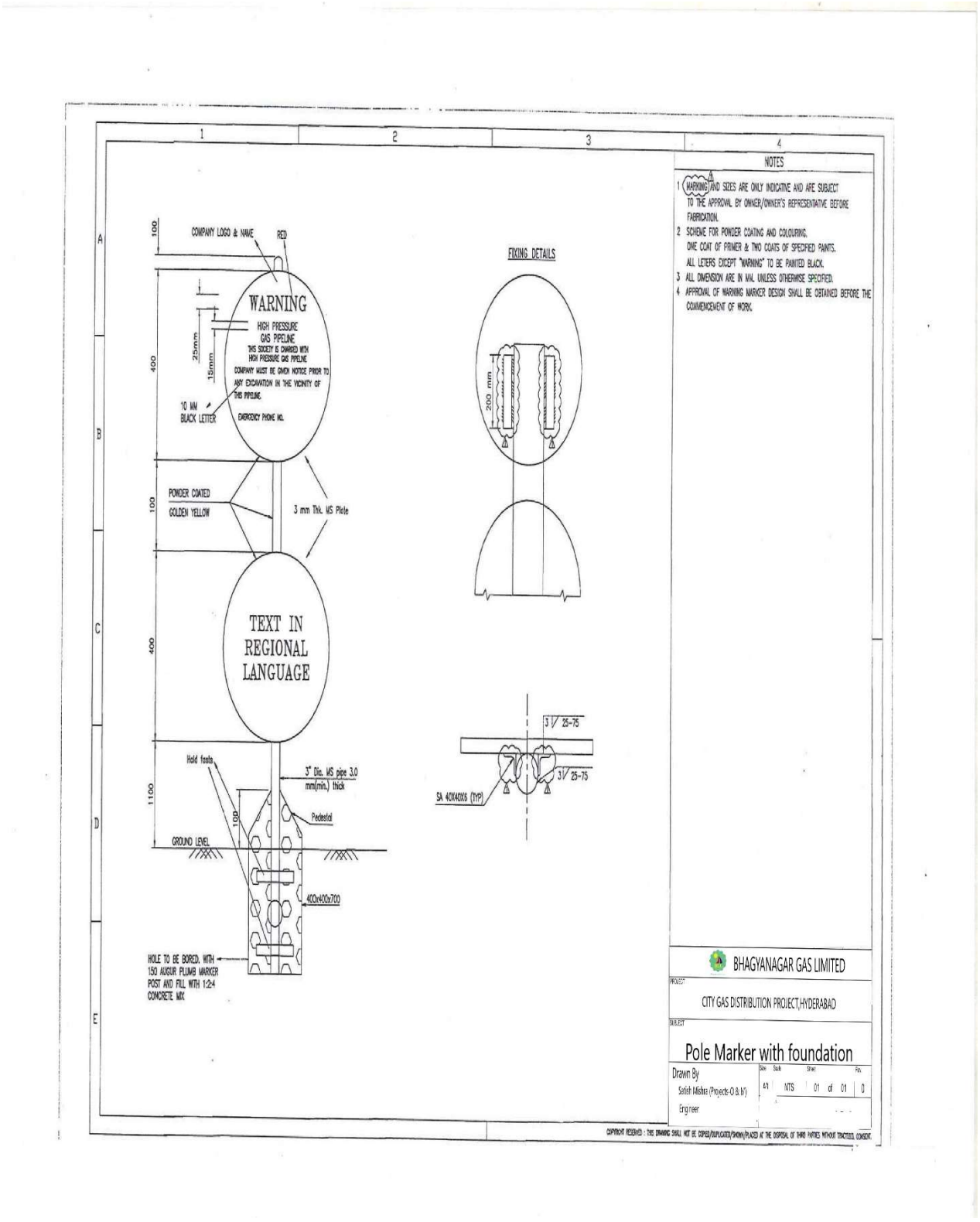


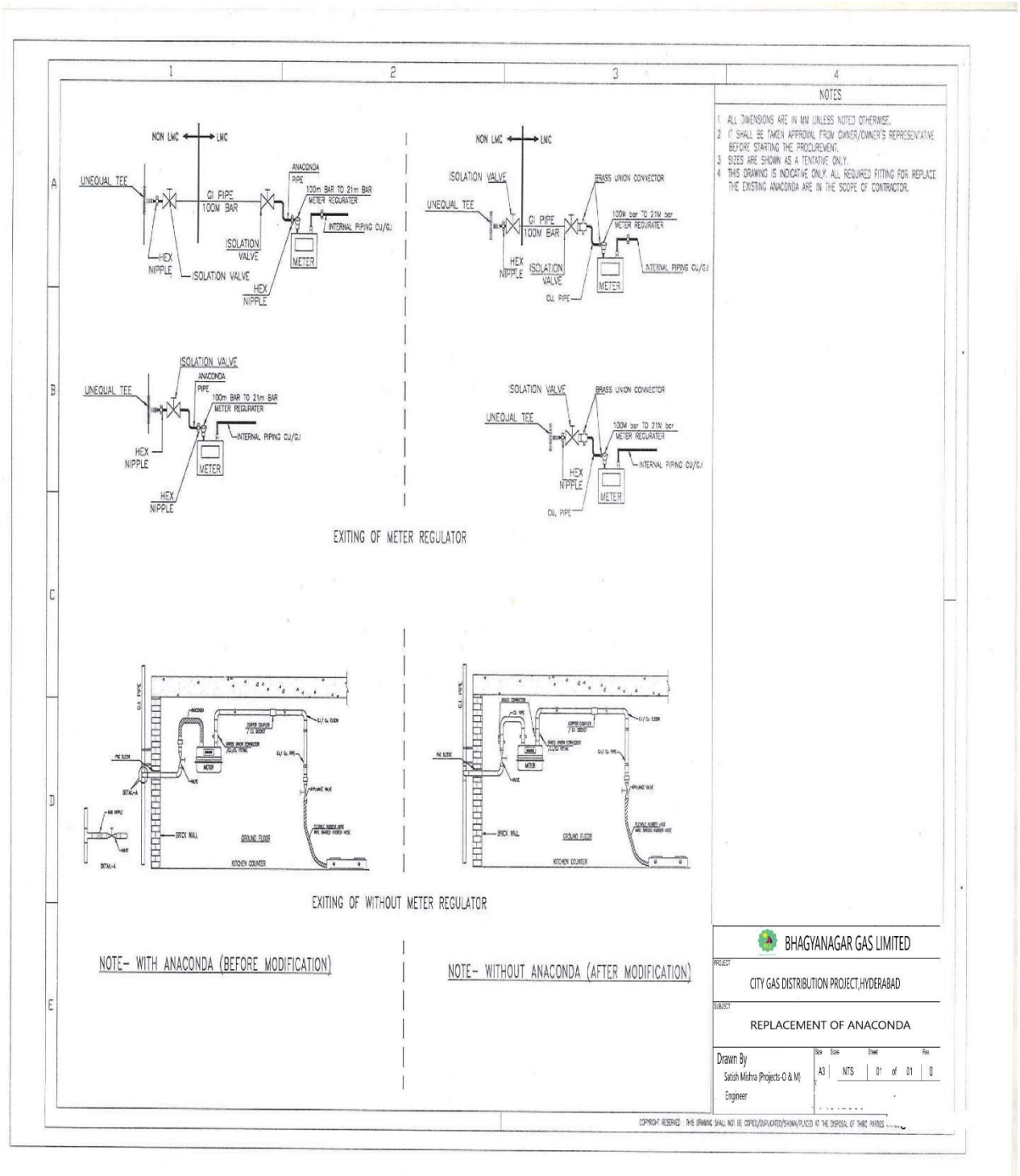












Bhagyanagar Gas Limited						
SCHEDULE OF RATES (SOR)						
Financial Bid / Priced Bid						
Bid Document ref: BGL/595/2023-24, dtd.14.11.2023						
Item: Annual Rate Contract for O&M allied services in Hyderabad GA						
		Name of Bidder:				
Sl. No.	**Service Accounting Code**	**DESCRIPTION**	**UOM**	**QTY.**	**RATE (Rs.)**	**TOTAL AMOUNT (Rs.)**
		MDPE WORKS				
1		**Attend/Repair works for Emergency leakages for MDPE Network:** Transportation including loading, unloading, handling of all free issue materials from BGL stores or Contractor's store to work site for repairing the emergency leakages from existing MDPE charged network. Scope includes providing manpower and machinery, RCC breakers, de-watering pump with fuel, driver/operator, transportation with all tools & all consumable required for the completion of attend/repair works. Execution of the work including excavation of the pits, dewatering (if required), Jointing, testing the network after repair, purging (wherever required), commissioning and backfilling, compaction, submission of testing and commissioning report as defined in bid document & as instructed by EIC / Site Engineer of Owner/ Consultant. Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims.				
	i	upto 32 mm dia	**Nos.**	**100**	₹ 2,000.00	₹ 2,00,000.00
	ii	63 mm dia.	**Nos.**	**30**	₹ 2,200.00	₹ 66,000.00
	iii	90 mm dia.	**Nos.**	**20**	₹ 2,500.00	₹ 50,000.00
	iv	125 mm dia.	**Nos.**	**20**	₹ 2,700.00	₹ 54,000.00

		Note: 1. Emergency team shall reach the leakage complain location within defined period of 25 minutes.				
		2. In case of valve replacement, dia. wise rate shall be applicable as per above SOR.				
		3. In case of involvement of JCB/ air compressor/pump/ RCC Breaker for repairing the network, additional payment shall be done as per applicable SOR item.				
2		**Shifting/Laying of MDPE Pipeline by any method** Receiving, handling, loading, transportation and unloading of owner supplied MDPE pipes & fittings, and other free issue items from BGL's designated stock yards to emergency site/Contractor's own stock-yards/ work-sites. Proper storing, stacking, identification, providing security and insurance cover for the materials. Liaisoning with Landowning agencies / statutory authorities, preparation of detailed route plan, making trial pits to determine the underground utilities/ services etc., obtaining permission from Land owning agencies,restoration of the abandoned excavation / trial pits (excavated to depth of 1.5 m or more as per satisfaction to EIC) to original condition,barricading the work area as per the procedures & drawings provided in the tender and as per the directions of EIC / site-in charge.Trenching to the required depth in normal surface, uncoiling / stringing of pipes, damping, jointing of the pipe ends/ fittings/ valves by qualified personnel, using approved electro fusion techniques as per specification, No separate payment shall be paid for liasioning, Pipeline laying by any method including excavation of the pits/trench, Lowering the MDPE pipe line in trench, padding around pipeline with suitable soil, supply & placement of PE warning mat over the pipeline along the complete route,jointing,flushing,testing, purging ,commissioning , backfilling with available excavated material and submission of as built graphs as defined in bid document & as instructed by EIC / Site Engineer of Owner/ Consultant. Compaction with jumping jack compactor and water at subsequent layers of 150 mm, placement of all tiles/ slabs/ curb stones etc. removed during excavation. Roads, pavements, footpaths etc. shall be made motorable wherever pipeline is laid. Cleaning the area of all unserviceable materials, debris, excess earth near trenches to the designated disposal area as per specifications,				

		instructions of land owners/ EIC to the complete satisfaction of local authorities. The laying shall be carried out by any methodology as per specification in consultation with EIC. All road crossing shall be carried out using HDPE casing pipe or as per the directions of EIC / site-in charge.(free issue item from BGL). Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims				
	i	Laying of Pipe line of size upto 20/32 mm dia. by any method (With or without casing)	m	3000	₹ 382.00	₹ 11,46,000.00
	ii	Laying of Pipe line of size upto 63 mm dia. by any method (With or without casing)	m	2000	₹ 397.00	₹ 7,94,000.00
	iii	Laying of Pipe line of size 90 & 125 mm dia. by any method (With or without casing)	m	1000	₹ 452.00	₹ 4,52,000.00
3		**Supply & installation of Saddle Jointing,1/2" TF and endcaps (It applicable for SOR no. 4)**				
	i	Supply and installation of 32 X 20mm saddle jointing	**Nos.**	**150**	₹ 650.00	₹ 97,500.00
	ii	Supply and installation of 63 X 20mm saddle jointing	**Nos.**	**80**	₹ 699.00	₹ 55,920.00
	iii	Supply and installation of 1/2" TF jointing	**Nos.**	**200**	₹ 339.00	₹ 67,800.00
	iv	Supply and installation of 20/32 mm end cap	**Nos.**	**200**	₹ 339.00	₹ 67,800.00
4		**Testing of MDPE Network & Internal pipeline & replacement of MDPE Fitting and find leakage if any & repair**				

		Pneumatic Testing of commissioned MDPE network at 4.0 bar to 110 mbar, internal piping of main line - service line at 4.0 bar to 110 mbar includes dismantling and re-installation of transition fitting of all sizes & all type of TF with replacement of damaged pipe. (wherever required), rectification of leakages (wherever required) as per instruction of EIC. Procurement of MDPE pipe fittings will be in scope of contractor. BGL as a free issue item. It also includes proper coordination and communication with residents/Users to conduct shut down on network. Restoring the wall surface to original by cleaning / touching of the corresponding paint to original as per instructions & to the satisfaction of the EIC. Tightening & Replacement of existing damaged pipe with new ones for MDPE pipe installations. It also includes installing new fitting wherever required as per directions of BGL O&M In charge. The rate includes procurement, inspection, transportation to site.				
		MDPE GRID TESTING (from inlets of mainline to TF Isolation Valve at 4.0 bar to 110 mbar (g))				
		Testing of MDPE Pipes Dia 20mm, 32mm and 63mm etc.				
	i	Up To 300 meters (Dia 20mm, 32mm and 63mm 90 mm and 125 mm etc)	**Nos.**	**10**	₹ 8,500.00	₹ 85,000.00
	ii	Up To 500 meters (Dia 20mm, 32mm and 63mm 90 &125mm etc)	**Nos.**	**20**	₹ 12,000.00	₹ 2,40,000.00
	iii	Up To 1000 meters (Dia 20mm, 32mm and 63mm 90 &125mm etc)	**Nos.**	**10**	₹ 17,000.00	₹ 1,70,000.00
	iv	Above 1000 meters charges (Dia 20mm, 32mm and 63mm 90 &125MM etc)	**Nos.**	**20**	₹ 34,500.00	₹ 6,90,000.00

5		**Installation of GI pipe with Fittings by threaded method / Copper Service Pipe only for modifications (including new or existing connection) :** To maintain minimum inventory of material, consumables as per instructions of BGL O&M in charge. Prior assessment of shortage & material requirement for installation at site, order placement for Purchasing of GI Pipes & GI Fittings, Copper pipes & Copper fittings, Brass Fittings from BGL's approved vendors (list attached in tender) , forwarding QAP for approval & subsequently arranging Inspection Call, Dispatch Clearance, handling, loading, transportation and unloading of these items at respective contractor's store. Receiving, taking over, handling, loading, transportation and unloading of owner supplied above ground items like regulators, meters, meter regulator, Isolation Valve, Appliance valve and other free issue items from Owner's designated stock yards to Contractor's own stores / work sites, proper storing, stacking, identification, providing security and insurance cover. Making temporary but stable platforms/ scaffolding/ rope ladders and supply of all other safety devices including full body harness.				

		Installation of GI/ Copper service pipes & fittings only for modifications & extra points, replacement of Meter/meter regulator, regulators, Valves etc. including NPT threading, as specified, Drillings of holes through the walls (Brick, RCC), Granite, Marble, Wood Cutting, Glass Cutting with proper heavy duty hammer drill machine, tools & tackles, using proper sealant/grout material and colors to match the original replacement of the damages during drilling, restoring the area to the original condition, Painting of entire length of pipe along with fittings after proper surface finish by one coat of approved primer paint and two coats of approved synthetic enamel paint. Restoring the wall surface to original conditions, Supply & fixing of approved clamps & dowel Plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape / lock tight, Joining of transition fittings to above ground service. GI pipes testing, purging and commission of the complete installation. Planning & coordination with existing consumer's for testing of existing risers and recommissioning of existing connections. All installation/re-installation carried out with GI/Copper will be paid on running meter basis . These rates include testing and commissioning. **This SOR shall be applicable only in case of emergency and leakage complaints.**				
	A	**Supply of GI fitting /Cu Pipe including Fittings and any other materials required to complete the activities(BGL approved vendor)**				
	i	Copper pipes: 12mm	**m**	**150**	₹ 271.70	₹ 40,755.00
	B	**Services**				
	i	Installation/ Re-installation of GI Pipes : 1/2"	**m**	**1500**	₹ 253.65	₹ 3,80,475.00
	ii	Installation/ Re-installation of GI Pipes : 3/4"	**m**	**500**	₹ 299.25	₹ 1,49,625.00
	iii	Installation/ Re-installation of GI Pipes : 1"	**m**	**100**	₹ 345.80	₹ 34,580.00
	iv	Installation/ Re-installation of GI Pipes : 1 1/2" & ABOVE	**m**	**100**	₹ 354.35	₹ 35,435.00
	v	Installation/ Re-installation of Cu Pipes	**m**	**100**	₹ 271.00	₹ 27,100.00

	vi	Re-installation of Appliance valve with reinforced rubber hose / Isolation valve (If service is performed without dismentling of existing GI/Cu pipes, in that case this SOR shall be applicable)	**Nos.**	**500**	₹ 225.00	₹ 1,12,500.00
	vii	Installation/ Re-installation of LMC part including meter/meter regulator (upto 4 mtr) Installation from riser (lateral isolation valve) - The cumulative length of 1/2" powder coated GI pipe within 2 m & Cu pipe within 2m or (GI + Cu) within 4m after lateral isolation valve up to appliance valve along with re-installation of meter, rubber hose with clamps. Additional quantity above 4 Meters (GI + Cu) shall be payable only in case if cumulative length exceeds 4 m. Payment against additional length of (GI / Cu) shall be against item 8B (a & e) of SOR.	**Nos.**	**150**	₹ 1,100.00	₹ 1,65,000.00
		Note:1.GI, Cu, brass fittings shall not be counted separately. It shall be included in the measurement of GI & Cu pipe.				
		2. Payment against Dismantling of GI Pipes and Copper Pipes (wherever applicable) shall be made as per SOR item no 5.				
6		**Disconnection/Dismantling/Removal of Threaded GI pipe & Fittings & Copper Pipes;** Dismantling/removal of GI & Copper service pipes & fittings or disconnection on customer/ end user request and store at contractor's store. After completion of contract, return back balance dismantled material to Owners Control room. This includes restoration of holes left out after removal at customer's premises. Contractor shall submit material details & meter reading data to control room immediately after dismantling or as directed by control room in charge. This SOR shall be applicable only in case of emergency and leakage complaints.				
	i	GI pipe 1/2"	**m**	**1500**	₹ 100.00	₹ 1,50,000.00
	ii	GI pipe 3/4"	**m**	**500**	₹ 110.00	₹ 55,000.00
	iii	GI pipe 1"	**m**	**100**	₹ 140.00	₹ 14,000.00
	iv	GI pipes: 1 1/2" & above	**m**	**150**	₹ 180.00	₹ 27,000.00
	v	Copper pipe 12 mm	**m**	**150**	₹ 115.00	₹ 17,250.00

	vi	Temporary Disconnection/Permanent Disconnection (TD/PD) by using Plug inside Kitchen/out side kitchen and without dismantling of existing pipes. This activiity includes supply of necessary fittings and removal of existing fitting (if required) to perform the job.	**Nos.**	**80**	₹ 250.00	₹ 20,000.00
		Note::GI, Cu, pipes and fittings dismantled shall be returned back to BGL Control room after material reconciliation against each PO.				
7		**Installation of CS/GI pipe alongwith / forged Fittings by welded method only for modifications (including new/existing connections):** To maintain minimum inventory of material, consumables as per instructions of BGL O&M in charge. Prior assessment of requirement for installation of riser & header at site, Procurement of GI Pipes (heavy duty) as per IS-1239 Part-I duly powder coated, forged fittings conforming to IS-1239 Part-II equivalent from any of the approved vendors of BGL. Scheduling, Planning of material & Forwarding inspection call, Getting Dispatch clearance from BGL, Handling, loading, transportation and unloading of these materials at contractor's store / site. Preparation and approval of sketches, schedules, execution procedures & WPS as per technical specification. All consumables e.g. electrodes,flux etc. for welding pipes and fittings are under contractor's scope. Finalizing optimum route in consent of BGL representative from transition fitting to last floor of building (wherever required) including lateral piece with isolation valve. Dismantling, Erection, Fabrication, Socket Welding, Testing & Installation of welded GI Pipes & Fittings etc., including NPT threading as per technical specification. Supply & fixing of MS angle clamps, Ceiling clamps & dowel plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape / lock tight, Supply and fixing of studs & bolts of various sizes ranging from 1/2" to 2", Jointing of transition fittings to above ground GI pipes, purging, testing and commissioning of the complete installation. In case of complete riser modification, welded riser shall be installed				

		after successful testing at ground level. Pneumatic testing shall becarried out for entire riser length after installation of riser as per technical specification. All the safety equipments,tools and tackles required for satisfactory execution of welding/installation work are under contractor's scope. Any other material & activities not mentioned/covered above, but otherwise required for satisfactory completion/safety of work as defined in tender has to be supplied / done by contractor within specified schedule at no extra cost to owner.				
		Services of GI Pipe forged Fittings and any other materials required to complete the activities				
	A	**Services**				
	i	Installation of GI Pipes : 1/2"	**m**	**150**	₹ 360.00	₹ 54,000.00
	ii	Installation of GI Pipes : 3/4"	**m**	**150**	₹ 435.00	₹ 65,250.00
	iii	Installation of GI Pipes : 1"	**m**	**150**	₹ 324.90	₹ 48,735.00
	iv	Installation of GI Pipes : 1 1/2" & above	**m**	**150**	₹ 397.10	₹ 59,565.00
	Note	1. forged fittings shall not be counted separately. It shall be included in the measurement of GI pipe.				
		2. Payment against Dismantling of welded GI Pipes (wherever applicable) shall be made as per applicable SOR item				
		3. Type of welding - Butt Weld shall be used for CS and Fillet Weld shall be used for GI pipes				
		4. NDT/testing of Weld joint other then pnumatic testing (wherever applicable) shall be carried out as per instruction of EIC.				
8		**Installation, commissioning for new D-PNG connections in gasified area**				

		To maintain minimum inventory of material, consumables as per instructions of BGL O&M in charge. Prior assessment of requirement for installation of riser & header at site, Procurement of GI Pipes (heavy duty) as per IS-1239 Part-I duly powder coated, forged fittings conforming to IS-1239 Part-II equivalent from any of the approved vendors of BGL. Scheduling, Planning of material & Forwarding inspection call, Getting Dispatch clearance from BGL, Handling, loading, transportation and unloading of these materials at contractor's store / site. Preparation and approval of sketches, schedules, execution procedures as per technical specification. All consumables e.g. electrodes,flux etc. for threaded/welding pipes and fittings are under contractor's scope. Finalizing optimum route in consent of BGL representative from transition fitting to last floor of building (wherever required) including lateral piece with isolation valve. Dismantling, Erection, Fabrication, Socket Welding, Testing & Installation of welded/threaded GI Pipes & Fittings etc., including NPT threading as per technical specification. Supply & fixing of MS angle clamps, Ceiling clamps & dowel plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape / lock tight, Supply and fixing of studs & bolts of various sizes ranging from 1/2" to 2", Jointing of transition fittings to above ground GI pipes, purging, testing and commissioning of the complete installation. In case of complete riser modification, welded riser shall be installed after successful testing at ground level. Pneumatic testing shall becarried out for entire riser length after installation of riser as per technical specification. All the safety equipments,tools and tackles required for satisfactory execution of welding/installation work are under contractor's scope. Any other material & activities not mentioned/covered above, but otherwise required for satisfactory completion/safety of work as defined in tender has to be supplied / done by contractor within specified schedule at no extra cost to owner.				
	a	Online connection, where the riser available in the society or apartment upto 5mtrs	**Nos**	**1000**	₹ 2,070.00	₹ 20,70,000.00

	b	Installation, testing and commissiong of meter including meter regulator and nessessry works	**Nos**	**1500**	₹ 488.30	₹ 7,32,450.00
	c	Installation, testing, and commissioning of meter regulator, If not availbale meter regulator only	**Nos**	**800**	₹ 143.45	₹ 1,14,760.00
	d	Installation, testing and commissioning of GI/Cu pipeline of meter outlet **upto 2 meter**	**m**	**1500**	₹ 542.40	₹ 8,13,600.00
	e	Supply, Installtion, testing and commissiong of appliance valve	**Nos**	**800**	₹ 198.55	₹ 1,58,840.00
	f	Supply, Installtion, testing and commissiong of Isolation valve/MCV	**Nos**	**1000**	₹ 240.35	₹ 2,40,350.00
	g	Installation of service regulator along with civil works, As per SIC/EIC	**Nos**	**30**	₹ 538.65	₹ 16,159.50
	h	Installation, testing and commissiong of D-PNG connections, where TF is not availbale up to 10 meters for GC including necessary materials..	**Nos**	**500**	₹ 4,586.78	₹ 22,93,387.50
9		**Dismantling/Removal of Welded GI pipe & forged Fittings :** Dismantling/removal of GI service pipes & forged fittings on customer/ end user request and store at contractor's store. After completion of contract, return back balance dismantled material to Owners Control room. This includes restoration of holes left out after removal at customer's premises. Contractor shall submit material details & meter reading data to control room immediately after dismantling or as directed by control room in charge. This SOR shall be applicable only in case of emergency and leakage complaints.				
	a	GI pipe 1/2"	**m**	**100**	₹ 160.00	₹ 16,000.00
	b	GI pipe 3/4"	**m**	**100**	₹ 180.00	₹ 18,000.00
	c	GI pipe 1"	**m**	**50**	₹ 190.00	₹ 9,500.00
	d	GI pipes: 1 1/2" & above	**m**	**50**	₹ 235.00	₹ 11,750.00
	Note:	GI pipe and fittings dismantled shall be returned back to BGL Control room after material reconciliation against each PO.				

10		**Painting - GI pipes, Manhole Cover:** Painting of manhole cover/ above ground entire length of GI pipe along with fittings of various sizes installed at domestic and commercial/Industrial connection after proper surface finish by one coat of approved primer paint and two coats of approved synthetic enamel paint complete as per specifications & directions of EIC. Restoring the wall surface to original by cleaning / touching of the corresponding paint to original as per instructions & to the satisfaction of the EIC.				
	a	1/2"	**m**	**5000**	₹ 50.00	₹ 2,50,000.00
	b	3/4"	**m**	**3000**	₹ 60.00	₹ 1,80,000.00
	c	1"	**m**	**1000**	₹ 70.00	₹ 70,000.00
	d	1 1/2" & Above	**m**	**500**	₹ 80.00	₹ 40,000.00
	e	Manhole Cover	**Nos.**	**200**	₹ 700.00	₹ 1,40,000.00
	f	FRS/MRS all type of skid	**Nos.**	**40**	₹ 6,000.00	₹ 2,40,000.00
11		**Testing of Riser & Internal Pipe, Meter Check & replacement of clamps :** Pneumatic Testing of commissioned GI Riser at 2.0 bar, internal piping of kitchen - GI or Copper at 100/150 mbar includes dismantling and re-installation of regulators of all sizes & all type of diaphragm Meter with replacement of damaged pipe, anaconda, meter clamps, brass valves & fittings-GI, Copper or Brass as per specifications. It includes checking of meters & replacement of faulty meter (wherever required), rectification of leakages (wherever required) as per instruction of EIC. Procurement of GI/Copper pipe & fittings, Brass fittings & GI /CU Clamps will be in scope of contractor. All type of regulators, all type of diaphragm Meter and Brass valves will be provided by BGL as a free issue item. It also includes proper coordination and communication with residents/Users to conduct shut down on riser. Restoring the wall surface to original by cleaning / touching of the corresponding paint to original as per instructions & to the satisfaction of the EIC. Tightening & Replacement of existing damaged clamps				

		with new ones for GI & Copper installations. It also includes installing new clamps wherever required as per directions of BGL Control room In charge. The rate includes procurement, inspection, transportation to site.				
	A	**RISER TESTING (from outlets of Regulator to Meter Isolation Valve at 2.0 bar (g)), if required for New riser commissiong**				
	i)	Testing of GI Pipes (1/2"/ 3/4"/ 1" and above)	**m**	**8000**	₹ 30.00	₹ 2,40,000.00
12		**Installation of new or replacement of damaged GI sleeves / Half round RCC Sleeves/ RCC Crush Guard:** Supply & installation of GI Sleeves, 2.5" NB x 300 mm length GI Sleeve / Half Round Concrete Sleeves/Crush Guard for domestic connections , 3" NB x 300 mm length GI Sleeve for commercial and industrial installations, Squeezing of MDPE pipe near to Transition fittings ,dismantle of regulator, shutdown the riser /individual connections,insertion of GI pipe, sealing the annulus, firm fixing of the sleeves with concrete mix, preparation of pedestal & restoration of excavated pits within the size of pedestal as defined in technical specification and instruction of EIC.The rate includes liaisoning with statutory bodies if required and no separate rates are payable.				
	a	Supply and installation of RCC Half Round Sleeves with pedestal	**Nos.**	**1300**	₹ 375.00	₹ 4,87,500.00

	b	Supply and installation of GI Sleeves, 2.5"/3" NB, 1' length with pedestal	**Nos.**	**1300**	₹ 175.00	₹ 2,27,500.00
	c	Supply and installation of RCC Crush Guard with PCC pedestal	**Nos.**	**1000**	₹ 375.00	₹ 3,75,000.00
	d	Sand filling in all type of sleeves	**Nos.**	**1000**	₹ 50.00	₹ 50,000.00
13		**Modification of Old Transition Fittings / Temporary Disconnection of MDPE service pipe line for existing user:** Scope includes excavation, breaking any obstructions, Squeezing of MDPE pipe near Transition fittings or as per instruction of EIC and modification/shifting of PE pipes,dismantling regulator,shutdown the riser/individual connections, modification of GI pipe, Installation of isolation valve (if required), saddle cutting (if required), re-testing , commissioning of GI and MDPE pipe, sealing the annulus, firm fixing of the sleeves with concrete mix, preparation of pedestal & restoration of excavated pits within the size of pedestal as defined in technical specification and instruction of EIC.The rate includes liaisoning with statutory bodies if required. all civil works including supply of manpower, materials, excavation of pit including PCC , finishing, clean up and restoration as defined in technical specification & instruction of EIC.Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims				
	a	Modification of Old Transition Fittings	**Nos.**	**500**	₹ 850.00	₹ 4,25,000.00
	b	Temporary Disconnection of MDPE service pipe line for existing user	**Nos.**	**300**	₹ 1,000.00	₹ 3,00,000.00
14		**Construction, Repair & Maintenance of valve Chambers:** All civil works including supply of manpower, materials, excavation of pit, piping supports including all PCC, RCC and Brick works for valve pits, addition of water proofing agent, pedestals with insert plates as required, sealing of pipe at pits, providing cover etc., finishing, clean up, dewatering (if required) and restoration as per technical specification & instruction of EIC. scope also includes installation of PE valve in valve chamber with required squeezing of on line Gas networkcutting,cleaning,electrofusion jointing,testing and commissioning of gas network. Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party				

		claims				
	a	Fabrication and erection of new Valve chambers as per drawing - RCC - 1.5 m x 1 m	**Nos.**	**30**	₹ 35,000.00	₹ 10,50,000.00
	b	Fabrication and erection of new Valve chambers as per drawing - Brick - 1.5 m x 1 m	**Nos.**	**30**	₹ 22,500.00	₹ 6,75,000.00
	c	Repair/Modification in size, increase/decrease in height of valve chambers - RCC Type	**Cum**	**10**	₹ 12,000.00	₹ 1,20,000.00
	d	Repair/Modification in size, increase/decrease in height of valve chambers - Brick Type	**Cum**	**10**	₹ 9,500.00	₹ 95,000.00
	e	Fabrication of fresh top RCC slab along with manhole cover of all type & sizes of valve chambers -For RCC & Brick Type	**Nos.**	**10**	₹ 8,000.00	₹ 80,000.00
	f	Providing manhole cover of valve chambers (only in case where manhole cover is damaged/ lost)	**Nos.**	**50**	₹ 2,800.00	₹ 1,40,000.00
	g	Cleaning & Sand filling in Valve Chamber	**Cum**	**25**	₹ 1,500.00	₹ 37,500.00
	h	Supply & installation of HD-20 SFRC slabs for SS tubing trench and PNG area (If required)	**m2**	**20**	₹ 12,500.00	₹ 2,50,000.00
	Note	In case of Fabrication and erection of new RCC Valve chamber (Size 1.5 m x 1 m), precast chamber is also acceptable.				
15		**Fabrication, Installation, Painting & Relocating of Pipeline Markers:** Supply and Installation /reinstallation of Route Markers / Pole Markers/plate marker as per the attached drawings, along the route / along boundary wall, lamp posts including all associated civil works such as excavation and construction in all types of soils, construction of pedestals and grouting with concrete, cleaning, supply and application of approved color and quality of primer and paint, stencil letter cutting of numbers, direction, chainage etc., restoration of area to original condition and performing all works as per drawings, specification and instruction of Engineer-in-Charge.Contractor will provide a list of installation or reinstallation of in charge and get their approval before start of work. Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims				
	I	**Painting of Route Markers - RCC, Pole & Stone**				

	a	RCC Marker	**Nos.**	**2000**	₹ 350.00	₹ 7,00,000.00
	b	Pole Marker	**Nos.**	**500**	₹ 550.00	₹ 2,75,000.00
	II	**Re- installation of uprooted Route Markers - RCC, Pole, Stone**				
	a	For All types of markers	**Nos.**	**500**	₹ 400.00	₹ 2,00,000.00
	III	**Supply & Installation of Route Markers - RCC, Pole & Plate**				
	a	RCC Route Markers as per Drawing and instructions of EIC and specification.	**Nos.**	**500**	₹ 900.00	₹ 4,50,000.00
	b	Pole markers with foundation as per Drawing and instructions of EIC and specification.	**Nos.**	**100**	₹ 4,000.00	₹ 4,00,000.00
	c	Plate markers as per Drawing and instructions of EIC and specification.	**Nos.**	**500**	₹ 500.00	₹ 2,50,000.00
	d	Refurbishment of existing Plate Markers. (It includes immediate replacement of old marker with new marker and refurbishment of old marker for further use.)	**Nos.**	**150**	₹ 300.00	₹ 45,000.00
16		**Painting & Stencilling of Pipeline Markers:** Cleaning, supply and application of approved color and quality of primer and paint, stencilling as per instruction of Engineer-in-Charge. (copy of stenciling samples shall be submitted to BGL)The rate also includes liaisoning with statutory bodies etc.				
	a	For All types of markers - upto 20 Digits/ Characters on individual markers	**Nos.**	**500**	₹ 225.00	₹ 1,12,500.00
Note:		1. Contractor will provide a list of stencilling of markers to control room in charge and get their approval before start of work.				
17		**NG Conversion:** Conversions of all types of LPG Kitchen appliances to NG based appliances, Supply & changing of the nozzles / jets and associated controls for domestic & imported appliances including oven and grill with proper tools and tackles. The rate also includes testing of Kitchen piping from Isolation Valve to Appliance valve and supply and fixing of Reinforced rubber hose with clamps. Cleaning and performing minor maintenance, greasing etc. and all associated works for conversion of appliance. Testing and displaying the performance to the				

		customer, signing of joint meter records (wherever required) and instructing safety norms to the customer as per specifications & to the satisfaction of customer / owner / Engineer in Charge. Any other material & activities not mentioned/covered above, but otherwise required for satisfactory completion/safety of work as defined in tender has to be supplied / done by contractor within specified schedule at no extra cost to owner.				
	a	Supply of Reinforced rubber hose with clamps - upto 1.00 mtr	**Nos.**	**2000**	₹ 100.00	₹ 2,00,000.00
	b	Supply of Reinforced rubber hose with clamps - moretehn 1.00 mtr & upto 1.5 meter	**Nos.**	**2000**	₹ 120.00	₹ 2,40,000.00
18		Rectifying Flame problem of domestic & imported appliances including oven and grill with proper tools and tackles. The rate also includes testing of Appliance & Reinforced Rubber Hose from Appliance valve to inlet of appliance and fixing of clamps (wherever required). Cleaning and performing maintenance, greasing etc. and all associated works for rectifying flame proble. Displaying the performance of Burner to the customer, signing of reports and instructing safety norms to the customer as per specifications & to the satisfaction of customer / owner / Engineer in Charge. Any other material & activities not mentioned/covered above, but otherwise required for satisfactory completion/safety of work as defined in tender has to be supplied / done by contractor within specified schedule at no extra cost to owner. (Applicable only after 15 days from the date of conversion of appliance)				
	a	Conversion of appliances brners from LPG to PNG Or PNG to LPG	**Nos**	**5000**	₹ 80.00	₹ 4,00,000.00
	b	Drill in all type of slab during NG conversion	**Nos**	**1000**	₹ 350.00	₹ 3,50,000.00
19		Supply and service for replacement/installation of PVC clamp for copper	**Nos.**	**500**	₹ 35.00	₹ 17,500.00
20		Supply and instllation of clamps for GI Pipes				
	a	Supply and service of replacement/installation of clamps for ¾" / ½ " GI pipes	**Nos.**	**800**	₹ 45.00	₹ 36,000.00
	b	Supply and service of replacement/installation of clamps for 1" & above GI pipes	**Nos.**	**200**	₹ 55.00	₹ 11,000.00

	Note	Item no. 18 to 20 will be applicable in case above mentioned specific activities carried out as per instruction of EIC	Nos.			
21		**ATTEND / REPAIR Work for Emergency leakage from welded/threaded Joints - Above Ground Piping:** Transportation including Loading, unloading, handling of all piping items from Owner's and/ or Contractor's storage point to work at site/ workshop as applicable, complete work of cutting, bevelling and edge preparation,grinding the edges of pipes, fittings, etc. including Non-destructive testing (wherever applicable) as per tender specification & instruction of EIC., testing of pipes and fittings and making ready for further Commissioning / Start-up of piping spools of all sizes and ratings including supply of all consumables, equipment, manpower and other resources and execution, but not limited to, the following works in accordance with relevant specifications indicated , and as per instructions of Engineer-in-charge. Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims				
	a	1/2"	**Nos.**	**20**	₹ 2,200.00	₹ 44,000.00
	b	3/4"	**Nos.**	**20**	₹ 2,400.00	₹ 48,000.00
	c	1"	**Nos.**	**10**	₹ 2,800.00	₹ 28,000.00
	d	1 1/2" & above	**Nos.**	**10**	₹ 3,200.00	₹ 32,000.00
Note		The quantity of repair work shall be payable based on no. of weld joint/Threaded joint.				
22		**REPLACEMENT OF Riser REGULATOR(4 bar to 21 mbar)** Scope includes providing manpower and machinery with fuel, driver/operator, transportation with all tools & consumable required, prior intimation to Consumers/society/RWA, replacement of regulator, receiving and transportation of free issue material from BGL stores or Contractor's store to site for repairing the leakage from any joints. Execution of the work including rectification of regulator leakages points by replacing the regulator & submit report as defined in bid document & as instructed by EIC / Site Engineer of Owner/ Consultant. Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims	**Nos**	**300**	₹ 450.00	₹ 1,35,000.00

23		**Supply & installation of SS gauge:** Supply & installation of SS pressure/temperature gauge of approved make as per data sheet & Drawing attached in the tender Installation of pressure gauges and their accessories inclusive of supply of necessary piping materials and tubings alongwith all necessary valves and fittings, fabrication and installation of impulse lines / manifolds and hydraulic testing and calibration as per installation standard.				
	A	**Supply and installation of Pressure Gauge with calibration certificate and any other materials required to complete the activities**				
	a	Range 0-4 BAR - 4"- DIAL SIZE	**Nos.**	**10**	₹ 1,437.50	₹ 14,375.00
	b	Range 0-10 BAR - 4"- DIAL SIZE	**Nos.**	**10**	₹ 1,437.50	₹ 14,375.00
	c	Range 0-49 BAR - 4"- DIAL SIZE	**Nos.**	**10**	₹ 2,070.00	₹ 20,700.00
	d	Range 0-10 BAR - 2"- DIAL SIZE	**Nos.**	**10**	₹ 1,437.50	₹ 14,375.00
	e	Range 0-7 BAR - 1"- DIAL SIZE	**Nos.**	**15**	₹ 1,437.50	₹ 21,562.50
	f	Range 0-400 BAR - 1"- DIAL SIZE	**Nos.**	**5**	₹ 2,070.00	₹ 10,350.00
	g	Range 0-250 BAR - 1"- DIAL SIZE	**Nos.**	**5**	₹ 1,725.00	₹ 8,625.00
	h	Range 0-160 BAR - 1"- DIAL SIZE	**Nos.**	**5**	₹ 1,840.00	₹ 9,200.00
	i	Digital pressure gauge Range - 0-10 bar & 1/2" DIAL SIZE	**Nos.**	**3**	₹ 17,250.00	₹ 51,750.00
	j	Digital pressure gauge Range - 0-300 bar & 1/2" -1" DIAL SIZE	**Nos.**	**2**	₹ 34,500.00	₹ 69,000.00
	B	**Supply and installation of Temperature Gauge with calibration certificate and any other materials required to complete the activities**				
	a	Range 0-60 deg.C- 4"- DIAL SIZE	**Nos.**	**20**	₹ 2,242.50	₹ 44,850.00
24		**Supply and installtion of Earth pits.**				
	a	Construction of Earth pit to equpments like DRS, MRS,etc… including engineering, design, pit construction and other requiments. Which will be need to provide, as per EIC/SIC.	**Nos.**	**20**	₹ 6,850.00	₹ 1,37,000.00

	b	Eirth grid wire or GI plate of 50X30 meter with GI wire	**m**	**50**	₹ 280.00	₹ 14,000.00
25		**Supply, Installation of caution board/ Warning signages:** Supply and Installation of warning /caution boards as per the instruction of SIC/EIC. including all associated works such as excavation and fabrication in all types of Stations, MRS, DRS, in GA locations. Painting,stencling, supply and application of approved color and quality of primer and paint, stencil letter cutting of numbers, direction, safety precatuions, etc., restoration of area to original condition and performing all works as per drawings, specification and instruction of Engineer-in-Charge.Contractor will provide a list of installation or reinstallation of in charge and get their approval before start of work. Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims. As per SIC/EIC.				
	a	Supply and installation along with all accessories	**Sq.f**	**50**	₹ 200.00	₹ 10,000.00
	b	Supply and installation of sticker or painting on existing signages	**Sq.f**	**50**	₹ 60.00	₹ 3,000.00
26		**Supply & Installation of FLP (Fixtures/ Capacitor/ 250 W bulbs)** **S**upply and installation of CIMFR certified LED flamproof wellglass in die cast Al housung with heat resistant toughened glass. recomnded fr Gas/vapor groiup of IIA & IIB and 1&2. IP65 protected. performing all works as per instruction of Engineer-in-Charge/SIC. (PESO approved)	**Nos**	**10**	₹ 29,670.00	₹ 2,96,700.00

27		**STEEL FABRICATION & MECHANICAL WORKS:** Fabrication of MS structural / Mechanical works of different sizes (all material to be ISI Mark) including supply of materials i.e hinges nuts, bolts, washers of all sizes etc. / MS plates/Sheets of requiredd size as per site requirements / EIC, primer coating / painting etc and transportation at site, as required (complete in all respect) any specific part /piece/materials may be paid separately, if required however fabrication part remains included. Fabrication & Fixing of Different type of fabricated structures / mechanical covers for valve pits / man holes with its frame,if required and other supports & etc mechanical works. (This will include the removal of old/damaged scrap materials from site to the designated place by EIC, if required as asked for).	MT	2	₹ 92,000.00	₹ 1,84,000.00
28		**PAINTING on SKIDS/MS FENCING:** Painting of skid after surface preparation which are situated at various locations of city. Scope include removal of dust , grease and loosely adhering paint with wire brush emry paper and cleaning with linen cloth. touch up primer shall be high solid polyamine cured epoxy one. Finish coat should be of epoxy paint. Colour as per instruction of EIC.	M2	300	₹ 1,550.00	₹ 4,65,000.00
29		**EXCAVATION WORKS :** Earth work in excavation below ground level for all kinds of works in all types of soil as directed for a depth upto site requirements (for the purpose meant for taking up any work by owner) including removal of vegetation, shrubs and debris, cutting and dressing of sides in slopes, leveling, grading and ramming of bottoms, de- watering of accumulated water from any source and keeping the surface dry for subsequent works and disposal or stacking of excavated material at undisputed place, as directed including providing temporary suports to existing service lines like water pipes, sewage pipes, OFC, electric overhead and underground cables etc. all complete.	M3	25	₹ 2,219.00	₹ 55,475.00

30		**RESTORATION WORKS**: Supply of proper grade of selected materials as per EIC & to be arranged by contractor at their risk & cost and back filling by compaction / watering / making crown as per site requirement or as per EIC. Restoration of trenches & pits excavated for repairing of damaged or for rerouting/modifications of laid/existing MDPE pipeline to original conditions, surface like Asphalted/Bituminous Road, Concrete Pavement, Agra & Kota Stones, Tiles (Chequered/Interlocking etc.), Dry Brick Pavement as per the technical specifications attached in the tender after laying of pipeline for Built- Up surface as per the directions of EIC / Site In charge. Scope includes supply of approved quality material, testing of materials by third party agencies (if required) as per technical specification / CPWD / IRC Standards, submission of the restoration reports. The NOC from local authorities (if required) will be as per direction of EIC/ BGL O&M In charge. It includes cases, where excavation was carried out to repair the damaged section of pipeline/where the trench settles despite earlier restoration.	M3	60	₹ 11,000.00	₹ 6,60,000.00
31		**DISMANTLING OF EXISTING STRUCTURES**: Dismantling of existing RCC work / any Civil Structures : The dismantling of the structure and the debris is to be thrown or placed to a location desired by EIC. The purpose of the dismantling is to make ready for repair or re- work.This structure may include like skid Foundation/Valve Chambers / etc structure.	M3	10	₹ 3,000.00	₹ 30,000.00
32		**PLAIN CEMENT CONCRETE:** Supplying and laying plain cement concrete (including shuttering of required) in all types of concrete works including leveling courses below foundation, substructure, superstructure, chambers, cable trench, under floors and any other locations, at all levels as per drawings, specifications and directions of the Engineer- in-chargeand as per scope of work. PCC 1:2:4 (Rate to include cost of all labour, tools, tackles, equipment, hire charges, supply of all materials, shuttering, earthwork in excavation and backfilling using approved earth in all conditions etc. with all bye works and sundry works.) 1 Cement : 2 Coarse sand : 4 stone aggregate, 40mm nominal size.	M3	30	₹ 7,365.00	₹ 2,20,950.00

33		**BRICK WORK:** Brick Works of all types including surrounding the metering skid area and making stairs to reach metering skid plate form. This item includes the plastering with cement mortrar with ratio of 1:6 also. Bricks to be used of First Class Quality and this item also includes all labour, scaffolding materials etc. All complete as per direction EIC.	M3	10	₹ 6,658.25	₹ 66,582.50
34		**SAND FILLING:** Supplying & filling Sand in layers and compacting by rolling,ramming, consolidating & dressing the surface including the cost of Sand & its transportaion as specified by EIC in all respect.(rates to include cost of all labour,tools,tackles, equipments,hire charges & etc whatever are required)	M3	20	₹ 1,282.50	₹ 25,650.00
35		**RCC WORK:** Providing of laying Reinforced Cement of grade M25 with 20mm and down grade crushed stone aggregate in all types of structures like foundations, pedestals, pedestal bases, pipe supports, sleepers cable trench including construction joints, bitumen painting on surface in contact with soil, providing and fixing reinforcing steel, shuttering, inserts, finishes etc. at all depths and heights complete as per drawings, specifications and direction of the EIC. (Including cost of providing Shuttering etc) .	M3	15	₹ 10,846.00	₹ 1,62,690.00
36		**REINFORCEMENT STEEL:** Supplying & Fabricating & Fixing in positionHYSD Steel Reinforcement / TMT Grade Fe-415 conforming to IS 1786- 1985 at all level (all depth & Height) and positions including the cost of transport, Straightening, Cutting, Bending , Cranking, Binding, Welding, provision of necessary chairs and Spacers, Preparation of Bar bending, schedule, getting the same approved by EIC etc., complete as per drawings and specifications and including the cost of binding wire, labour etc. all complete in all respect as per scope of work in detail construction drawings, technical specifications and direction of EIC. The chairs & Spacers bars provided will be measured for payments.	MT	1	₹ 89,650.00	₹ 89,650.00

37		**PROVIDING CHAIN LINK FENCING: Supply & Installation** Hot dip G.I. chain link fencing woven Hot dip G.I. chain link fencing woven with (50x50) mm diamond shaped. The same shall be fixed over single iron with post vertical maximum 2.00 meter distance centre alongwith crossed brasing of 4 mm thick wire controlmap to cs 40x40x5 mm to centre for enclosing metering skids/Valve Chamber/Odourising Unit/Eqpuipment/ or as per instruction of EIC etc at different / various / scattered locations within CGD network. Encloser of metering skid/Valve Chamber/Odourising Unit/Eqpt etc shall be of any suitable size as per EIC or as per the space available.	M2	100	₹ 330.00	₹ 33,000.00
38		**REPAINTING OF CHAIN LINK FENCING:** Repainting of chain link fencing/Welded Mesh Fencing alongwith its support i.e. Angle Iron, channel or at any other article with structure: Complete Painting (after proper cleaning) with paint for galvanized Iron/Alluminium paint of approved brand & manufacturar. (Measurement will be taken of one side only) including cleaning of rust with wire brush.	M2	400	₹ 200.00	₹ 80,000.00
39		**WATER PROOFING OF VALVE CHAMBERS:** Water Proofing of Valve Chamber with RCC type surface, having the size upto 2 m X 2 m X 2 m Size as per scope of work. Providing and laying integral cement based treatment for water proofing on horizontal surface at all depth below ground level for under ground structures as directed by Engineer-in-Charge and consisting of 25 mm thick cement mortar 1:3 (1 cement: 3 coarse sand) mixed with water proofing compound in recommended proportions. Rate to include supply of all material, all machinery, tools & tackles for carrying out the job. Rate also include the serface preparation/cleaning of valve chamber walls for the job. 50% of payment will be done upon execution of work and balance payment will be done only after observing satisfactory performance of water proofing treatment till next one calender year from the date of execution of item.	Nos	4	₹ 10,000.00	₹ 40,000.00

40		**WALL PAINTING WORK FOR INTERIOR:** Provinding services for pianting on Inside walls and ceilings of rooms/ buildings with acrylic washable distemper after proper suerface preparation. Includes supply of all necessary materials, consumables, paints, tools and ladder etc as per scope of work.	M2	200	₹ 50.00	₹ 10,000.00
41		**WALL PAINTING WORK FOR EXTERIOR:** Outside wall with weather resistant exterior paint such as "Weathershield" of ICI or "Apex Ultima" of Asian Paints or "Narolac suraksha advance" of approved color after proper surface preparation. Includes supply of all necessary materials, consumables, paints, tools and ladder etc as per scope of work.	M2	200	₹ 30.00	₹ 6,000.00
42		**Shifting and Installation of FRS/MRS:** Scope includes Dismantling (if required), Loading at BGL's store/ site, Transportation to another store/ site, Unloading , shifting and installations of skids on the platform / foundation using cranes / hydra with fuel, driver/operator and all consumable required as per site conditions. Rates are inclusive of liaisoning with statutory authorities,other utility agencies and settlement of 3rd party claims				
	i	Shifting and installations of FRS/MRS skids (for weight upto 3 TONNES)	**Nos.**	**5**	₹ 22,000.00	₹ 1,10,000.00
	ii	Shifting and installations of FRS/MRS skids (for weight MORE THAN 3 TONNES and upto 10 TONNES)	**Nos.**	**5**	₹ 30,000.00	₹ 1,50,000.00
43	**43.1**	**Materials transportation/ Shifting (Upto 4 Ton capacity Vehicle)**				
	i	BGL site location to store/other location up to 15 km/trip including loading & Unloading	**Nos**	**5**	₹ 8,000.00	₹ 40,000.00
	ii	BGL site location to store/other location up to 50 km/trip including loading & unloading	**Nos**	**5**	₹ 15,000.00	₹ 75,000.00
	43.2	**Materials transportation/ Shifting (Upto 06 Ton capacity Vehicle)**				
	i	BGL site location to store/other location up to 15 km/trip including loading & Unloading	**Nos**	**5**	₹ 12,500.00	₹ 62,500.00

	ii	BGL site location to store/other location up to 50 km/trip including loading & unloading	**Nos**	**5**	₹ 20,500.00	₹ 1,02,500.00
44		**SUPPLY OF LABOURS:** Laboures with Genti, Phawara, Khurpi, Tasla,sledge hammer, crow bar/long chisel & other tools required for completion of works as per directions of EIC				
	a	Unskilled manpower with necessary tools, As per EIC/SIC	MAD	70	₹ 846.40	₹ 59,248.00
	b	Semi-Skilled manpower with necessary tools, As per EIC/SIC	MAD	70	₹ 938.40	₹ 65,688.00
	c	Skilled manpower with necessary tools like welder etc., As per EIC/SIC	MAD	70	₹ 1,031.55	₹ 72,208.50
45		**Hire charges for JCB / Hydra including all consumables such as Diesel etc. and Wages of operator.(Not includes SOR no. 1,2,3 &4)** Scope includes providing JCB for excavation of earth/LCV for transportation of material and manpower / tractor mounted air compressor/pump (for removal of water/mud from trench or pits)/ RCC Breaker machines with fuel, driver/operator, transportation with all tools & tackles and consumables required in emergency within stipulated time frame as defined in tender document. Payment for deployment of JCB/tractor mounted air compressor/pump (for removal of water/mud from trench or pits)/ RCC Breaker Compressor shall be done for minimum 4 hours. Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims for damages by JCB/tractor mounted air compressor/ pump/ RCC Breaker m/c.				
	i	Hiring of JCB / Hydra M/c	HR	80	₹ 1,200.00	₹ 96,000.00
	ii	Hiring of Tractor Mounted Air Compressor	HR	50	₹ 1,100.00	₹ 55,000.00
	iii	Hiring of Pump (min. 5HP) for removal of water/mud from trench/pits	HR	50	₹ 550.00	₹ 27,500.00
	iv	Hiring of RCC Breakers	HR	50	₹ 1,212.50	₹ 60,625.00

46		**SS Tube Laying and Testing:** Laying with PVC heavy duty tube clamp, Pneumatic testing with Nitrogen at 280 bar and commissioning of SS tubes excluding hose, mass flow meter and valves as given below and as per Technical Specification and scope of work including handling, lifting, transportation from stores to location of CNG stations.				
	i	1"OD X 0.120" min Wall thk. SS Tube	RM	**50**	₹ 800.00	₹ 40,000.00
	ii	3/4"OD X 0.095" min Wall thk. SS Tube	RM	**750**	₹ 600.00	₹ 4,50,000.00
	iii	1/2"OD X 0.083" min Wall thk. SS Tube	RM	**75**	₹ 550.00	₹ 41,250.00
47		**Supply of Lubricants**				
		Compressor oil of grade as per OEM recommendations / EIC instructions	Per Ltr	**250**	₹ 250.00	₹ 62,500.00
		Engine oil of grade as per OEM recommendations / EIC instructions	Per Ltr	**250**	₹ 350.00	₹ 87,500.00
48		**Maintenance of steel pipeline valve Chambers:** scope also includes valve maintenance , sealent injection , operation of steel pipeline valves of different sizes and installation of bird mesh in vent lines , sealing of pipe at pits, providing cover etc., finishing, clean up, dewatering (if required) and restoration as per technical specification & instruction of EIC. Rates are inclusive of liaisoning with statutory authorities, other utility agencies and settlement of 3rd party claims.	Nos.	15	₹ 7,475.00	₹ 1,12,125.00
49		**Supply of offline UPS of capacity 01 KVA UPS and make APC or microtek**	Nos.	15	₹ 6,037.50	₹ 90,562.50
50		**Supply and installation of MCCB / MCB**				
		400A MCCB, TP	Nos.	2	₹ 21,586.00	₹ 43,172.00
		200A MCCB, TP	Nos.	5	₹ 11,016.00	₹ 55,080.00
		125A MCCB	Nos.	5	₹ 7,189.00	₹ 35,945.00
		63A MCB	Nos.	5	₹ 3,144.00	₹ 15,720.00
		32A MCB	Nos.	5	₹ 2,152.00	₹ 10,760.00

51		**Hiring of Diesel generator scope including the loading , unloading, transporation of generator to required location (to & fro) and providing the connecting cables, change over switch, providing the diesel, etc. along with required tools and tackles as per instruction of EIC**				
		upto 10 KVA	Hrs	50	₹ 300.00	₹ 15,000.00
		upto 63 KVA	Hrs	50	₹ 300.00	₹ 15,000.00
		upto 125 KVA	Hrs	50	₹ 300.00	₹ 15,000.00
		upto 250 KVA	Hrs	50	₹ 400.00	₹ 20,000.00
52		**Supply of MDPE fittings(As approved vendor)**				
	i	Reducer EF 125x(90/63/32)	Nos.	50	₹ 1,045.00	₹ 52,250.00
	ii	Reducer EF 90x(63/32)	Nos.	50	₹ 565.00	₹ 28,250.00
	iii	Reducer EF 63x32	Nos.	50	₹ 175.00	₹ 8,750.00
	iv	Equal Tee EF 125/90 mm	Nos.	50	₹ 1,700.00	₹ 85,000.00
	v	Equal Tee EF 63 mm	Nos.	50	₹ 330.00	₹ 16,500.00
	vi	Equal Tee EF 32/20 mm	Nos.	50	₹ 180.00	₹ 9,000.00
	vii	End Cap Kit 32/20mm	Nos.	96	₹ 180.00	₹ 17,280.00
	viii	Tapping Saddle EF 32x20	Nos.	200	₹ 305.00	₹ 61,000.00
	ix	EF Coupler 32/20mm	Nos.	200	₹ 47.00	₹ 9,400.00
	x	EF Coupler 63mm	Nos.	200	₹ 125.00	₹ 25,000.00
	xi	EF Coupler 125/90mm	Nos.	200	₹ 360.00	₹ 72,000.00
	xii	Transition Adapter32/20mm	Nos.	200	₹ 340.00	₹ 68,000.00
	xiii	stop off PE Valve 63 mm	Nos.	20	₹ 6,100.00	₹ 1,22,000.00
	xiv	stop off PE Valve 90 mm	Nos.	10	₹ 14,005.00	₹ 1,40,050.00
	xv	stop off PE Valve 125 mm	Nos.	10	₹ 19,610.00	₹ 1,96,100.00
53		**Supply of MDPE Squeezers**				
	i	125mm MDPE squeezer - Hydraulic type	Nos.	10	₹ 18,500.00	₹ 1,85,000.00

	ii	32 mm MDPE squeezer - Manual type	Nos.	10	₹ 2,200.00	₹ 22,000.00
	iii	125/90 mm MDPE Squeeser- Manual Type	Nos	10	₹ 12,000.00	₹ 1,20,000.00
54		Clearance of vegetation as per the directions of EIC	Sqm	2000	₹ 28.15	₹ 56,300.00
					Total estimated value inclusive of all applicable taxes & duties (excluding GST) (In Rs.)	**₹ 2,78,82,211.00**
					Quoted percentage on estimated value of tender (in %)	
					Total Quoted Rate excl. GST (Rs.)	
					GST @ 18% (Rs.)	
					Grand Total (including GST @18%) Rs.	