	HNGPL/HARIDWAR/LMC CONNECTION/200 NOS/394 DATED 08-04-2026	HIRING AGENCIES (MAX. 06 NOS.) FOR LMC CONNECTION IN HARIDWAR FOR 200 (50+ 50 + 100) CONNECTIONS EACH.
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CORRIGENDUM#01

Dated 09-04-2026

NAME OF JOB: HIRING AGENCIES (MAX. 06 NOS.) FOR LMC CONNECTION IN HARIDWAR FOR 200 (50+ 50 + 100) CONNECTIONS EACH.

Following amendments / clarifications are made in the tender:

Sr. No.	Reference Clause	Existing File	Revised File/ New Clause
1	Other Document On HNGPL website under the subject tender	394-PRICE-BID.xlsx	394 NEW PRICE BID.

1. All other terms and conditions of the tender documents shall remain same.
2. Sealed & Signed copy of the Corrigendum-01 to be submitted along with the Techno Commercial offer. Non-submission of this Corrigendum-01 shall lead to rejection of bid.

C&P Dept.



HNGPL/HARIDWAR/LMC
CONNECTION/200 NOS/394 DATED
08-04-2026

HIRING AGENCIES (MAX. 06 NOS.) FOR LMC
CONNECTION IN HARIDWAR FOR 200 (50+ 50 + 100)
CONNECTIONS EACH.

REQUEST FOR QUOTATION

To,
HNGPL,
129 Rani Pur Mode Haridwar, 249401

1. M/s Haridwar Natural Gas Pvt. Ltd. (JV of BPCL and GAIL GAS LTD), the CGD company, invites quotation from bidders for the subject service.
2. The brief details of the RFQ are as under:

A	SCOPE OF WORK	HIRING AGENCIES (MAX. 06 NOS.) FOR LMC CONNECTION IN HARIDWAR FOR 200 (50+ 50 + 100) CONNECTIONS EACH.
B	RFQ NO. & DATE	HNGPL/HARIDWAR/LMC CONNECTION/200 Nos/394 Dated 08-04-2026
C	MODE OF TENDERING	Open Domestic Competitive percentage Bidding under two part bid system through email (Un-price bid on bid@hngpl.co.in and price bid on pricebid@hngpl.co.in)
D	TYPE OF WORK	Split able
E	EMD, B.E.C AND EVALUATION METHODOLOGY	As per annexure-A
F	CPBG/SD	10% Applicable.
G	DURATION OF TIME OF BID SUBMISSION	4 days from date of Publish on website HNGPL.
H	BID SUBMISSION DUE DATE & TIME	13.04.2026 IST 14:00
I	BID OPENING DUE DATE & TIME	13.04.2026 IST 14:10
J	CONTACT DETAIL	For Technical Part Query: 1. Mr. Ashish Rangar (7895299764) project1@hngpl.co.in 2. C.M Harendra Kumar Gupta For Commercial Part Query: 3. Mr. Sunil Sharma (+91 97541 89466) Email Id: - Tenders@hngpl.co.in

3. Terms & Conditions governing the following.
 - a) GCC: <https://hngpl.in/wp-content/uploads/2026/02/WORKS.pdf>
 - b) SCC: - Annexure- B.
 - c) SOR: - Annexure- C.
4. INFORMATION TO BIDDER:
 1. Bidder need to submit the signed and stamped bids strictly as follows:
 - a) Un-priced bids: Through email with subject "Un-priced Bid" to email id bid@hngpl.co.in
 - b) Priced Bid: Through email with subject "Priced Bid" to email id pricebid@hngpl.co.in
 2. Bidders can attend opening of Un-priced Bids at scheduled date and time at HNGPL Office.
 3. Techno-commercial qualified bidders will be intimated date and time for priced bid opening through e-mail.
5. ACCEPTANCE OF QUOTATION:
 - a. The authority for acceptance of the quotation documents and quoted rates will rest with the competent authority of HNGPL, who does not bind himself to accept the lowest or any other quotation, nor does he undertake to assign reasons for his decision in this matter.



HNGPL/HARIDWAR/LMC
CONNECTION/200 NOS/394 DATED
08-04-2026

HIRING AGENCIES (MAX. 06 NOS.) FOR LMC
CONNECTION IN HARIDWAR FOR 200 (50+ 50 + 100)
CONNECTIONS EACH.

- b. Canvassing in connection with quotation is strictly prohibited and the quotation submitted by the bidder who resorts to canvassing will be liable for rejection.**
- c. If the bidder deliberately gives wrong information or conceals any information/facts in his quotation, which shall be favourable for acceptance of his quotation fraudulently, then HNGPL reserves the right to reject such quotation at any stage of execution without any financial liability.**
The bidder shall treat the contents of the quotation documents as private and confidential.
- d. Please note that unpriced bid /tender doc should submit through mail to bid@hngpl.co.in and Offer/price bid to pricebid@hngpl.co.in on or before due date and time.**

On the behalf off:

Vendor Acceptance

HNGPL



TECHNICAL CRITERIA	DOCUMENTS REQUIRED
<p>The bidder should have successfully executed / completed "SIMILAR SERVICES" in any CGD. Within previous seven (07) years to be reckoned from the bid submission Due Date & Time.</p> <p>At least one order similar service of value Rs 8.88 lakh/- Or At least two orders similar service of value Rs 5.55 lakh/- Or At least three orders similar service of value Rs 4.44 lakh/-</p> <p>Order value shall be as per C&P procedure.</p> <p>SIMILAR SERVICE: - Installation, commissioning of domestic piped natural gas connections which should include laying of associated PE pipes.</p>	<p>Bidder must submit a copy of POWO along with SOR and its Execution/completion certificate and Payment proof issued by the user/owner/authorized consultant/End user.</p> <p>Above documents must be duly notarized by notary public and signed by POA/Authorized signatory.</p>
Type of Bidding	Open domestic tender under two part bid system through email.
EMD/Bid security	<p>Rs 38,000/- Applicable (Not exempted for any bidder being works contract)</p> <p>Note: Bidder need to submit the EMD on or before bid due date through bank transfer/RTGS/NEFT/IMPS to following account. Failing which bid shall be liable for rejection.</p> <p>A/C Name: Haridwar Natural Gas Pvt Ltd. Bank Name : HDFC Bank Ltd Bank Account No. : 57500000040536 IFSC : HDFC0004713</p>

- (i) In case more than one contract are emanating against one tender, all such individual contracts are to be considered as single contract for evaluation of credential of a bidder for meeting their experience criteria.
- (ii) Bidder must be single source/agency having requisite experience and resources to execute the job. Consortium bidding is not applicable.
- (iii) Experience acquired by the bidder as a Sub-contract shall be taken into account for above qualification of above BEC-Technical.
- (iv) Bidders must furnish all relevant certificates / documents / information in support of their credentials to the above eligibility criteria along with the Offer, failing which the offer shall be summarily liable for rejection.



A. BID EVALUATION METHODOLOGY

1. *Bid Evaluation shall be done on overall basis i.e., for complete scope of work, based on total price including quoted GST.*
2. *The ranking of bidders (L-1, L-2, L-3 ...) shall be determined by the bidder's evaluated price (arrived after applying quoted % age increase or decrease on total estimated price and quoted GST) in ascending order.*
3. *In the event of a tie at any position (i.e L1/L2/ and so on), the determination of bidder ranking shall be made on a First-Come-First-Served (FCFS) basis, wherein preference shall be accorded to the bidder whose bid (initially) is received earlier, as evidenced by the date and time of receipt of the bid through email.*
4. *As HNGPL is looking for maximum 06 vendors for 200 connections each, the award shall be done on first 06 lowest qualified bidders subject to matching of overall lowest cost (L1). Therefore, all bidders who are found to be techno-commercially responsive, other than the L1 bidder (irrespective of their inter-se ranking), shall be invited, in a single instance, to submit their confirmation for matching the L1 price, within the stipulated time period.*
5. *In case the number of selected bidders is less than six, the work shall be distributed among the available bidders only. However, each bidder shall be assigned upto maximum limit of 200 connections.*
6. *Purchase preference of PPP- MSE and PPP-MII are not applicable.*

B. Award of work order

1. Work order for 200 connections would be awarded in three stages. Each bidder will initially be issued a Work Order (Initial PO) for 25% of the assigned work (up to 200 connections). Upon successful completion of the initial PO, Second work order for 25% value and upon completion thereof, third and final PO will be issue for balance 50% quantity subject to satisfactory performance. Decision of EIC would be final in this case.

Illustration: Work Allocation Table -1

Bidder Status	No of connection	Initial Contract/PO	1st Contract/PO Amendment	2nd Contract/PO Amendment
L-1	200	25%	25%	50%
L-2	200	25%	25%	50%
L-3	200	25%	25%	50%
L-4	200	25%	25%	50%
L-5	200	25%	25%	50%
L-6	200	25%	25%	50%

Condition of contract: -

- Mobilization Period: Immediate basis (within 2 days from date of LOA).
- Connection Competition period: within 2 days from the date of written intimation of E.I.C/engineer.
- Contract Competition Period: 60 days.
- Bidder need to submit the Firm/Company GST Copy, PAN, Cancel Cheque.
- Drawing: [1773920562.pdf](#)
- Forms: Attached below as a Section -1.
- SCC: Attached below as a Section -2.
- SOW: Attached below as a Section -3.

SECTION 1
FORMS.

DECLARATION REGARDING HOLIDAY/BANNING AND LIQUIDATION,
COURT RECEIVERSHIP
On CA letterhead (with UDIN)

To,
M/s. Haridwar Natural Gas Pvt. Ltd.

Dear Sir,

We hereby confirm that we are not on 'Holiday' by HNGPL or Public Sector Project Management Consultant (like EIL, Mecon only due to "poor performance" or "corrupt and fraudulent practices") or banned by Government department/ Public Sector on due date of submission of bid.

Further, we confirm that neither we nor our allied agency/(ies) (as defined in the Procedure for Action in case of Corrupt/ Fraudulent/ Collusive/ Coercive Practices) are on banning list of HNGPL or the Ministry of Petroleum and Natural Gas.

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

In case it comes to the notice of HNGPL that the bidder has given wrong declaration in this regard, the same shall be dealt as 'fraudulent practices' and action shall be initiated as per the Procedure for action in case of Corrupt/Fraudulent/Collusive/Coercive Practices.

Further, we also confirm that in case there is any change in status of the declaration prior to award of contract, the same will be promptly informed to HNGPL by us.

Place: [Signature of Authorized Signatory of Bidder]

Date: Name:

Designation:

Seal:

"NO DEVIATION" CONFIRMATION

To,

M/s Haridwar Natural Gas Pvt. Ltd.

Dear Sir,

We understand that any 'deviation / exception' in any form may result in rejection of Bid. We, therefore, certify that we have not taken any 'exception / deviation' anywhere in the Bid and we agree that if any 'deviation / exception' is mentioned or noticed, our Bid may be rejected.

Place:	[Signature of Authorized Signatory of Bidder]
Date:	Name:
	Designation:
	Seal:

UNDERTAKING ON LETTERHEAD

To,

M/s. Haridwar Natural Gas Pvt. Ltd.

Dear Sir,

We hereby confirm that “The contents of this Tender Document No. _____ have not been modified or altered by M/s.(Name of the bidder with complete address). In case, it is found that the tender document has been modified / altered by the bidder, the bid submitted by M/s (Name of the bidder) shall be liable for rejection”.

Place: [Signature of Authorized Signatory of Bidder]
Date: Name:
Designation:
Seal:

Contract Agreement.
PROFORMA FOR CONTRACT AGREEMENT

LOA No. HNGPL/

Dated -----

Contract Agreement for the work of ----- of HNGPL Ltd. made on ----- between (Name and Address)-----, hereinafter called the “CONTRACTOR” (which term shall unless excluded by or repugnant to the subject or context include its successors and permitted assignees) of the one part and HARIDWAR NATURAL GAS PVT. LTD. hereinafter called the “EMPLOYER” (which term shall, unless excluded by or repugnant to the subject or context include its successors and assignees) of the other part.

WHEREAS

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

AND WHEREAS

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

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

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

A N D

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

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

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

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

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

Signed and Delivered for and
on behalf of EMPLOYER.

Signed and Delivered for and
on behalf of the CONTRACTORS.

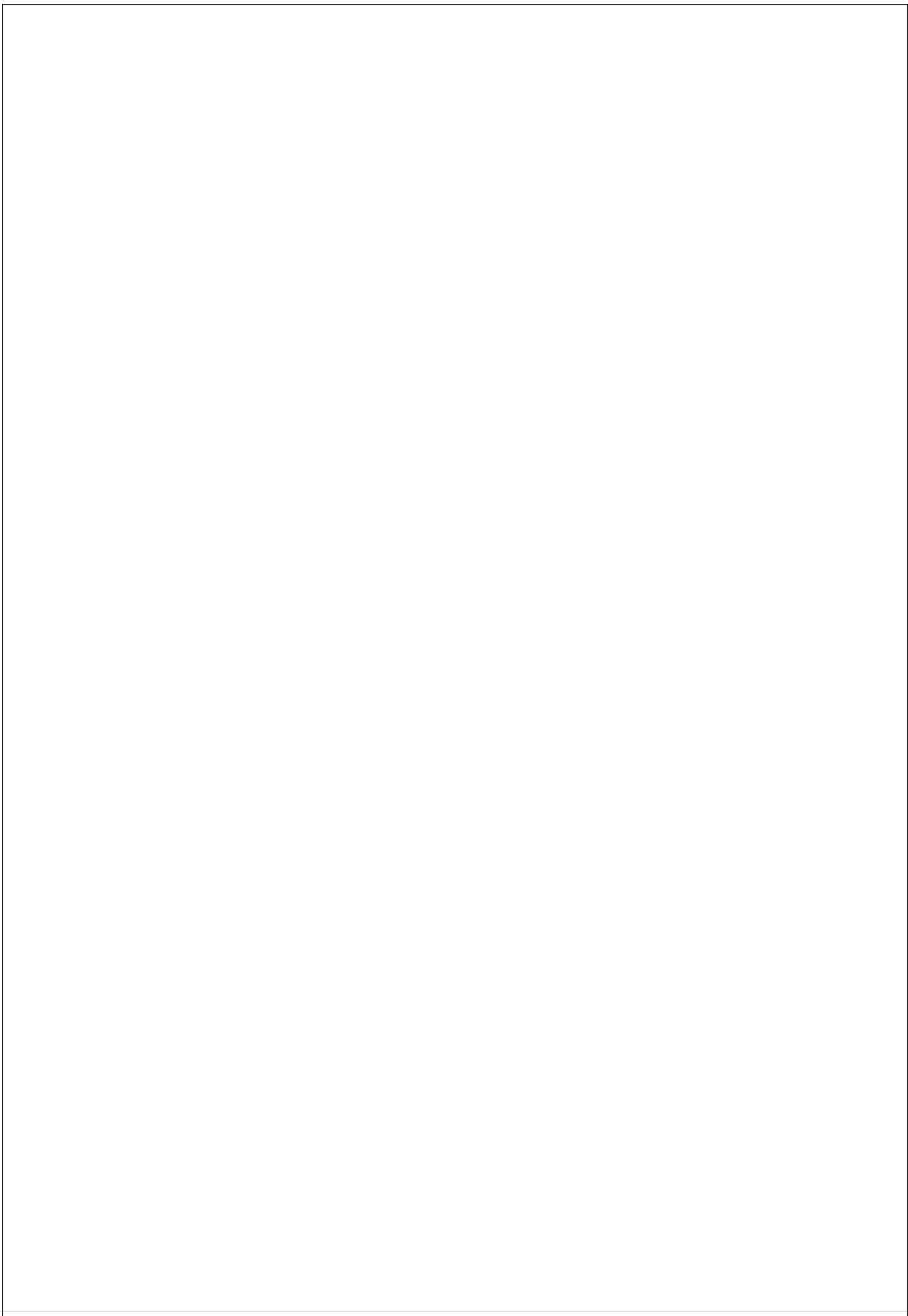
HNGPL

(NAME OF THE CONTRACTOR)

IN PRESENCE OF TWO WITNESSES

1. _____
2. _____

1. _____



Section 2
Special Conditions of Contract (SCC)

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- 1.0 SPECIAL CONDITIONS OF CONTRACT**
- 2.0 ANNEXURE TO SCC**
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[01]

SPECIAL CONDITIONS OF CONTRACT

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40. SUMMARY OF INSURANCE POLICIES

1. GENERAL

1.0 Special conditions of contract (SCC) shall be read in conjunction with the General Conditions of Contract (GCC). Schedule of rates, specifications of work, drawings and any other document forming part of this contract wherever the context so requires.

1.1 Notwithstanding the sub-division of the document into these separate sections and volumes, every part of each with and into the contract so far as it may be practicable to do so.

1.2 Where any portion of the GCC is repugnant to or at variance with any provisions of the special conditions of contract, then unless a different intention appears, the provision(s) of the special conditions of contract shall be deemed to override the provision(s) of GCC only to the extent that such repugnancies or variations in the special conditions of contract are not possible of being reconciled with the provisions of GCC.

1.3 Wherever it is stated in this Bidding Document that such and such a supply is to be effected or such and such a work is to be carried out, it shall be understood that the same shall be effected/carried out by the contractor at his own cost, unless a different intention is specifically and expressly stated herein or otherwise explicit from the context. Contract value (also referred to as Contract price) shall be deemed to have included such cost.

1.4 The materials, design and workmanship shall satisfy the applicable relevant Indian Standards, the job specifications stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied. In the absence of any Standard/ Specifications/codes of practice for detailed specifications covering any part of the work covered in this Bidding on the contractor.

1.5 In partial modification to Clause No.21.0 of GCC the following shall apply:

In case of contradiction between Indian or other applicable Standards, General Conditions of Contract, Special Conditions of Contract, Specifications, drawings, Schedule of Rates, the following shall prevail in order of precedence:

- i) Letter of acceptance along with statement of Agreed variations.
- ii) Fax / Letter of Intent / Fax of Acceptance
- iii) Schedule of Rates as enclosures to letter of acceptance
- iv) Job / Particular Specifications
- v) Drawings
- vi) Technical / Material Specifications
- vii) Special Conditions of Contract

- viii) General Conditions of Contract
- ix) Indian Standards
- x) Other Applicable Standards
- xi) Contract Agreement
- xii) Instruction to Bidders (ITB)

1.6 It will be contractor's responsibility to bring to the notice of Engineer-in-charge any irreconcilable conflict in the contract documents before starting the work(s) of making the supply with reference which the conflict exists.

In the absence of any specifications covering any material, design of work(s) in the same shall be performed / supplies / executed in accordance with Standards Engineering Practice as per the instructions / directions of the Engineer-in-charge, which will be binding on the Contractor.

1.7 The requirements of any statutory body and authority like Indian boiler regulation, Tariff Advisory Committee, Chief controller of Explosives, etc, shall govern where these are more stringent than the requirements specified above.

1.8 Owner's representative means authorized representative of Owner (i.e. M/s HNGPL.) and / or Consultant authorized by M/s HNGPL.

2.0 **THE WORK**

2.1 Scope of work

The scope of work covered in this Contract will be as described in **Annexure-1** to SCC at Particular job specifications, Standard Specifications, Schedule of Rates etc.

2.2 Scope of Supply

The scope of supply covered in this Contract will be as described in **Annexure-2** to SCC Particular Job Specifications, Standard Specifications, Schedule of Rates etc.

2.3 Time schedule

2.3.1 The work shall be executed strictly as per time schedule given in **Annexure-3** to SCC. The period of completion given includes the time required for mobilization as well as testing, rectifications, if any, retesting, demobilization and completion in all respects to the satisfaction of the Engineer-in-Charge.

2.3.2 A joint program of execution of work will be prepared by the Engineer-in-Charge and Contractor. This program will take into account the time of completion mentioned in 2.3.1 above.

2.3.3 Monthly/Weekly execution program will be drawn up by the Engineer-in-

Charge jointly with the Contractor based on availability of materials, work fronts and the joint program of execution as referred to above. The contractor shall scrupulously adhere to the Targets/Programs by deploying adequate personnel, Construction Equipment, Tools and Tackles and also by timely supply of required materials coming within his scope of supply as per Contract. In all matters concerning the extent of target set out in the weekly/monthly program and the degree of achievement, the decision of the Engineer-in-Charge will be final and binding on the Contractor.

2.3.4 Contractor shall give every day category-wise labour and equipment deployment report along with the progress of work done on previous day in the Performa prescribed by the Engineer-in-Charge.

2.4 Measurement of Works

In addition to the provisions of Clause 88.1 of the General Conditions of Contract and associated provisions thereof, the provisions of **Annexure – 4** to SCC shall apply.

2.5 Terms of Payment

Terms of Payment will be as specified in **Annexure – 5** to SCC.

2.6 Temporary Works

All temporary works, ancillary works, enabling works, including dewatering of surface and subsoil water, temporary drains at the work site, preparing approaches to working areas, wherever required, for execution of the work, shall be the responsibility of Contractor.

2.7 Contractor's Temporary Structure

The Contractor may, at his own costs and expenses and subject to the approval of the Engineer-in-Charge and statutory authorities, construct offices, stores, workshop and remove the same as per the orders of the Engineer-in-Charge on completion of the contract. Whenever required the Contractor shall furnish such details of his temporary works as may be called for by the Owner/Engineer-in-Charge as to their safety and efficiency. The Owner/Engineer-in-Charge may direct those temporary works which he considers unsafe or, inefficient be removed and replaced in a satisfactory manner. The Contractor shall immediately follow Owner/Engineer-in-Charge's direction/instruction, on maintenance of all the equipments and he shall ensure that they are suitable for the work and is maintained in such a manner as to ensure their efficient working. The Owner/Engineer-in-Charge, may if they deem fit, direct the Contractor to remove from site any equipment which are not efficient and/or prejudicial to the quality of work to be replaced

by equipment to their satisfaction. The Contractor shall immediately follow Owner/Engineer-in-Charge's direction/instruction.

2.8 Statutory Approvals

- 2.8.1 All associated activities required for obtaining necessary clearances, permissions, approvals, all licenses from all concerned authorities in respect of pipeline crossing & all related works shall be the responsibility of the Contractor and the cost of the same shall be deemed to have been included in the quoted prices.

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

Any change/addition required to be made to meet the requirements of the statutory authorities shall be carried out by the Contractor free of charge. The inspection and acceptance of the work by statutory authorities shall however, not absolve the Contractor from any of his responsibilities under this Contract.

2.9 Quality Assurance

- 2.10.1.1 Bidder shall include in his offer the quality assurance program containing the overall quality management and procedures, which is required to be adhered to during the execution of contract. After the award of contract detailed quality assurance program shall be prepared by the contractor for the execution of Contract for various works, which will be mutually discussed and agreed to.
- 2.10.1.2 The Contractor shall establish document and maintain an effective quality assurance system as outlined in recognized codes.
- 2.10.1.3 Quality Assurance System plans/procedures of the Contractor shall be furnished in the form of QA manual. This document should cover details of the personnel responsible for the quality assurance, plans or procedures to be followed for quality control in respect of Design, Engineering, Procurement, Supply, Installation, Testing and Commissioning.

The quality assurance system should indicate organizational approach for quality control and quality assurance of the construction activities, at all stages of work at site as well as at manufacturer's works and dispatch of materials.

- 2.10.1.4 The Employer/ consultant / Consultant or their representative shall reserve the right to inspect/witness, review any or all stages of work at shop/site as deemed necessary for quality assurance.
- 2.10.1.5 The Contractor has to ensure the deployment of quality Assurance and Quality Control Engineer(s) depending upon the quantum of work. This QA/QC group shall be fully responsible to carry out the work as per standards and all code requirements. In case Engineer- in-charge feels that contractor's QA/QC Engineer (s) are incompetent or insufficient, contractor has to deploy other experienced Engineer(s) as per site requirement and to the full satisfaction of engineer-in- charge.
- 2.10.1.6 In case contractor fails to follow the instructions of Engineer –in-charge with respect to above clauses, next payment due to him shall not be released unless until he complies with the instructions to the full satisfaction of Engineer – in –charge.
- 2.10.1.7 The contractor shall adhere to the quality assurance system as per specification enclosed in the bidding document as **Annexure-6**.

2.10 Notice and Licenses

The Contractor shall at his costs and expenses give to the Municipal or Panchayat, Police and other authorities all notices etc., that may be required in law to be given and obtain all necessary permissions and licenses etc., for temporary obstructions, enclosures and pay all fees, taxes charges etc. which may be leviable by such authorities for that purpose. The Contractor shall make good any damage to the adjoining property whether public or private.

2.11 Working Hours

Depending upon the requirements, time schedule/ drawn up programs and the target set to complete the job in time the works may have to continue beyond normal working hours to the extent of round the clock and on holidays also for which no extra claim shall be entertained.

2.12 Responsibility of Contractor

Preparing approaches and working area for the movement and operation or the cranes, leveling the area for assembly and erection shall also be the responsibility of the Contractor. The Contractor shall acquaint himself with access availability, facilities such as railway siding, local labour etc.

The procurement and supply in sequence and at the appropriate time of all materials and consumables covered under Contractor's scope of supply shall be entirely the Contractor's responsibility. Contractor shall not use any of the equipment or materials issued to him by Owner for temporary works, manufacturing erection aids etc. Misuse of materials will be seriously viewed and deduction at penal rates will be made from the Contractors bill for such quantities that are misused.

Contract Price is deemed to be inclusive of all expenses towards above responsibilities.

2.13 **Additional Works/Extra Works**

Owner reserve their right to execute any additional works/ extra works, during the execution of Work, either by themselves or by appointing any other agency, even though such works are incidental to and necessary for the completion of works awarded to the Contractor. In the event of such decisions taken by Owner, Contractor is required to extend necessary cooperation and act as per the instructions of Engineer-in-Charge

2.14 **Compensation for Idle Time**

The owner shall make every reasonable effort to have the materials and working front available so as not to delay laying activities. No idle time claim shall be entertained under any circumstances.

2.15 **Power and Water Connection**

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

2.16 **Penalties**

2.16.1 In case of proper barricading is not provided, along the trench and pits, as per technical specification for laying of PE Pipeline, the work shall be immediately suspended till such time proper barricading as per the technical specification is provided and Rs. 1000.00 per case / location per day shall be levied as penalty till such time the barricading is provided. In case the contractor fails to provide the barricading for long time, at the discretion of Owner, the work shall be offloaded to some other agency at the risk and cost of the contractor.

2.16.2 Installation/ Works to be carried out by the contractor as per the latest industry recommended practices/ latest relevant standards/ latest relevant code/ technical specification/ SOR. In case of any conflict among above, most stringent requirement shall be adopted. If installation/ works carried out by the contractor is not as per the latest industry recommended practices/ latest relevant standards/ latest relevant code/ technical specification/ SOR, and rectification of the same is not completed within the stipulated time, a penalty of Rs. 2000.00 per connection shall be levied on the contractor.

- 2.16.3 In case it is noticed and confirmed by the consultant / Third Party Agencies / Owner's Site-In Charge that any fusion jointing and conversion is being carried out by personnel other than approved / qualified technicians as per the technical specifications for laying of PE pipelines and technical specifications for installation of GI/Copper Pipes, Rs. 1000.00 per joint or conversion shall be levied and the person supervising the work shall be suspended from Client's/Owner's/TPI Site.
- 2.16.4 All TF Done need to be got verified for saddle and TF Joint leakage through our Project Engineer/ Third Party Agencies with 2 color photographs per Connections clearly showing the latitude/ Longitude, date, Location. Witness by team consisting of Project Engg/ Third Party Agencies. The photograph should cover Team member Photo/ Location of House from distance 5-10 meters. While claiming RA bill, for each connection above photo need to be produced failing which a penalty of Rs. 500.00 per connection will be deducted from Contractor's RA Bills. In Play store for this various app is available like "GPS map Camera".
- 2.16.5 In case in delay in conversion for more than 1 weeks from RFC date & fails to submit customer consent form duly signed by customer & approved by HNGPL engineers then penalty @0.5 SCM per day at prevailing PNG rates will be imposed & recovered from contractors bills the penalty will be applicable in slab of 10 days for eg., the delay of 1 to 10 days will attract penalty for 10 days gas charges, 11 to 20 days penalty of 20 days gas charges shall be imposed & so on....
- 2.16.6 Material reconciliation statement must be provided with each running bills.

If Consumer connection is not feasible for doing GI & NG for awarded work order, on that case depending upon the site conditions, Site engineer & EIC decision in this regard shall be final & acceptable.

If we delay in giving you the DPNG Connection/PE laying to the contractors as per site condition as decided by EIC, in that case contractor is expected to complete no. of house hold connection/PE laying on monthly basis.

If HNGPL failed to give you DPNG connection/PE Laying to the contractor, in that case no penalty till such time.

Further, if awarded DPNG connections/PE laying to the contractors are varies from stipulated DPNG connections/PE laying as mentioned above or varies as per site condition as decided by EIC, in that case Contractor is expected to complete no. of house hold connection/PE laying monthly on pro-rata basis as decided by EIC.

- 2.16.7 In case Fusion machine with GPS facility is not available at site, a penalty shall be levied @ Rs. 500 per joint per machine.
- 2.16.8 Quarterly Closure Statement/ Report must be provided after every quarter, failing which a penalty of Rs. 5000.00 per week of delay will be deducted from Contractor's RA Bills. Format of Quarterly Closure Report will be provided by EIC.
- 2.16.10 Vendor's responsibility: When vendor submit the JMR in HNGPL office, make sure that the pipe details (length of pipe ½" & ¾") are clearly mentioned in JMR form. & Extra Pipe: While doing NG or Installation work, if any extra pipe is coming out beyond 15 meters, please inform the customer immediately that extra pipe is chargeable. Only 15 meters is in HNGPL's scope. vendor should collect the cheque for extra pipe from the customer either at the time of Installation or during NG/JMR & submit to HNGPL office on the same or next day.If contractor fails to submit the JMR result a Penalty of Rs.500/- per JMR.
- 2.16.11 When the GI connection is completed in gasified area/non gasified area. The TF work is done, the pedestal installation must be completed within one or two day & restoration work should be completed within week. If contractor fails to complete the pedestal installation within the specified timeframe, a penalty of Rs.500/- will be imposed per connections. If the restoration work is not completed within the one week period, a penalty of Rs. 1000/- will be applicable.
- 2.16.12 The vendor is responsible for arranging electricity at the site at their own cost for fusion/joint work. The vendor should not rely on the customer for electricity and must have their own generator to carry out the joint/fusion work without any interruption. If contractor not arrange electricity a penalty of Rs. 1000/- will be applicable per connection.
- 2.16.13 In LMC Connection: At the outlet part after meter, a union/adaptor are required for installation for the GI connection. If contractor fails as result a Penalty of Rs. 500/- per connection. (if applicable)

3.0 **CONSTRUCTION**

OWNER reserves the right to inspect all phases of Contractor's operations to ensure conformity to the SPECIFICATIONS. Owner will have Engineers, Inspectors or other duly authorized representatives, made known to the Contractor present during progress of the WORK and such representatives shall have free access to the WORK at all times. The presence or absence of an Owner's representative does not relieve the Contractor of the responsibility for quality control in all phases of the WORK. In the event that any of the WORK being done by the Contractor or any Sub-Contractor is found by Owner's representatives to be unsatisfactory or not in accordance with the DRAWINGS, procedures and SPECIFICATIONS, the Contractor shall, upon verbal notice of such, revise the work in a manner to conform to the relevant DRAWINGS, procedures and SPECIFICATIONS.

3.1 **Rules and Regulations**

Contractor shall observe in addition to Codes specified in respective specification, all national and local laws, ordinances, rules and regulations and requirements pertaining to the work and shall be responsible for extra costs arising from violations of the same.

3.2 **Procedures**

Various procedures and method statements to be adopted by Contractor during the construction as required in the respective specifications shall be submitted to Engineer-in-Charge in due time for approval. No construction activity shall commence unless approved by Engineer-in-Charge in writing.

3.3 **Security**

The work being in protected area, entry into the work area shall be restricted and governed by issue of photo gate passes by the Security/CISF. The Contractor shall arrange to obtain through the Engineer-in-Charge, well in advance, all necessary entry permits/gate pass for his staff and labour and entry and exit of his men and materials shall be subject to vigorous check by the security staff. The Contractor shall not be eligible for any claim or extension of time whatsoever on this account.

3.4 **Drawings and Documents**

3.4.1 The drawings accompanying the bid document (if any) are of indicative nature and issued for bidding purpose only. Purpose of these drawing is to enable the bidder to make an offer in line with the requirements of the Employer/Consultant. However no extra claim whatsoever, shall be entertained for variation in the "Approved for Construction" and "Bid

document drawings" regarding any changes/units. Construction shall be as per drawings/specifications issued/approved by the Engineer-in-Charge during the course of execution of work. Detailed construction drawings (wherever required) on the basis of which actual execution of work is to proceed will be prepared by the contractor.

3.4.2 The drawings and documents to be submitted by the Contractor to Employer/Consultant after award of the work as per the requirements enlisted in the bidding document shall be for Employer/Consultant's review, information and record. The Contractor shall ensure that drawings and documents submitted to Employer/Consultant are accompanied by relevant calculations, data as required and essential for review of the document/drawings. HNGPL shall review the drawings/ documents within two weeks from the date of submission provided the same are accompanied by relevant calculations, data as required and essential for review.

3.4.3 All documents and drawings including those of Contractors sub-vendor's Manufacturer 's etc. shall be submitted to Employer/Consultant after having been fully vetted in detail, approved and co-opted by the Contractor & shall bear Contractor seal/ certifications to this effect. All documents/drawings & submissions made to Employer/Consultant without compliance to this requirement will not be acceptable and the delay & liability owing to this shall be to the Contractor's account.

3.4.4 The review of documents and drawings by Employer/Consultant shall not absolve Contractor from his responsibility to meet the requirements of specifications, drawings etc. and liabilities for mistakes and deviations. Upon receiving the comments on the drawing/documents reviewed by Employer/Consultant, Contractor shall incorporate the comments as required and ensure their compliance.

3.4.5 Copies of all detailed working drawing relating to the works shall be kept at the contractors' office at the site and shall be made available to the Engineer-in-charge/ Employer/Consultant at any time during execution of the contract. However no extra claim what so ever shall be entertained for any variation in the "approved/issued for construction drawings" and "tender drawings" regarding any changes/units unless otherwise agreed.

3.4.6 The Contractor shall rectify any inaccuracies, errors and non-compliance to contractual requirements. Any delay occurring on this shall not construe a reason for delay/ extension.

3.5 [Excavation by blasting](#)

Excavation by blasting is not permitted wherever required in hard strata other mechanical tools shall be used.

3.6

Construction Equipment & Mechanization of Construction Activities

Contractor shall, without prejudice to his overall responsibility to execute and complete the Work as per specifications and time schedule, adopt as far as practicable, mechanized construction techniques for major site activities. However, Contractor agrees that he will deploy the required numbers and types of the part & machinery applicable for different activities in consultation with the Engineer-In-Charge during execution of works.

The Contractor shall mechanize the construction activities to the maximum extent by deploying all necessary construction equipment/machinery in adequate numbers and capacities.

Wherever Structural/Piping works are included in the scope, the Contractor's responsibilities shall include establishing and maintaining of a proper fabrication workshop with transportation facilities to site to carryout fabrication of steel structures, piping specials etc., preparing approaches working areas for the movement/operation of cranes and leveling the areas for assembly/erection to ensure effective mechanization on the works. The Contractor shall acquaint himself with availability of access, facilities such as railway siding, local labour etc. and the Contractor may have to build temporary access roads to aid his work and the quoted and agreed rates shall be deemed to include the same. It may be noted that all fabrication work shall be carried out in fully mechanized workshops to reduce site fabrication to minimum.

For speedy execution of work, Contractor shall also ensure use of computer software for at least the following:

- (i) Billing
- (ii) Planning & Scheduling
- (iii) Progress Reporting
- (iv) Material Control & Warehousing
- (v) Safety Records
- (vi) Resource Deployment
- (vii) Communication

Contractor further agrees that Contract price is inclusive of all the associated costs) which he may incur for actual mobilization, required in respect of use of mechanized construction techniques and that the Owner/Consultant in this regard shall entertain no claim whatsoever.

3.7

Site Organization

The Contractor shall provide all necessary superintendence during the design and execution of the Works and as long thereafter as the Engineer-in-Charge may consider necessary for the proper fulfilling of the Contractor's

obligations under the Contract. Such superintendence shall be given by sufficient persons having adequate knowledge of the operations to be carried out including the methods and techniques required the hazards likely to be encountered and methods of preventing accident for the satisfactory and safe execution of the Work. The workmen deployed, by the Contractor should also possess the necessary license etc., if required under any law, rules and regulations.

Subject to the provisions in the Contract Document and without prejudice to Contractor's liabilities and responsibilities to provide adequate qualified and skilled personnel on the Work, Contractor shall augment the same as decided by the Engineer-in-Charge depending on the exigencies of Work.

3.7.1 SUPERVISION

All construction work will be carried out as per direction of EIC, and this will be the primary point of contact between the Contractor and HNGPL. on site. All work will be issued and sanctioned through the EIC and site control exercised by site 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 HNGPL.

The Contractor will appoint his own supervisors of minimum number instructed by EIC. These personnel will be responsible to the SE for monitoring construction standards and for ensuring that all detailed technical requirements are met on each and every job which is undertaken. The Contractor's supervisor(s) will have day to day liaison with the SE, and will provide the SE with technical reports and audits, and other management information as is required on work progress and construction quality standards.

The Contractor's supervisor shall have mobile telephones or pagers to ensure that they can be contacted at all times. The Contractor will also nominate one person who can be contacted if necessary out of 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 HNGPL. as is required. The normal day to day issue of work instructions, communication between HNGPL. and the Contractor's supervisor and the SE. No deviation from the approved technical specification / issued construction drawings shall be undertaken without written approval of EIC.

3.8 Health Safety and Environment (HSE) Management

After the award of the contract, detailed Health, Safety and Environment (HSE) program to be followed for execution of contract under various divisions of works will be mutually discussed and agreed between

Contractor, Client.

The Contractor shall establish document and maintain an effective Health, Safety and Environment (HSE) management system.

In case contractor fails to follow the instructions of Engineer-in-charge with respect to above clauses, next payment due to him shall not be released unless until he complies with the instructions to the full satisfaction of Engineer-in-charge.

The Contractor shall adhere to the Health, Safety and Environment (HSE) management system as per HNGPL. Specification and General Conditions of Contract.

It will be the Contractor's responsibility to acquaint his site staff and operatives of all current safety legislation, statutory requirements and HNGPL.'s safety standards. In addition, and before any work takes place all the Contractor's operatives shall be given training in site safety by the trained person under supervision of HNGPL. If the Contractor wishes to start any new operatives on site, he must first inform the SE, who will arrange for such training to be arranged.

3.9 General Guidelines During and Before Erection

3.9.1 The Contractor shall be responsible for organizing the lifting of the structural element, equipment in the proper sequence, that orderly progress of the work is ensured and access routes for erecting the other structures/ equipments are kept open.

3.9.2 During the performance of the work the Contractor at his own cost, shall keep structures, materials and equipment adequately braced by guys, struts or otherwise approved means which shall be Supplied and installed by the Contractor as required till the installation work is satisfactorily completed.

Such guys, shoring, bracing, strutting, planking supports etc. shall not interfere with the work of other agencies and shall not damage or cause distortion to other works executed by him or other agencies.

3.9.3 Manufacturer's recommendations and detailed specifications for the installation of the various equipment and machines shall be fulfilled by the Contractor.

3.9.4 Various tolerances required as marked on the drawings and as per specifications and instructions of the Engineer-in-Charge, shall be maintained.

Verticality shall be maintained. Verticality shall be verified with the

Theodolite/advanced instruments,

3.10 Construction Photographs

The Owner desires to have two sets of monthly progress reports with photographs showing the progress of construction. Before utilizing any photograph for publicity, the Contractor shall obtain prior approval of the Owner.

3.11 Schedule of Labour Rates

Schedule of Labour Rates attached as **Annexure-10** to SCC shall be used for analysing rates for extra items.

Schedule of equipment rates attached as **Annexure-11** to SCC shall be used for analysing rates for extra items.

3.11.1. Construction Equipment

Minimum construction equipment to be deployed is enclosed as **Annexure-8** to SCC. However, Any other equipment required for completion of pipeline laying work but not specifically mentioned here, shall be deployed by contractor without any additional cost. The list of equipments mentioned in **Annexure-8** is the minimum to be deployed by contractor and contractor shall ensure the availability at site of listed equipments in good working condition.

3.12 Specific Requirements

Specific requirements spelt out in various technical parts of the Bidding Document shall be followed by Contractor.

3.13 SITE CLEANING

3.13.1 The BIDDER shall take care for cleaning the working site from time to time for easy access to work site and also from safety point of view.

3.13.2 Working site should be always kept cleaned up to the entire satisfactions of the Engineer-in-charge.

Before handing over and work to owner, the BIDDER in addition to other formalities to be observed as detailed in the document shall clear the site to the entire satisfaction of Engineer-in-charge.

3.14 SURVEY OF WORK

Before the WORK or any part thereof are begun, the Contractor's agent and the Engineer-in-Charge's representative shall together survey the SITE and decide the tentative route considering all obstructions on which the pipeline is to be laid and on which measurements of the WORK are to be based. Such particulars

shall be plotted by the BIDDER and trial pits started thereon.

The Contractor shall be entirely responsible for the correctness of every part of the WORK and shall rectify any errors or imperfections therein. Such rectifications shall be carried out by the Contractor at his own cost, when instructions are issued to this effect by the Engineer-in-Charge or his representative.

WORK shall be suspended for such times as necessary for checking lines and levels on any part of the WORK.

The Contractor shall at his own expense provide all assistance, which the Engineer-in-Charge may require for checking the setting out to WORKS.

Before commencement of any activity, Contractor's quality control set up duly approved by company must be available at site.

3.15 MANPOWER DEPLOYMENT

3.15.1 Bidder shall meet the requirement regarding deployment of minimum skilled manpower as specified in the bidding document at **Annexure-9**.

3.15.2 Schedule of Labour & Equipment Rates

Hiring / Recovery Rate for Deployment of Manpower attached as **Annexure-9** to SCC shall be used for analyzing rates for extra items and recovery for non-deployment of manpower.

3.15.3 Equipment Hiring / Recovery Rates attached as **Annexure-11** to SCC shall be used for analyzing rates for extra items and recovery for non-deployment of equipment.

3.16 PRICE ADJUSTMENT DUE TO DELAYED MOBILIZATION OR SHORTFALL IN MOBILISATION OF MINIMUM EQUIPMENT AND MANPOWER

3.16.1 In case during execution, adequate front is not available at site, contractor may request for delayed mobilization of certain equipments / manpower and submit for approval of Engineer-in-charge.

3.16.2 Contractor shall maintain record of actual mobilization of each equipment and key personnel and offer the same to EIC on monthly basis.

3.16.3 In case of delay in mobilization or shortfall in mobilization of equipment and key personnel w.r.t. approved deployment of equipments and manpower, recovery shall be effected from contractor's running bills as certified by ENGINEER INCHARGE.

3.16.4 If found necessary, HNGPL may deploy any equipment / manpower and recover the amount for such deployment as per rates provided at **Annexure- 10 & Annexure- 11** to SCC respectively.

3.16.5 In case of early mobilization or additional mobilization of equipment as compared to required equipments to meet the schedule requirement. Contractor shall not be entitled for

any extra claim.

- 3.16.6 An equipment and key personnel may be demobilized by the contractor on completion of its equivalent at site after written clearance of Engineer-in-charge. Unilateral withdrawal of any equipment / key manpower by the contractor will attract recovery as per rates specified in **Annexure- 08 & Annexure- 09** to SCC.
- 3.16.7 In case of final bill, contractor shall be required to submit NOC from subcontractor about receipt of full payment from the contractor.
- 3.16.8 Contractor shall maintain record of actual mobilization of each equipment and key personnel. Joint record of equipment mobilization will be maintained month-wise. Further a copy of hindrance register for the specified period (RA bill period) duly signed by contractor HNGPL shall be maintained and submitted along with each RA bill.

4.0 TESTS, INSPECTION AND COMPLETION

- 4.1 **Tests and Inspection of Material under Contractor's Scope**
Inspection and test prior to shipment of material and at final acceptance shall be as specified in Technical Specification. However, without prejudice to the provision of Technical Specification following shall hold good.

The Owner/Consultant or its representative shall have the right to inspect and to test the material to conform their conformity to the specification.

If any inspected or tested material fail to conform the specification, the Owner/Consultant may reject them and the contractor shall either replace the rejected materials or make all the alteration necessary to meet the specification, free of cost to the purchaser/consultant.

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

Tests and Inspection during execution

The Contractor shall carry out the various tests as enumerated in the technical specifications of this Bidding Document and technical documents that will be furnished to him during the performance of the work at no extra cost to the Owner.

All the tests either on the field or at outside laboratories concerning the execution of the work and supply of materials by the Contractor shall be carried out by Contractor at his own cost.

The work is subject to inspection at all times by the Engineer-in-Charge. The Contractor shall follow all instructions given during inspection and shall ensure that the work is being carried out according to the technical

specifications of this Bidding Document, the technical documents that will be furnished to him during performance of work and the relevant codes of practice.

The Contractor shall provide for purposes of inspection access ladders, lighting equipment for testing, necessary instruments etc. at his own cost, low voltage lighting equipment for tray fixing and inspection work.

Compressed air for carrying out works shall be arranged by the Contractor at his own cost.

For material supplied by Owner, Contractor shall carryout the tests, if required by the Engineer-in-Charge, and the cost of such tests shall be reimbursed by the Owner at actual to the Contractor on production of documentary evidence.

Contractor shall inspect carefully all equipment before receiving them from Owner for installation purposes. Any damage or defect noticed shall be brought to the notice of Engineer-in- Charge immediately.

All results of inspection and tests will be recorded in the inspection reports, proforma of which will be approved by the Engineer-in-Charge. These reports shall form part of the completion documents. Any work not conforming to execution drawings, specifications or codes shall be rejected and the Contractor shall carryout the rectifications at his own cost.

Inspection and acceptance of the work shall not relieve the Contractor from any of his responsibilities under this Contract.

4.2 **Final Inspection during execution**

After completion of all tests as per specification the whole work will be subject to a final inspection to ensure that job has been completed as per requirement. If any defect is noticed, the Contractor will be notified by the Engineer-in-Charge and he shall make good the defects at his own cost and risk with utmost speed. If, however, the Contractor fails to attend to these defects within a reasonable time (time period shall be fixed by the Engineer-in-Charge) then Engineer-in-Charge may have defects rectified at Contractor's cost.

When these works are carried out at the risk and cost of the Contractor, the Engineer-in-charge would recover the actual cost incurred towards labour, supervisions and material, consumables or otherwise, plus 100% towards overheads from any pending bill of the Contractor or the security deposit.

4.3 **Documentation**

4.3.1 **As - Built Drawings**

Notwithstanding the provisions contained in standard specifications, upon completion of commissioning, the BIDDER shall complete all of the related approved drawings along with bill of materials to the "AS BUILT" stage provide to a **scale of 1:200** and submit to HNGPL., the following:

- a) One complete set in reduced size (279 mm x 432 mm).
- b) One complete set of Soft Copy in CD of all original drawings.
- c) One complete set (original) of approved prints in A2 / A3 sizes for site office and one set for HNGPL.

4.3.2 Completion Document

The following documents shall be submitted in hard binder by the BIDDER in two sets One complete set (original) for site office and one set for HNGPL), as a part of completion documents: -

- a) Copies of the Inspection reports, Laying Graphs, HDD Profiles (IF ANY) and valve pit drawings (IF ANY).
- b) Pre testing, final Hydrostatic / pneumatic and other Test results and reports.
- c) Consumption statements of PE / GI certified by Owner's Site Engineer.
- d) Final Material Reconciliation, stores issue & return statements
- e) All other requirements as specified in the respective specifications.
- f) Completion Certificate issued by Owner's Site Engineer.
- g) No claim certificate by the BIDDER.
- h) Completion certificate for embedded and covered up works wherever applicable.
- i) Recovery statement, if any.
- j) Deviation statement.
- k) Statement for reconciliation of all the payments and recoveries made in the progress bills.
- l) Copies of deviation statement and order of extension of time, if granted.
- m) Any other contractual documents required on completion.
- n) Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given /completed.
- o) The details recorded in measurement cards of every domestic house.
- p) Details of houses where extra piping done along with materials used.
- q) Total material consumption report.
- r) Material reconciliation with respect to the materials issued.
- s) Test reports & test certificates of gauges etc.
- t) Any other documents / records required.

4.4 Issue and Reconciliation of Material

Refer **Annexure-7** to SCC for details.

4.5 GOVERNMENT OF INDIA NOT LIABLE

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

5.0 REGISTRATION OF THE CONTRACT WITH STATUTORY AUTHORITIES (FOR FOREIGN BIDDER (if applicable))

Within 30 days of execution of the Contract agreement, the Contractor shall register themselves and the Contract at their own cost with the Reserve Bank of India, Income Tax, Sales Tax and such other statutory authorities, as may be required under the rules and regulations governing in India. The Contract Price shall be deemed to include all costs towards the same. A copy of all documents related to all such registration shall be submitted to Employer for record.

6.0 CONTRACT PERFORMANCE GUARANTEE

Please refer clause no. 37 of ITB (Vol. I) & clause no. 24.0 of GCC (General Condition of Contract) & BDS. In addition to above, following will also apply:-

6.1 In the event completion of works is delayed beyond the Scheduled Completion Date for any reasons whatsoever, the Contractor shall have the validity of the guarantee suitably extended to cover the period mentioned above.

6.2 The Employer shall have an unqualified option under this guarantee to invoke the Banker's Guarantee and claim the amount there under in the event of the Contractor failing to honor any of the commitments entered into under this Contract and/or in respect of any amount due from the Contractor to the Employer/Consultant. In case Contractor fails to furnish the requisite Bank Guarantee as stipulated above, then the Employer shall have the option to

terminate the Notification of Award of Work and forfeit the Bid Security/Earnest Money amount and no compensation for the works performed shall be payable upon such termination.

6.3 Upon completion of the Works as per Completion Schedule stipulated in the Contract, the above said guarantee shall be considered to constitute the Contractor's warranty / guarantee for the work done by him or for the Works supplied and their performance as per the specifications and any other conditions against this Contract. The warranty/guarantee shall remain in force for 12 months from the date of issuance of certificate of Completion and Acceptance against this Contract as per GCC. The Contractor shall also arrange for the Performance Guarantee to remain valid till expiration of the guarantee period for entire works covered under the contract.

6.4 In the event of Completion of Project being delayed beyond the Scheduled Completion Date, the Employer may without prejudice to any other right or remedy available to the Employer, operate the Bank Guarantee to recover the Compensation for delay leviable as per Clause 27 of GCC. The Bank Guarantee amount shall thereupon be increased to the original amount, or the Contractor may alternatively submit a fresh Bank Guarantee for the equivalent amount of compensation for delay recovered.

7 TAXES, DUTIES AND LEVIES IN INDIA

7.1 The Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all taxes, duties, including GST, custom duty, Applicable Cess, etc. now in force and hereafter increased, imposed or modified from time to time in respect of works and materials and all contributions and taxes for unemployment compensation, insurance and old age pensions or annuities now or hereafter imposed by any Central or State Government authorities which are imposed with respect to or covered by the wages, salaries, or other compensations paid to the persons employed by the Contractor and the Contractor shall be responsible for the compliance with all obligations and restrictions imposed by the Labour Law or any other law affecting employer-employee relationship and the Contractor further agrees to comply, and to secure the compliance of all subcontractors with all applicable Central, State, Municipal and local law and regulation, and requirement of any central, State or Local Government agency or authority. Contractor further agrees to defend, indemnify and hold Employer/Consultant harmless from any liability or penalty which may be imposed by the Central, State or Local authorities by reason of any violation by Contractor or Subcontractor of such laws, regulations or requirements and also from all claims, suits or proceedings that may be brought against the Employer/Consultant arising under, growing out of, or by reason of the work provided for by this Contract, by third parties, or by Central or State Government authority or any administrative sub-division thereof. The prices

shall also be inclusive of all taxes / Trade tax/ turnover tax as applicable.

- 7.2 Employer shall make from Contractors bills such tax deductions as are required as per rules and regulations in force from time to time.
- 7.3 If GST is applicable during site fabrication, the same must be assessed and deemed to be included by the bidder in the quoted prices. The bidder in this regard shall arrange all required formalities.
- 7.4 Bidder shall take care of all applicable taxes & duties while submitting their prices.
- 7.5 Any errors of interpretation of applicability of taxes/ duties by Bidders shall be to their account.

8. SUBSEQUENT LEGISLATION

- 8.1 All duties, taxes (including trade tax/ turnover tax/GST, as applicable), fees, charges, expenses, etc. (except where otherwise expressly provided in the Contract) as may be levied/ imposed in consequence of execution of the works or in relation thereto or in connection therewith as per the Acts, Laws, Rules, Regulations in force shall be to Contractor's account. However, any new taxes /duties imposed after the date of submission of last price bid & up to Contractual Completion date shall be to the HNGPL's account but such Taxes /duties imposed beyond Contractual Completion date shall be to the Contractor's account. However if such new taxes etc. is in substitute of existing taxes, same will be considered on merit of each case.

9.0 CUSTOMS DUTY ON CONSTRUCTION EQUIPMENTS

- 9.1 Contractor is liable to pay custom duty on the equipments brought into India for executing the project. The Contractor shall be fully liable for observing all the formalities in this regard as well as to pay the custom duty chargeable on the equipments, including any deposit payable for such purposes. No adjustment in contracted rates shall be permissible for any change in duty drawback applicable in respect of equipment & machinery brought in India for the use of the project and for re-export of equipment and machinery, on completion of the project.
- 9.2 If the Custom Authorities require the Contractor to furnish a bond to secure payment of any custom duty in respect of any import and that such Bond shall be furnished by the Employer, the Employer may at the request of the Contractor furnish the said Bond against the Contractor furnishing a Bank Guarantee to the Employer, of the like amount in the form and from a Bank in India approved by the Employer.
- 9.3 If for any reason the Employer is required by the Customs Authorities during pendency of Contract to pay any customs duty due to the importation or

retention by the Contractor of any imports, the Contractor shall forthwith on demand by the Employer pay the same to the Employer, with the right in the Employer/Consultant (without prejudice to any other mode of recovery or right of the Employer/Consultant) to deduct the same from the on account and other payments due and/or becoming due or payable to the Contractor from time to time. The payments under such a case shall be subject to submission of Bank Guarantee from a Bank approved by Employer, by the Contractor in favor of the Employer for an amount equivalent to amount of custom duty.

9.4 The obligations undertaken and/or any bond or facility provided by the Employer to the Contractor shall be based on the clear understanding that the said equipment shall be utilized by the Contractor only for the performance of

the work covered under this contract and that the Employer/Consultant shall be discharged forthwith from all said obligations and shall be entitled forthwith to discontinue and recall any bond or other facility to the Contractor if the Contractor shall utilize or permit to be utilized the said equipment(s) or any of them for the performance of any work other than the work covered by the Contract in which event any amount due from Contractor in this connection shall also carry interest @22% (Twenty two percent) per annum from the date of relative payment by Employer up to the date of recovery in full.

10 ISSUE OF CERTIFICATE- PERTAINING TO IMPORT

HNGPL shall not provide any kind of certificate.

11 IMPORT LICENCE

11.0 Contractor shall arrange import of all materials required for permanent incorporation in the works as well as construction equipment as per the guidelines laid down by the Government of India. Employer shall not provide import license.

12 WITHHOLDING, ACCOUNTING AND TAX REQUIREMENTS

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

13 INTELLECTUAL PROPERTY

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

14 FIRM PRICE

14.0 The quoted prices shall be firm and shall not be subjected to price escalation till the work awarded is completed in all respects.

15 WORKS CONTRACT

15.0 The work covered under this contract shall be treated as "Works Contract".

16 PROVIDENT FUND ACT

16.0 The Contractor shall strictly comply with the provisions of Employees Provident Fund Act and register themselves with RPFC before commencing work. The Contractor shall deposit Employees and Employers contributions to the RPFC every month. The Contractor shall furnish along with each running bill, the challan/ receipt for the payment made to the RPFC for the preceding months.

17 TEAM MOBILIZATION

When the contractor accepts the Work Order/Letter of Acceptance (LOA), the contractor must mobilize their team within 07 days of accepting the Work Order/LOA. If the contractor fails to fulfill this condition, the Earnest Money Deposit (EMD) will be forfeited. If the contractor does not respond to an email notification/ Letter within 30 days, they will be placed on the Holiday List for a period of 3 years.

18 TERMS OF PAYMENT

18.0 Basis and terms of payment for making “On Account Payment” shall be as setout in Annexure-5 to SCC.

19 COORDINATION WITH OTHER AGENCIES

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

20 ROYALTY

20.0 Contractor's quoted rate should include the royalty on different applicable items as per the prevailing Government rates. In case, Employer is able to obtain the exemption of Royalty from the State Government, the contractor shall pass on the same to Employer for all the items involving Royalty.

21 THE FACILITIES FOR WORKMEN

21.0 Following facilities are to be ensured at all work places where workmen are deployed/engaged by Contractor & any other, as required by law at the time of execution.

Arrangement of first aid

Arrangement for clean drinking water.

Toilets

Canteen where tea & snacks are available

A crèche where 10 or more women workmen are having children below the age of 6 years.

22 ARBITRATION

22.0 Clause No. 107.0 of GCC-Works pertaining to Arbitration shall be replaced by the following:-

22.0.1 All disputes, controversies, or claims between the parties (except in matters where the decision of the Engineer-in-Charge is deemed to be final and binding) which cannot be mutually resolved within a reasonable time shall be referred to Arbitration by sole arbitrator.

22.0.2 The Employer/Consultant (HNGPL) shall suggest a panel of three independent and distinguished persons to the other party (Bidder/Contractor/Supplier/Buyer as the case may be) to select any one among them to act as the sole Arbitrator.

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

22.0.4 The award of the Sole Arbitrator shall be final and binding on the parties and unless directed/awarded otherwise by the Sole Arbitrator, the cost of arbitration proceedings shall be shared equally by the Parties. The arbitration proceeding shall be in English language and the venue shall be at Delhi, India.

22.0.5 Subject to the above, the provisions of (Indian) Arbitration & Conciliation Act, 1996 and the rules framed there under shall be applicable.

22.0.6 All matters relating to this contract are subject to the exclusive jurisdiction of the Courts situated in the **State of Uttarakhand (India)**.

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

23 PROJECT PLANNING, SCHEDULING AND MONITORING SYSTEM

23.1 The Contractor shall follow the specifications with respect to Project Planning, Scheduling and Monitoring system as giving in Bidding Document.

24 CHECKING OF LEVELS

24.0 The Contractor shall be responsible for checking levels, orientation plan of all foundations, foundation bolts, etc., well in advance of taking up the actual erection work and bring to the notice of Engineer-in-Charge discrepancies, if any. In case of minor variations in levels etc. the Contractor shall carry out the necessary rectifications to the foundations within his quoted price.

24.1 The Contractor shall also be responsible for checking with templates, wherever necessary, the disposition of foundation bolts with the corresponding bases of structure and shall effect rectifications, as directed, within his quoted rate.

25 STORAGE FACILITIES

25.0 The Contractor shall maintain wherever required an air-conditioned room for the storage of the instruments as well as for calibration and testing of the instruments at his own cost. The contractor shall provide these facilities within the quoted price.

26 COMPUTERIZED CONTRACTORS BILLING SYSTEM

Without prejudice to stipulation in General Conditions of Contract, Contractor should follow following billing system.

The bills will be prepared by the contractors on their own PCs as per the standard formats and codification scheme proposed by HNGPL. The contractors will be provided with data entry software to capture the relevant billing data for subsequent processing. Contractors will submit these data to HNGPL in an electronic media along with the hard copy of the bill, necessary enclosures and documents. The contractor will also ensure the correctness and consistency of data so entered with the hard copy of the bill submitted for payment.

Employer/Consultant will utilize these data for processing and verification of the Contractor's bill and payment."

27 ORDER PLACEMENT OF BOUGHT OUT ITEMS

The contractor is required to place firm order for all bought out items of adequate quantity (including 1st lot in those cases where items are required to be procured in more than one lot, if so stated in SOR/ SCC) within 30 days

from the date of placement of order, failing which owner reserves the right to procure the same at the risk & cost of the contractor. However the contractor shall always take prior approval of owner and consultant for items required to be procured.

Further lots (for those cases where items are required to be procured in more than one lot, if so stated in SOR/ SCC) shall be procured after suitable period so as to ensure adequate availability of material at site throughout the execution period).

Proper inspection of bought out items at site by HNGPL is to be ensured by contractor within 1 week from the date of arrival of material at site failing which no amount will be certified against supply as well installation in RA bill.

28 REQUIREMENTS FOR CONTRACTOR AT SITE

- 28.0 Contractor shall establish site office in the respective areas with adequate facilities like tables, chairs, telephone, and computer with mailing facility etc. for effective communication and documentation.
- 28.1 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.
- 28.2 Contractor shall supply transport for their technical staff and operatives to move from site to site, and to move tools and equipment from site to site, this vehicle will also be fitted with a tow bar suitable for the towing of a mobile air compressor or pipe trailer.
- 28.3 Contractor shall make appropriate arrangements to ensure that their supervisor(s) are adequately mobile and can attend sites or meeting with HNGPL & other authorities or customers as required, without any undue delay.
- 28.4 Contractors shall provide cell phones to their supervisors for day to day communication with HNGPL and site representatives of HNGPL
- 28.5 The site in-charge must be a permanent employee of the contractor having desired qualification and work experience, Any change in key persons working at site shall be informed to the Owner promptly.
- 28.6 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.

29 COMPLIANCE WITH LAWS

29.0 The Contractor shall abide by all applicable rules, regulations, statutes, laws governing the performance of works in India, including but not limited to the following:

29.0.1 Contract Labour (Regulation & Abolition) Act 1970 & the centre rules, 1971 framed there under.

29.0.2 Payment of Wages Act.

29.0.3 Minimum Wages Act.

29.0.4 Employer's Liability Act.

29.0.5 Factory Act.

29.0.6 Apprentices Act.

29.0.7 Workman's Compensation Act.

29.0.8 Industrial Dispute Act.

29.0.9 Environment Protection Act.

29.0.10 Wild life Act.

29.0.11 Maritime Act.

29.0.12 Any other Statute, Act, Law as may be applicable.

29.0.13 PNGRB Act.

30 NOTES TO SCHEDULE OF RATES (SOR)

- i) The SOR items would be operable as per job requirement.
- ii) The quantities stated in SOR are tentative and may vary considerably on \pm side depending upon site condition, methodology adopted as per site requirement. The payment will be made as per actual certified Measurement at site and as instructed by EIC.
- iii) The scope as mentioned in the SOR is of **indicative nature only** and shall include all activities as detailed in the relevant clauses of the specifications attached and other relevant documents enclosed with tender.
- iv) Any other materials & activities not mentioned/covered in SOR, but otherwise required for satisfactory completion/safety of work as defined in tender has to be supplied /done by contractor with in the specified schedule at no extra cost to owner.
- v) Contractor shall be required to deploy adequate no. of plumbing teams to ensure domestic conversions expeditiously.

31 PRICE REDUCTION SCHEDULE

The Price reduction schedule shall be applicable at the rate mentioned as per clause no. 27 of GCC-Works as per following:

In case of delay in completion of work as per total scope of work within the completion schedule, Price Reduction Schedule shall be applicable at the rate of $\frac{1}{2}$ % of the contract Price per week of delay or part thereof.

The maximum PRS shall be 5% of total contract Price.

For PRS purpose, Contract value shall be excluding of GST.

The compensation on account of any liability (lies) including penalties other than above shall be as per provisions of bidding documents and shall be applicable in addition to PRS.

32 DIRECT PAYMENTS TO SUB-VENDORS/ SUPPORTING AGENCIES OF MAIN CONTRACTOR

Normally, the payment is to be made to vendor/ contractor only as per provision of contract. During execution, in case of financial constraints, HNGPL may make direct payment to their sub-vendor/ supporting agencies as an exception from the amounts due to the vendors/ contractors from any of their bills under process upon certification by EIC subject to receipt of such request from the vendor/ contractor. Further, the request for direct payments to the sub-vendor/ sub-contractor shall be considered in performance evaluation of such vendor/ contractor.

33 SUB-LETTING OF WORKS

Pursuant to Clause No. 37 of GCC-Works:

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

However, subletting of WHOLE WORKS is prohibited. Vendor/ Contractor shall submit undertaking to this effect along with each invoice/ bill.

34 BONUS FOR EARLY COMPLETION

The Clause 27.3 of GCC-Works for Bonus for early completion shall not be applicable in this Contract.

35 JOINTS MEASUREMENT OF WORK EXECUTED, BILLING, INVOICE AND PAYMENTS.

Measurement shall be recorded as per the methods of measurement spelt out in Specification/Contract Documents/ Procedure of HNGPL.

36 WAY BILL / ROAD PERMIT:

Shall be issued by Owner only for transportation of free issue material from one state to another.

37 LOCAL EMPLOYMENT

In order to encourage local employment, contractor shall endeavour to deploy personnel pass-out from local institutes including execution of non-critical activities through local agencies. However, preference should be given to engage more unskilled manpower resources locally to boost localemployment.

38 COMPLETION CERTIFICATE

Engineer-in-charges against the contract shall be HNGPL, however, the completion certificate shall be issued by HNGPL. The provisions of GCC are modified to this extent.

39 PRADHAN MANTRI SURAKSHA BIMA YOJANA (PMSBY) AND PRADHAN MANTRI JEEVAN JYOTI BIMA YOJANA (PMJJBY)

Contractor shall ensure that all its personnel deployed under this contract have obtained additional insurance coverage under the Pradhan Mantri Suraksha Bima Yojana (PMSBY) and Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) through the participating banks and submit the proof of such insurance coverage to the satisfaction of HNGPL. The cost of the insurance premium amount for both the above schemes shall be borne by the contractor giving evidence/proof to HNGPL in this respect and the Contractor shall suitably consider the same in their bid. Both the schemes are to be regulated continuously on yearly basis and the same should be renewed on each successive relevant date in subsequent years.

40 SUMMARY OF INSURANCE POLICIES

Contractor is required to cover all resources deployed by him with the following insurances / schemes:

No.	SCHEM E	APPLICABILIT Y	PREMIUM/CO N TRIBUTION	SUM ASSURED/ BENEFIT S	REMARKS
1	The Employees' State Insurance Act, 1948	Applicable to all resources of the Contractor (within ESI wage limit) working in notified area.	3.25% of wages by employer 0.75% of wages by employees	Benefits under the Employees' State Insurance Act, 1948.	
2	The Employees' Compensation Act, 1923 (in lieu of ESI mentioned at Sl. 1)	Applicable to Excluded employees under ESI and those who are working in non-notified area to extend similar benefits as available under ESI Act, 1948	Premium to be calculated considering wage limit under EC Act, 1923 (i.e. Rs. 15,000/- p.m currently)	Maximum Compensation Liability under Employee's Compensation Act, 1923 along with a Medical policy within overall premium @ 3.25 % of Minimum wages (i.e. employer Contribution towards ESI)	Provides compensation and medical facility to resources.

3	Group personal Accident Insurance	Applicable to all resources of the Contractor	Based on the coverage	Insured value: Rs. 3 Lakh to cover expenses associated with any accident.	Death, permanent disablement, temporary total disability or any other medical expenses related to accident.
4	Pradhan Matri Suraksha Bima Yojana (PMSBY)	-Eligibility – age group 18 to 70 years - Applicable to all resources of the Contractor	Rs. 20/- per annum	Accidental death and permanent disability: (i) Permanent total disability – Rs. 2 lakhs. (ii) Permanent partial disability – Rs. 1 Lakh.	
5	Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJJB)	Eligibility – age group 18 to 50 years. (can continue upto 55 years) - Applicable to all resources of the Contractor	Rs. 436/- per annum.	Risk coverage – Rs. 2 Lakhs- in case of death due to any reason	

C O N T E N T S

Annexure-1	:	Scope of Work
Annexure-2	:	Scope of Supply
Annexure-3	:	Time Schedule
Annexure-4	:	Measurement of
Work Annexure-5	:	Terms of Payment
Annexure-6	:	Quality Assurance
Annexure-7	:	Conditions for issue & reconciliation of material
Annexure-8	:	Minimum no. of Construction equipment to be
deployed Annexure-9	:	Minimum no. of skilled manpower to be
deployed Annexure-10	:	Schedule of Labour Rate
Annexure-11	:	Schedule of Equipment Hourly Rental Rate

Seal & Sign of Bidder

SCOPE OF WORK

(ANNEXURE -I TO SPEICAL CONDITION OF CONTRACT)

ANNEXURE-1 TO SCC

1.0 **SCOPE OF WORK**

Scope of work shall be as detailed in Particular Job Specification, Technical Specifications, Schedule of Rates & various other parts of this Bidding Document.

SCOPE OF SUPPLY

(ANNEXURE-2 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-2 TO SCC

1.0 SCOPE OF SUPPLY

1.1 Owner's Scope of Supply (Free Issue Item)

Owner's scope of supply shall be as specified in Particular Job Specification, Technical Specifications, Schedule of Rates & various other parts of the Bidding Document.

In order to speed up the project Free Issue Materials on replacement basis shall be issued to the Contractor from the designated store(s) of HNGPL. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

PE pipe of various length which are not in scrap category as per SCC clause (Annexure-7, point no. 1.6), owner can issue such pipe length to contractor for laying & installation purpose.

Conditions for Issue and Reconciliation of Materials shall be as per Document enclosed as **Annexure-7** to Special Conditions of Contract.

1.2 Contractor's Scope of Supply

All materials except what is under Owner's scope of supply as mentioned in Clause No. 1.1 above, and required for successful completion of works in all respects shall be supplied by the Contractor and the cost of such supply shall be deemed to have been included in the quoted price without any additional liability on the part of Owner.

TIME SCHEDULE

(ANNEXURE-3 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-3 TO SCC

TIME SCHEDULE

Name of Work	Scope of work	Contract period
HIRING AGENCIES (MAX. 06 NOS.) FOR LMC CONNECTION IN HARIDWAR FOR 200 (50+ 50 + 100) CONNECTIONS EACH.	As per specified in Section -3	Contract is valid for 02 months from Date of LOI/LOA/EIC intimation whichever is later.

Note: The above time schedule is inclusive of mobilization period.

- 1) The time of completion shall be reckoned from the date of award of contract, which shall be the date of issue Fax of Acceptance.
- 2) The time indicated is for completing all the works in all respects as per specifications, codes, drawings and instructions of Engineer-in-charge.
- 3) It should be noted that the period of construction given above includes preparation of drawings (if required), procurement and supply of materials including their inspection & testing, mobilization at site, construction, laying, fabrication, erection inspection, testing, rectification (if any), pre-commissioning, commissioning and demobilization works etc. complete in all respects to the entire satisfaction of Owner/ Engineer-in-charge.

**(STAMP & SIGNATURE OF
BIDDER)**

MEASUREMENT OF WORK

(ANNEXURE-4 TO SPECIAL CONDITIONS OF CONTRACT –TECHNICAL)

ANNEXURE-4 TO SCC

MEASUREMENT OF WORK

1.0 GENERAL

- 1.1** The mode of measurement shall be as mentioned in relevant standard specification incorporated in the Bidding Document. Any other mode of measurements not covered in above specifications shall be followed in accordance with relevant BIS codes/ Schedule of Rates/ Specifications etc. and/ or as decided by Engineer-in-charge.
- 1.2** Payment will be made on the basis of joint measurements taken by Contractor and certified by HNGPL Engineer. Measurement shall be based on “Approved for Construction” drawings, to be the extent that the work conforms to the drawings and details are adequate. 3-5% checking of measurement work shall be by EIC..
- 1.3** Wherever work is executed based on instructions of Engineer-in-charge or details are not adequate in the drawings, physical measurements shall be taken by Contractor in the presence of Engineer-in-charge.
- 1.4** Measurements of weights shall be in metric tonnes corrected to the nearest Kilogram. Linear measurements shall be in meters corrected to the nearest centimeters.
- 1.5** The weights mentioned in the drawing or shipping list shall be the basis for payment. If mountings for panels etc. are packed separately, their erection weights shall include all mountings.
- 1.6** Welds, bolts, nuts, washers etc. shall not be measured. Rates for structural steel work shall be deemed to include the same.
- 1.7** No other payment either for temporary works connected with this Contractor for any other item such as weld, shims, packing plates etc. shall be made. Such items shall be deemed to have been included for in the rates quoted.
- 1.8** Measurement will be made for various items under schedule of rates on the following basis as indicated in the unit column.
- | | | | |
|------|--------|---|-----------|
| i) | Weight | : | MT or Kg |
| ii) | Length | : | M (Meter) |
| iii) | Number | : | No. |
| iv) | Volume | : | Cu.M |
| v) | Area | : | Sq.M |

2.0 PIPING

- 2.1** Length of pipes shall be measured along the curvilinear centre of the pipelines laid/ installed and shall include all types of fittings, bends etc. but excluding all types of valves. Length of valves shall be excluded from piping measurement and shall be considered on number basis.

3.0 FOR PIPELINE CROSSINGS BY HDD (if required) / BORING / MOLING METHOD

Payment shall be made as specified in SOR, PJS and Technical Specification.

TERMS OF PAYMENT

(ANNEXURE-5 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-5 TO SCC

1.0

TERMS OF PAYMENT

Pending completion of the whole works, provisional progressive payments for the part of work executed by the contractor shall be made by Owner on the basis of said work completed and certified by the Owner's representative as per the agreed milestone payment schedule and the percentage break-ups given below.

Contractor shall submit his invoices to the Owner's representative monthly in the manner as instructed by Owner. Each invoice will be supported by documentation acceptable to Owner and certified by the Owner's representative. Payments made by owner to the contractor for any part of the work shall not deem that the Owner has accepted the work.

The Contractor shall raise the RA bill and payment shall be made as per the following payment terms and the payment shall be released within 30 days from the date of certification of the bill by EIC and payment shall be made as per the following terms :-

For SOR item 1.1 & 1.4

FOR OPEN TRENCHING METHOD

70%	Trenching, lowering, electro-fusion jointing of pipeline along with installation of Transition fitting, back-filling and compaction for the PE pipeline length as per the scope of work.
10%	Testing of PE pipeline
5%	Purging with nitrogen of the PE pipeline
5%	Commissioning with natural gas of the PE pipeline & submit along RA bill As-built drawings
10%	Submission of all documents and closure of contract.

FOR MOLING METHOD

70%	On manual moling, installation & electro-fusion jointing of PE pipeline along with installation of Transition fittings, back-filling of moling pits, pits restoration as per the scope of work.
10%	Testing of PE pipeline and restoration
5%	Purging with nitrogen of the PE pipeline
5%	Commissioning with natural gas of the PE pipeline & submit along RA bill As-built drawings
10%	Submission of all documents and closure of contract.

For SOR item 1.2

70%	After Complete restoration (local area wise) as per the standards (bidder may note that restoration work shall be carried out after successful testing and commissioning in respective area).
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20%	After obtaining NOC from respective owner /EIC.
10%	After Completion of all works and closure of contract.

For SOR item 1.3

30%	Supply of casing (HDPE) pipe
40%	Installation of HDPE pipe
10%	Testing of PE pipeline
5%	Purging with nitrogen of the PE pipeline
5%	Commissioning with natural gas of the PE pipeline& submit along RA bill As-built drawings
10%	Submission of all documents and closure of contract.

For SOR item 1.5 & 1.6 & 4 & 5 & 8 & 2.6 & 2.7

90%	Completion of work as per SOR including supply.
10%	After submission of documents and closure of contract

For SOR item 2.1

90%	On procurement of GI pipes, Completion of installation of pipes including all fittings, valves, etc. and clamping, Testing of installations &, painting, Commissioning including all related activities.(NG)
10%	After submission of documents and closure of contract

For SOR item 2.3 & 2.4

90%	Upon installation of meters (free issue) and supply and complete installation of rubber hose all its associated work. Conversion of burners (NG) and gas charging(i.e., Commissioning work).
10%	After submission of documents and closure of contract

For SOR item 2.5 & 1.7 & 6 & 7

70%	Upon supply of items.
10%	Upon Complete installation of item's and all its associated work.
10%	Commissioning / gas charging
10%	After submission of documents and closure of contract

For SOR Item No. 3.0 registration Work

Payment for the registration work shall be made for the actual no. of registration as follows:

10%	On submission of consumer detail confirming to take connection
20%	Submission of forms duly filled and signed by consumer

60%	After technical inspection (For ascertaining whether connection can be given or not) and collection of security amount from consumer (security amount to be collected only if connection is feasible technically)
10%	After final charging of gas in the consumer connection

2. Any other work (Not mentioned above)
- a) Completion of individual work as per SOR including supply:90% (wherever applicable)
 - b) Completion of all activities and their acceptance submission offinal documents, final bill and acceptance of these by owner thereafter for successful closure of work order:: 10%

Note: Any further breakup of each activity for the payment purpose can be done depending upon the site situation / requirement and recommendation by EIC and approval of construction in-charge.

3. **Payment Methodology**

- I. The Contractor shall raise invoices (as per GST Act/ rules) on monthly basis. Bidder shall enclose all documents as per checklist issued by HNGPL including during Kickoff meeting
- II. The payment of the contractor shall be released within 30 days from the date of certification of the bill by EIC.
- III. Employer will release payment through e-payments only as detailed in bidding document.
- IV. Further break-up of Lumpsum Prices, if deemed necessary for any progressive payment of individual item may be mutually arrived at between Engineer-in-Charge and the Contractor.
- V. Successful bidder(s) to submit material reconciliation certificate along with each bill.
- VI. Bills shall be raised by contractor in line with check list attached in Tender document.
- VII. *As per CBDT Notification No. 95/2015 dated 30.12.2015, mentioning of PAN no. is mandatory for procurement of goods / services/works/consultancy services exceeding Rs. 2 Lacs per transaction.*

Accordingly, supplier/ contractor/ service provider/ consultant should mention their PAN no. in their invoice/ bill for any transaction exceeding Rs. 2 lakhs. As provided in the notification, in case supplier/ contractor/ service provider/ consultant do not

have PAN no., they have to submit declaration in Form 60 along with invoice/ bill for each transaction.

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

VIII. *HNGPL's PAN No. is AADCH8780N.*

IX. All RA Bills shall be submitted to EIC of HNGPL.

**QUALITY ASSURANCE
(ANNEXURE-6 TO SPECIAL CONDITIONS OF
CONTRACT)**

For Details - (Refer our Technical Specification of same is enclosed in Section 4 of tender document.)

CONDITIONS FOR ISSUE AND RECONCILIATION OF MATERIAL

(ANNEXURE-7 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-7 TO SCC

1.0 CONDITIONS FOR ISSUE OF MATERIALS

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

1.1 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.

1.2 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.

1.3 The contractor shall bear 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.

1.4 No material shall be allowed to be taken outside the plant without a gate pass.

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

1.6 Reconciliation of Owner supplied materials

1.6.1 Every month, the contractor shall submit an account for all materials issued by Owner in the proforma prescribed by the Engineer-in-charge. On completion of the work the contractor shall submit “Material Appropriation Statement” for all materials issued by the Owner in the proforma prescribed by the Engineer-in-charge.

Waste materials like part lengths of pipes and other partly used items are the property of HNGPL. and must be returned to the store with the appropriate documentation so that they can be considered as part of the material reconciliation.

Item	Unaccountable	Scrap
Regulators, meters	0%	0%
GI Service Pipes	2%	2% (less than 0.5 mtrs)
PE Pipes	2%	2% (less than 2.0 mtrs)
Consumables	Discretionary	-

* In case supplied by Owner

Unaccountable wastage / scrap shall be at actual as per site assessment subject to maximum as stated above.

The percentage allowance shall be accounted on the basis of final measurement book.

1.6.2 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 above 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. 125% 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 Owner. Contractor shall be responsible for the adjustment/weight/ 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.

1.6.3

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.

CONSTRUCTION EQUIPMENT TO BE DEPLOYED
(ANNEXURE-8 TO SPECIAL CONDITIONS OF CONTRACT)

MINIMUM NO. OF SKILLED MANPOWER TO BE DEPLOYED

(ANNEXURE-9 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-9
MINIMUM NO. OF SKILLED MANPOWER TO BE DEPLOYED

S.No	Description	Requirement per contractor
1	Resident Construction Manager /Section Incharge	1
2	Engineer (QA/QC)	1
3	Safety Officer/Safety supervisor ***	1
4	Foreman/Supervisor	2
5	Document Controller	1
6	Store Keeper/ Store in-charge	1
7	Fusion Operation/ Jointer	2

The above proposed list of skilled manpower is the minimum to be deployed by Contractor.

TENTATIVE NO. OF SKILLED MANPOWER TO BE DEPLOYED

S.No	Description	Requirement per contractor
1	Skilled Workers (GI Plumber)	10
2	Plumber's Helper	10
3	NG Conversion Team	2
4	Skilled Workers (Moling Team)	As and when required
5	Unskilled Workers (Labour)	As and when required

***Note: -

Safety Supervisor: A dedicated Safety Supervisor having recognized degree in science or diploma in engineering with one-year experience of working as a safety supervisor in any oil & gas industry /chemical/construction industry shall be deployed up to 50 workers. Subsequently for every 50 workers, CONTRACTOR shall deploy one dedicated Safety Supervisor.

Safety Officer: A full time /dedicated qualified Safety Engineer/Officer shall be assigned for every 250 workers are employed at site/GA. The Safety Engineer/Officer shall possess requisite qualification and experience in line the Central/State Regulations.

(SIGNATURE OF BIDDER)

NOTES:-

1. Site Engineer/Section In-charge should be posted at Site.
2. The details of minimum manpower required to be mobilized by the execution contractor to complete the work within schedule is given above and is not exhaustive. Contractor is required to augment the above list with additional numbers/categories of workmen as required and directed by Engineer-In charge to complete the work within the completion time schedule and quoted price.
3. The Manpower as identified above should have required qualification and adequate relevant experience.
4. The minimum no. of. skilled manpower to be deployed may however vary (increase/decrease) depending on availability of work front. The decision of EIC in this regard shall be final.

SCHEDULE OF LABOUR RATES
(ANNEXURE-10 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE -1 to SCC

SCHEDULE OF LABOUR RATES (FOR EXTRA WORKS)

Sl. No.	Classification Personnel	Rates in INR for 8 hours	Rate per Hour for OT, Sunday & Holiday
		Standard Time (Rs)	In Rs
1.	Engineer	3500/-	775
2.	Surveyor	1750/-	385
3.	Pipe Fitter	1000/-	220
4.	Pipe Welder	1750/-	385
5.	Gas Cutter	1155/-	250
6.	Grinder	1155/-	250
7.	Mason	800/-	175
8.	Plumber	800/-	175
9.	Carpenter	800/-	175
10.	Painter	800/-	175
11.	Electrician	1000/-	220
12.	Cable Jointer	800/-	175
13.	Instrument Technician	850/-	185
14.	Rigger	750/-	165
15.	Watchman/Helper	650/-	140
16.	Concrete Mixer Operator	850/-	185
17.	Heavy Machine Operator	1000/-	220
18.	Fusion Operation/ Jointer	850	185
19.	Safety Officer	2750/-	600
20.	Document Controller	1000/-	220
21.	Store Keeper/ Incharge	1000/-	220
22.	Foreman	2475/-	540

(SIGNATURE OF BIDDER)

NOTES:-

Above rates are final and Tenderer is to sign only without deviation.

EQUIPMENT RENTAL RATES FOR EXTRAWORKS
(ANNEXURE-11 TO SPECIAL CONDITIONS OF CONTRACT)

ANNEXURE-11 TO SCC

EQUIPMENT RENTAL RATES FOR EXTRA WORKS

SL. NO.	DESCRIPTION OF EQUIPMENT	HOURLY RENTAL RATES FOR EXTRA WORKS INCLUDING CONSUMABLES
1)	Dozers	Rs. 6500/-
2)	Dewatering Pumps	Rs. 1500/-
3)	Fusion Jointing Machine	Rs. 5000/-
4)	Diesel operated power generators	Rs. 5000/-
5)	Gas cutting set with cylinders	Rs. 1250/-
6)	Compressor 600 CFM Capacity	Rs. 5000/-
7)	Trucks	Rs. 5000/-
8)	Car/Jeep	Rs. 2000/-
9)	Pipe bending m/c	Rs. 7500/-
10)	Tractor with trolley	Rs. 2000/-
11)	Tripod with 5 Tons Chain Pulley Block	Rs. 500/-
12)	Pipe Trailor (FB/ Semi Low Bed)	Rs. 10000/-
13)	Dumper	Rs. 7000/-
14)	Moling machine (Manual)	Rs. 3000/-
15)	Moling machine (Machine)	Rs. 5000/-
16)	JCB Excavator	Rs. 8000/-
17)	JCB Excavator with rock breaking tool	Rs. 12000/-
18)	Compressors up to 300 CFM	Rs. 4000/-
19)	Concrete mixer 0.25 to 0.40 cum with hopper	Rs 1000/-or as required

NOTES:-

- 1) Rates are final and Tenderer is to sign only without deviation.
- 2) Rates are inclusive of operators / drivers as applicable
- 3) Rates are inclusive of contractor's overhead & profit
- 4) The recovery rate shall be the rates provided above plus 20%

(SIGNATURE OF BIDDER)

[03] PARTICULAR JOB SPECIFICATION

CONTENTS

<u>S. No.</u>	<u>Description</u>
1.0	Project Description & Scope of Work
2.0	General Terms and Condition
3.0	Procurement
4.0	Scope of Supply
5.0	Documents, Specifications, Standards & Drawings
6.0	Resources/ Facilities
7.0	Project Scheduling & Monitoring
8.0	Construction
9.0	Documentation
10.0	Survey and Level/ Setting out Work
11.0	Order of Works/ Permissions/ Right of Entry/ Care of Existing Services
12.0	Make of Material/ Bought Out Items
13.0	Inspection of Supply Items
14.0	Escalation
15.0	Documents to be submitted along with R.A. Bills
16.0	Insurance for Free Issue Material
17.0	Special Points pertaining to Specification
18.0	Special notes pertaining to Schedule of Rates (SOR)
19.0	Appendix-I (List of Supplier for Bought Out items)

19.0 GENERAL & PROJECT DESCRIPTION

19.1 PROJECT DESCRIPTION

M/s Haridwar Natural Gas Pvt. Ltd, (JV of Gail Gas Ltd. & Bharat Petroleum Corporation Limited is engaged in development of CNG & City Gas Distribution Networks (CGDN) at Haridwar Geographical Areas in the country for distribution of CNG and PNG to various consumer segments.

Presently, HNGPL is developing CNG & City Gas Distribution Networks(CGDN) at Haridwar GA to supply Natural Gas to Domestic, Commercial, Industrial and Automobile Consumers in these Geographical Areas (GA).

This tender deals with the Laying, testing and commissioning of underground medium density Polyethylene (MDPE) service pipelines of size 32 / 20mm OD including PE/ GI transition fitting & installation of GI pipelines for Piped Natural Gas supply to domestic consumers in Haridwar city.

19.2 SCOPE OF WORK

The scope of work involves providing city gas connectivity to the consumers as per the following detail:

DPNG	200 (25+25+50) Domestic Connection
Existing RFC to NG	10 Connection
Commercial & Industrial Connection	8 Nos (Tentative Qty, Connection will be done if required)

The above scope of work covers laying, testing and commissioning of underground medium density Polyethylene (MDPE) service pipelines of size 32 / 20mm OD from the nearest branch line of various sizes MDPE line to various end point consumers of Piped Natural Gas (PNG) in **Haridwar** City. Other than MDPE pipe, meter and regulators, all other materials shall be procured by the contractor as indicated in SOR.

The last mile Connectivity, at the end points of various domestic consumers, includes supply and Installation and testing of GI pipes, Meters (meter free issue) and regulators (regulators free issue), Isolation and appliance valve with all fittings etc.

Further the scope of work also includes identification of existing structures, buildings, roads,paves / by-lanes, nallahs, culverts, drains, utility lines, electric poles, type of ground surface

, and marking on drawings along with location of all houses by their names and identificationnumber along with preparation of drawings.

The broad scope of this tender comprised of but not limited to the following:

- Laying, testing & commissioning of PE service line (of size 32 / 20mm) along with Fittings and valves from the nearest existing branch line of various sizes tothe Housing complex / society / individual houses etc including PE/GI transition pipe. Supply of

fittings & valves are in the Bidders scope.

- Supply and installation of tapping saddle on existing PE pipe of various sizes of existing network.
- Installation of Regulators, meters & other associated fittings (including supply of fittings).
- Supply and above ground GI installation including riser kit (PE to GI transition fittings) from regulator at consumer end.
- Supply of copper tube, isolation valves & appliance valves.
- Supply & installation of GI Pipe connection within Kitchen of Domestic consumers including installation of meters (free issue), regulators (free issue), anaconda, appliance / isolation valve, brass fittings, copper tube etc complete in all respect.
- Conversion of Domestic appliances (like burner, hotplate etc) for application / use of PNG.
- Supply ,fabrication and installation of Plate marker.
- Making of PCC pedestal of grade (1:2:4) and size (8"X6"X4").
- Supply and Installation of TF along with GI Sleeve.
- Registration of Domestic PNG Connections.
- Reconciliation of material received from store each time before submission of RA bills.

GENERAL Terms and Condition

- i. Special Condition of Contract shall be read in Conjunction with the General Conditions of Contract, SOR, PJS of work, specifications , Drawings and any other documents forming part of this contract wherever the context so requires.
- ii. Notwithstanding the sub-division of the documents into these separate sections and volumes every part of each shall be deemed to be supplementary to and complementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.
- iii. Where any portion of the General Condition of Contract is repugnant, to or at variance with any provisions of the Special Conditions of Contract, unless a different intention appears, the provisions of the Special Conditions of Contract shall be deemed to over-ride the provisions of the General Condition of Contract and shall to the extent of such repugnancy, or variations, prevail.
- iv. The materials, design and workmanship shall satisfy the relevant INDIAN STANDARDS, the TECHNICAL SPECIFICATIONS contained herein and CODES referred to. Where the technical specification stipulate requirements in addition to those contained in the standard codes and specifications, these additional requirements shall also be satisfied.
- v. Wherever it is mentioned in the specifications that the CONTRACTOR shall perform certain work or provide certain facilities, it is understood that the CONTRACTOR shall do so at his cost and the VALUE OF CONTRACT shall be deemed to have included cost of such performance and provisions, so mentioned.

- vi. It will be Contractor's responsibility to bring to the notice of Engineer-in-charge any irreconcilable conflict in the contract documents before starting the work(s) or making the supply with reference which the conflict exists.
- vii. In the absence of any specifications covering any material, design of work(s) the same shall be performed/ supplied/ executed in accordance with Standard Engineering Practice as per the instructions/ directions of the Engineer-in-charge, which will be binding on the Contractor.

3. Procurement

- 3.1.1 CONTRACTOR shall procure and supply all the materials other than OWNER supplied materials, required for permanent installation of pipeline and above ground GI Installation in sequence and at appropriate time. All equipment, materials, components etc. shall be suitable for the intended service. Approved vendor list has been indicated in the bid package for various items. For items which are not covered in the vendor list, CONTRACTOR shall obtain Owner's prior approval for the vendor based on PTR document.
- 3.1.2 CONTRACTOR shall procure all materials, components, equipment, consumable etc. required for successful completion of the pipeline system. CONTRACTOR shall also procure and supply spares required for pre-commissioning and commissioning/ start up as recommended for all items supplied by him as per specifications provided in the bid package. Where no specification is available in the contract, the same shall be prepared by the CONTRACTOR based on the piping material specification and shall be subject to Owner's approval.
- 3.1.3 Material take-off with complete description of size, rating, material, thickness and specifications to be prepared by contractor.
- 3.1.4 Only single offer shall be provided by the bidder fully complying to specifications/ drawings/ requirements for Owner's review and approval. CONTRACTOR shall provide for inspection of the items at vendor's works by the OWNER/ Owner's REPRESENTATIVE or by a reputed inspection agency and shall submit inspection reports for Owner's clearance.
- 3.1.5 Stores management including receipt, warehousing, preserving the material in good condition, issue of material to construction site, reconciling/ handing over surplus material to OWNER for OWNER supplied items .
- 3.1.6 Carryout proper documentation of inspection and quality assurance programmes for all equipment and bulk materials duly approved by OWNER. CONTRACTOR shall maintain an accurate and traceable listing of procurement records for the location, quality and character of all permanent materials in the Project.
- 3.1.7 CONTRACTOR shall immediately report to the OWNER of all changes which will affect material quality, and recommend any necessary corrective actions to be taken.
- 3.1.8 Submit periodic progress reports highlighting hold ups and slippages, if any, to OWNER and take remedial measures.

3.1.9 Interact with authorities such as Sales Tax, Octroi, Excise, Customs etc. as necessary and arrange for transportation of the materials under his scope of supply to site.

3.1.10 All purchase requisitions including purchase orders shall be approved by Owner/ Owner's Representative.

3.1.11 Compliance with vendor's and supplier's instructions and recommendations for transportation, handling, installation & commissioning.

3.2 Construction

3.2.1 General

3.2.1.1 All construction works shall be carried out as per "Approved for Construction" drawings, procedures, specification and applicable codes and standards. Any changes at site shall also need prior approval from the OWNER and revision of drawings. Construction drawings will be submitted by the Contractor in a phased manner for owner's approval in accordance with the procurement and construction plan prepared and furnished by contractor & agreed by Owner.

Owner will take minimum 7 working days from the date of submission of the documents / drawings submitted by the contractor for owner's comments / approval.

3.2.1.2 Statutory Approvals

The Owner shall provide to the Contractor the basic / in principal approval for laying the pipeline. However, the Contractor at his own initiative shall obtain all permissions, permits and licenses necessary for the performance of the work. **If any such permission, permit or license required for the performance of the work** by the contractor can only be granted at the request or recommendation of the Owner, the Owner shall at the request of the Contractor, provide recommendatory letters to the contractor to obtain or procure the same. The contractor shall not, however be entitled to any additional compensation over and above contracted rates of services for any hardship or increased cost caused by any idleness, suspension or disruption of work or any other account whatsoever as a result of the inability of the contractor to obtain the permission(s), permit(s), license(s) aforesaid to match with the progress of the work nor shall the same constitute a ground for extension of time.

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

b) The defective work resulting from poor workmanship and/ or material supplied by contractor, as pointed out by any statutory authority shall be rectified by the contractor at no extra cost to the Owner. Any change/ addition required to be made to meet the requirements of the statutory authorities, the same shall be carried out by the contractor free of charge. The inspection and acceptance of the work by statutory authorities shall, however, not absolve the contractor for many of his responsibilities under this contract.

3.2.1.3 The Contractor shall comply with all the conditions and requirements issued by Authorities having jurisdiction in the area where the work is to be performed.

It shall be the Contractor's sole responsibility to make arrangements for land for setting up of its string fabrication yards, all storage areas for line pipe and other materials, wherever required, and all other work areas.

The Contractor shall make all arrangements for access to his work site at his own cost and responsibility. If no public road exists Contractor shall arrange on his own for access to his work area at no extra cost to the COMPANY.

The CONTRACTOR shall be responsible for claims if any arising out of damage/ obstruction to public utilities like lines of DOT etc. where the claims will cover the restoration costs as well as loss of revenue due to down time.

3.2.1.4 Providing schedules, progress reporting, organization chart at construction site, quality assurance plan and developing quality control procedures, as per requirements indicated elsewhere in the bid package.

3.2.1.5 Coordination and supervising the work of sub-contractors.

3.2.1.6 Transportation of appropriate materials and taking delivery of Company supply materials, store, worksite, intermediate storage points, maintaining and operating an adequate materialcontrol procedure at worksite.

3.2.1.7 Fabrication of all GI piping, structural components as per approved drawings.

3.2.1.8 All civil/ structural works, electrical and instrumentation, laying and commissioning works shall be performed in accordance with relevant specifications and requirements enclosed elsewhere in the bid package.

3.2.1.9 CONTRACTOR shall provide complete details of manpower, equipment etc. to be deployed. Mobilizing and providing all equipments, manpower (skilled and unskilled), consumable and other resources etc. for each spread as required for the execution of the complete job defined herein and thereafter demobilizing the same upon completion of work.

3.2.1.10 Provide, maintain and operate all temporary facilities required for the construction related works and remove after completion of work. Providing barricading at trench incity area as per

instruction of engineer in charge for safety.

3.2.1.11

Hook up / tie-in of pipeline and piping system with other facilities etc.

3.2.1.12 All works related to cleaning, testing, dewatering, swabbing, drying, pre-commissioning and commissioning of the work tendered.

3.2.1.13 Idle time preservation of pipeline, if required.

3.2.1.14 All incidental and associated works and any other works not specifically listed there in but are required to be carried out to complete entire work related to pipelines and terminals.

3.2.2 Branch / service Pipeline

3.2.2.1 Familiarization of Pipeline Route

Bidders are advised to make site visits to familiarize themselves with all the salient features of available infrastructure along the proposed pipeline in concerned GA area (cities). Contractor shall be deemed to have considered all constraints and eventualities on account of site conditions while formulating his bid. Contractor shall not be eligible for any compensation in terms of cost and / or time, on account of site conditions varying to any extent from whatever described in the Bid Package.

3.2.2.2 The city condition field / other fields may have lots of PVC, PE & utility pipelines or other pipelines & cables being used for city utility / other utilities purposes. CONTRACTOR shall ensure that these lines shall not be damaged/ cut affecting the water / power / communication / other supply to concerned Users / Owners / Authorities. Wherever required temporary necessary precautions had to be maintained for uninterrupted supply.

3.2.2.3 Supply, loading, unloading, handling, stacking, storing and transportation to workshop/ work site of all materials that may be used for the construction of pipeline system at their designated stack yard/ dump site/ store and/ or by CONTRACTOR as the case may be.

3.2.2.4 Stacking, clearing, grading as required, trenching to all depths in all types of soil including soft & hard rock by chiseling or otherwise cutting etc. to a width to accommodate the PE pipeline as per relevant standards, drawings, specification etc. transportation of PE pipes along the route, stringing, aligning, bending, jointing including testing, inspection, field jointing including supply of all materials as per specifications, laying and lowering of the pipeline, back filling, Supply and installation of pipeline as shown in approved drawings and as directed by OWNER, installation of supports wherever required, supply of select backfill material as required, clean-up, flushing, pneumatic testing, nitrogen purging / pre-commissioning and commissioning of complete pipeline system, including all associated works as per relevant specifications, standards and approved drawings.

3.2.2.5 Sand / soft soil padding around pipe wherever required in areas where trenching has been done in hard soil area / rocky area including supply of sand/ soft soil. The thickness of sand/ soft soil padding at the top of pipe shall be minimum 150 mm and bottom of pipe shall be minimum 150 mm or as per drawing enclosed whichever is more.

3.2.2.6 Installation of all inline / online instruments / valves / fittings / transition fittings /

appurtenances etc. as per requirements of approved drawings.

3.2.2.7 Testing & Purging

A) Testing

Pressure testing will be carried out with compressed air. Compressed air will be provided by Contractor for testing purposes and is to be included in the rates.

Measuring instruments shall have been calibrated and their accuracy and sensitivity confirmed. For testing of Network, calibrated pressure gauges of suitable range shall be supplied by the contractor. 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.

For service lines in some cases testing will be carried out for the test duration of 4hrs. The service testing in this case will be performed after the service installation is complete but before the service tee has been tapped. Also in some cases the tapping of the service tee will be delayed pending the completion and purging of the main pipelines.

B) Purging

Purging shall be carried out in accordance with the principles defined in the American Gas Association publication ‘Purging Principles and Practice’.

Nitrogen required for purging will also be provided by the Contractor. Nitrogen shall be supplied in labeled, tested and certified cylinders, and completed with all necessary regulators, hoses and connections, which will be in good condition and working order.

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.

3.2.2.8 Markers

Installation of all types of markers including all associated civil works. Any other work not specifically mentioned above but required for making the entire pipeline system ready for operation.

3.2.2.9

Priorities

The Contractor shall start the execution work as per approved execution methodology / plan

/ procedure to complete the scope of work and shall deploy adequate manpower, machinery, tool & tackles etc. accordingly.

However, Owner may, at its sole option, assign priority of construction to any part/ segment of the work. Contractor shall comply with such priority of execution and their deployment without any time and cost implication to the Owner.

3.2.2.10 Pre-commissioning and Commissioning Assistance

- Pre-commissioning including supply of all materials, consumables and manpower of the complete pipeline system
- Making the entire system ready for commissioning and providing assistance during the complete duration of commissioning operations.
- Completion of all pipeline activities as detailed in SOR.

3.2.2.11 Civil Works

Civil works shall be carried out as per scope mentioned at SOR and as per Indian Standard norms.

- Any other work not specifically listed herein but required for the completion of the work.

4.0 **SCOPE OF SUPPLY**

4.1 Owner's Scope of Supply (Free Issue Item)

Owner's scope of supply includes all MDPE pipe, meters & Regulators only as required

In addition to above, In order to speed up the project other Materials if available with owner shall be issued on replacement basis to the Contractor from the designated store(s) of HNGPL. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

PE pipe of various length which are not in scrap category as per SCC clause (Annexure-7, point no. 1.6), owner can issue such pipe length to contractor for laying & installation purpose.

4.2 Material to be Supplied by Contractor

The procurement and supply, in sequence and at the appropriate time, of all materials and consumables required for completion of the work as defined in this Bid document except the materials specifically listed above, shall be entirely the CONTRACTOR'S responsibility and item rates quoted for the execution of the

CONTRACT shall be inclusive of supply of all these materials. The material to be supplied by the Contractor shall be as per specification and preferred make as indicated in Appendix-I. or duly approved / recommended for use by HNGPL . The materials will be, but not by way of limitations, as

follows:

All materials except what is under Owner's scope of supply as mentioned in Clause No. 4.1 above, and required for successful completion of works in all respects shall be supplied by the Contractor and the cost of such supply shall be deemed to have been included in the quoted price without any additional liability on the part of Owner.

Contractor has to supply valves, fittings, coupler, tee, end caps, HDPE Casing, reducer, TF fittings, warning mats, Saddle Tapping Tee GI fittings, Anaconda (flexible hoses), Steel reinforced rubber hose etc. as required to complete the scope of work. However any other additional / Supplementary materials required for successful execution of the project is to be supplied by the contractor.

Notes for contractor Supplied material:-

- i. All the supply items shall be procured from the Vendors / manufacturers listed in tender documents.
- ii. For any other item(s) for which the vendor list is not provided, bidders can supply those item(s) from vendors/ suppliers who have earlier supplied same item(s) for the intended services in earlier projects and the item(s) offered is in their regular manufacturing/ supply range. The bidder is required to submit documentary evidences (PO copies, Inspection Certificate etc.) before procurement / Placement of Order for approval to HNGPL.
- iii. For supply of other items, the contractor has to **submit Material Test Certificate** and other relevant documents from the approved / Listed manufacturer for review of HNGPL.
- iv. In case, Contractor proposes a vendor other than those as per the suggested vendor list, Contractor is required to submit documentary evidences such as PO copies, Inspection Certificate and any other information etc (such as reasons for proposing the change of vendor) before procurement / Placement of order for approval to HNGPL.
- v. HNGPL reserves the right to accept material on MTC basis from listed / approved vendors for procurement of supply items by the contractor

5.0 DOCUMENTS, SPECIFICATION, STANDARDS AND DRAWINGS

5.1 Owner shall furnish tender purpose drawings as listed in content of Volume-II of II of the tender document and other typical standard drawings attached with respective technical specifications enclosed with Volume-II of II of the tender document. Contractor shall prepare detail engineering drawing, bill of materials and all construction drawings and submit to owner for approval prior to start of the job /any procurement.

5.2 Contractor shall prepare isometric drawings, any specific detail drawings (if required by Engineer-in-charge) & bill of materials and submit the same for Owner/ Consultant's approval / record.

Contractor shall prepare drawing for utilities line as required or as per SOR and submit the same for Owner/ Consultant's approval/ record.

5.3 No construction small or big shall be carried out without proper construction / standard drawings duly approved by Owner's Engineers at Delhi or site office or Owner's representative duly authorized to do so.

5.4 After Completion of construction & commissioning of pipeline system, Contractor shall

incorporate all the correction in drawings, prepare and issue the drawings "as built drawings" as listed below to Owner as final submission of drawings. For pipeline

alignment sheet, all block valves location & details, pipe book etc. and for tap-off point & consumers premises, piping GAD, Isometric and all civil drawings including hook-up arrangement with Meter Regulator. For final submission only 4 sets of documents shall be handed over by Contractor. Any construction done by Contractor without duly approved drawings shall be wholly at his risk and cost. Contractor shall also submit soft copy of pipe book in excel alongwith hard copy. Softcopy of all as-built drawings shall be also submitted in AutoCAD.

5.5 Specifications

The work shall be carried out by CONTRACTOR strictly in accordance with the following specifications enclosed in Volume-II o II of this document :-

- 1) Laying of Underground PE Pipeline
- 2) Installation of Aboveground GI Piping for Domestic Consumers
- 3) PE Pipes
- 4) GI Pipe
- 5) GI Fittings
- 6) HDPE Pipes
- 7) Warning mats
- 8) MDPE Fittings and Electro-fusion
- 9) Brass Fitting
- 10) Flexible Hose (anaconda)
- 11) Isolation valve & Appliance Valve
- 12) Health safety and environment
- 13) Quality Assurance
- 14) Steel reinforced rubber hose

5.6 Drawings

The drawings to the extent available are included in Vol.-II of the bid package for BIDDER's reference purpose only; Bidders are advised to go through these drawings and also visit the site before submitting their bids. The Contractor shall develop all drawings including for all crossings, along with the all connection drawings required for construction works as detailed irrespective SCC, PJS & SOR etc.

6.0 **RESOURCES FACILITIES**

6.1 Recruitment of Personnel by Contractor

The Contractor shall not recruit personnel of any category from among those who are already employed by the other agencies working at the sites but shall make maximum use of local labour available.

6.2 **Construction Water and Power Supply**

No water and power will be provided by the owner. It should be the responsibilities of the contractor to arrange water and power at his own cost.

6.3 **Land for Residential Accommodation**

Owner shall not provide any land for residential accommodation of contractors staff and labour.

7.0 **PROJECT SCHEDULING & MONITORING**

The following schedules/documents/reports shall be prepared and submitted by the Bidder/Contractor for review/approval at various stages of the contract.

7.1

Along with Bid

a) Time Schedule

The Completion Time Schedule for the work (including mobilization period) as per SCC Annexure- 3. of **Tender in all respect, from the date of issue of telex/telegram/letter/Fax of Intent.**

The Bidder is required to submit a Project Time Schedule in Bar Chart Form, along with the Bid. The Schedule shall cover all aspects like sub-ordering, manufacturing and delivery, indicated in the Bid Document. The Owner interface activities shall be clearly identified with their latest required dates. Owner reserves the right to disqualify the Bidder if the above Schedule submitted by the Bidder is not in line with the overall Project requirement.

b) Scheduling & Monitoring System

The Bidders should describe their system of Project Scheduling and monitoring, the extent of computerization, level of detailing, tracing methodology etc. with the name of computer package and sample outputs.

7.2

After the Award of Contract

a) Overall Project Schedule

The Contractor shall submit within 1 week of Fax of Intent, a sufficiently detailed overall Project Schedule in the activity network form, clearly indicating the major milestones, interrelationship/ interdependence between various activities together with analysis of critical path and floats.

b) Progress Measurement Methodology

The contractor is required to submit within 1 week of award of WORK, the methodology of progress measurement of sub-ordering, manufacturing/ delivery, sub- contracting construction and commissioning works and the basis of computation of overall services/physical progress informed. Owner reserves the right to modify the methodology in part or in full.

c) Functional Schedules

The contractor should prepare detailed functional schedules in line with network for functional monitoring and control and submit scheduled progress covers for each function viz. ordering, delivery and construction.

7.3

Project Review Meetings

The Contractor shall present the programme and status at various review

meetings as required.

a) Weekly Review Meeting

Level of : Contractor's/Participati
on Site In charge & Job
Engineers.

Agenda : a) Weekly programme v/s
actual achieved in
the past week
& programme for next week.
b) Remedial Actions and hold up
analysis.
c) Client query/ approval.

Venue : HNGPL Office

b) Monthly Review Meeting

Level of Participation : Senior Officers of HNGPL /and contractors.

Agenda : a) Progress Status/ Statistics
b) Completion Outlook
c) Major hold ups/slippages
d) Assistancerequired
e) Critical issues
f) Client query / approval

Venue : HNGPL office

7.4 Progress Reporting Performa

A) Monthly Progress Report

This report shall be submitted on a monthly basis within 10 (ten) calendar days from cut-off date, as agreed upon covering overall scenarios of the work.

The report shall include, but not limited to the following :

- a) Brief Introduction of the work.
- b) Activities executed / achievements during the month.
- c) Schedule versus actual percentage progress and progress curves for Detail Engg. Sub-ordering, Manufacturing / Delivery, Sub- contracting, Construction, Commissioning and Overall and quantum wise status & purchase orders against schedule.
- d) Area of concern/ problem/ hold-ups, impacts and action plans.
- e) Resources deployment status.
- f) Annexures giving status summary for drawings, MRs, deliveries, sub-contracting and construction.
- g) Procurement status for items to be supplied by Contractor.

B) Weekly Reports

The report will be prepared and submitted by the Contractor on weekly basis and will cover following items :

- a) Activities programmed and completed during the week.
- b) Resource deployed men and machines.

- c) Quantities achieved against target in construction
- d) Record of Man days lost.
- e) Construction percentage progress schedule and actual.

C) Daily Repots

- a) Activity programme for the day
- b) Progress of the previous day and commutative progress.
- c) Manpower & machinery deployed.

7.5 Progress Reports

7.5.1 CONTRACTOR shall make every effort to keep the OWNER adequately informed as to the progress of the WORK throughout the CONTRACT period.

CONTRACTOR shall keep the OWNER informed well in advance of the construction schedule so as to permit the OWNER to arrange for requisite inspection to be carried out in such a manner as to minimize interference with progress of WORK. It is imperative that close coordination be maintained with the OWNER during all phases of WORK.

7.5.2 By the 10th (tenth) of each month, CONTRACTOR shall furnish the OWNER a detailed report covering the progress as of the last day of the previous month. These reports will indicate actual and scheduled percentage of completion of construction as well as general comments of interest or the progress of various phases of the WORK. The frequency of progress reporting by the CONTRACTOR shall be weekly.

7.5.3 Once a week, CONTRACTOR shall submit a summary of the WORK accomplished during the preceding week in form of percentage completion of the various phases of the WORK, to the OWNER.

7.5.4 Progress reports shall be supplied by CONTRACTOR with documents such as chart, networks, photographs, test certificate etc. Such progress reports shall be in the form and size as may be required by the OWNER and shall be submitted in at least 3 (three) copies.

7.5.5 Contractor shall prepare daily progress report (DPR) in the desired format and submit it to Engineer-in-charge along with schedule of next day to Engineer-in-charge.

8.0 CONSTRUCTION

OWNER reserves the right to inspect all phases of CONTRACTOR's operations to ensure conformity to the SPECIFICATIONS. Owner will have Engineers, Inspectors or other duly authorized representatives, made known to the CONTRACTOR present during progress of the WORK and such representatives shall have free access to the WORK at all times. The presence or absence of a OWNER's representative does not relieve the CONTRACTOR of the responsibility for quality control in all phases of the WORK. In the event that any of the WORK being done by the CONTRACTOR or any SUB-CONTRACTOR is found by OWNER's representatives to be unsatisfactory or not in accordance with the DRAWINGS, procedures and SPECIFICATIONS, the CONTRACTOR shall, upon verbal notice of such, revise the work in a manner to conform to the relevant DRAWINGS, procedures and SPECIFICATIONS.

8.1 Rules & Regulations

CONTRACTOR shall observe in addition to Codes specified in respective specification, all National and Local Laws, Ordinances, Rules and Regulations and requirements pertaining

to the WORK and shall be responsible for extra costs arising from violations of the same.

8.2 Procedures

Various procedures and method statements to be adopted by CONTRACTOR during the construction as required in the respective specifications shall be submitted to OWNER in due time for APPROVAL. No such construction activity shall commence unless approved by OWNER in writing.

8.3 Field Inspection

CONTRACTOR shall have at all times during the performance of the WORK, a Competent Superintendent on the premises. Any instruction given to such superintendent shall be construed as having been given to the CONTRACTOR.

8.4 Erection and Installation

The CONTRACTOR shall carry out required supervision and inspection as per quality Assurance plan and furnish all assistance required by the OWNER in carrying out inspection work during this phase. The OWNER will have engineers, inspectors or other authorized representatives present who are to have free access to the WORK at all times. If an OWNER's representative notifies the CONTRACTOR's authorized representative not lower than a Foreman of any deficiency, or recommends action regarding compliance with the SPECIFICATIONS, the CONTRACTOR shall make every effort to carry out such instructions to complete the WORK conforming to the SPECIFICATIONS and approved DRAWINGS in the fullest degree consistent with best industry practice.

8.5 Construction Aids, Equipment, Tools & Tackles

CONTRACTOR shall be solely responsible for making available for executing the work, all requisite Construction Equipments, Special Aids, Tools, Tackles and testing equipments and appliances. Such construction equipments etc. shall be subject to examination by owner and approval for the same being in first class operating condition. Any discrepancies pointed out by OWNER shall be immediately got rectified, repaired or the equipment replaced altogether, by CONTRACTOR. OWNER shall not in any way be responsible for providing any such equipment, machinery, tools and tackles.

The OWNER reserves the right to rearrange such deployment depending upon the progress and priority of work in various sections.

Tie-end between main line and starting point of terminal is included in the scope of contract, as and when main line section is available for Tie-ins.

9.0 DOCUMENTATION

9.1 "As Built" Drawings

The Contractor will be required to submit computerized as-built drawings duly certified by EIC in A1 / A2 sheet form at 1:200 scale with four sets of prints plus

softcopy. The as-built drawing shall be submitted on area wise as specified. The bill of materials used for the particular area shall be specified on the drawings

9.2 Completion Document – PE & GI

The following documents shall be submitted in hard binder by the BIDDER in FOUR sets, as a part of completion documents :-

- a) Copies of the Inspection reports, Laying Graphs, HDD Profiles (if required) and valve pit drawings (if required).
- b) Pre testing, final Hydrostatic / pneumatic and other Test results and reports.
- c) Consumption statements of PE / GI certified by Owner's Site Engineer.
- d) Material Reconciliation, stores issue & return statements
- e) All other requirements as specified in the respective specifications.
- f) Completion Certificate issued by Owner's Site Engineer.
- g) No claim certificate by the BIDDER.
- h) Completion certificate for embedded and covered up works wherever applicable.
- i) Recovery statement, if any.
- j) Deviation statement.
- k) Statement for reconciliation of all the payments and recoveries made in the progress bills.
- l) Copies of deviation statement and order of extension of time, if granted.
- m) Any other contractual documents required on completion.
- n) Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given / completed.
- o) The details recorded in measurement cards of every domestic house.
- p) Details of houses where extra piping done along with materials used.
- q) Total material consumption report.
- r) Material reconciliation with respect to the materials issued.
- s) Test reports & test certificates of gauges etc.
- t) Any other documents / records required.

10.0 **LEVEL / SETTING OUT WORK**

10.1 Before the WORK or any part thereof are begun, the CONTRACTOR's agent and the Engineer-in-Charge's representative shall together survey and take levels of the SITE and decide all particulars on which the survey is to be made, and on which measurements of the WORK are to be based. Such particulars shall be plotted by the CONTRACTOR and after agreement the drawings shall be signed by the Engineer-in-Charge.

10.2 The CONTRACTOR shall be entirely responsible for the horizontal and vertical alignment, the level and correctness of every part of the WORK and shall rectify any errors or imperfections therein. Such rectifications shall be carried out by the CONTRACTOR at his own cost, when instructions are issued to this effect by the Engineer-in-Charge or his representative.

10.3 The Engineer-in-Charge shall furnish the relevant existing grid point with Bench Mark on the land. It shall be CONTRACTOR's responsibility to set out the necessary control points in and to set out the alignment of the various works. The CONTRACTOR shall have to employ efficient survey team for this purpose and the accuracy of such setting out work shall be CONTRACTOR's responsibility.

10.4 The CONTRACTOR shall give the Engineer-in-Charge not less than 24 (twenty four) hours notice in writing of his intention to set out or give levels for any part of the WORK so that arrangements may be made checking the same.

10.5 WORK shall be suspended for such times as necessary for checking lines and levels on any part of the WORK.

10.6 The CONTRACTOR shall at his own expense provide all assistance, which the Engineer-in-Charge may require for checking the setting out of WORKS.

10.7 Before commencement of any activity, contractor's quality control set up duly approved by company must be available at site.

11.0 **ORDER OF WORKS / PERMISSIONS / RIGHT OF ENTRY / CARE OF EXISTING SERVICES.**

11.1 The order in which the WORK shall be carried out shall be subject to the approval of the Engineer-in-charge and shall be so as to suit the detailed method of construction adopted by the CONTRACTOR, as well as the agreed joint programme. The WORK shall be carried out in a manner so as to enable the other contractors, if any, to work concurrently.

OWNER reserves right to fix up priorities which will be conveyed by Engineer-in-Charge and the CONTRACTOR shall plan and execute work accordingly.

11.2 Existing Service

11.2.1 Drains, pipes, cables, overhead wires and similar services encountered in course of the works shall be guarded from injury by the CONTRACTOR at his own cost, so that they may continue in full and uninterrupted use to the satisfaction of the Owners thereof, or otherwise occupy any part of the SITE in a manner likely to hinder the operation of such services.

11.2.2 Should any damage be done by the CONTRACTOR to any mains, pipes, cables or lines (whether above or below ground etc.), whether or not shown on the drawings the CONTRACTOR must make good or bear the cost of making good the same without delay to the satisfaction of the Engineer-in-Charge.

12.0 **MAKE OF MATERIAL / BOUGHT OUT ITEMS**

Approved vendors for various major items are enclosed as Appendix-I to Particular Job Specification with this tender document. The bidder shall consider such names only as indicated in the aforesaid list and clearly indicate in the bid the name(s) as selected against these items. For any other item not covered in the list enclosed with this tender document, prior approval shall be obtained by the contractor for its make/supplier's name.

13.0 **INSPECTION OF SUPPLY ITEMS**

All inspections and tests shall be made as required by the specifications forming part of this contract. Contractor shall advise Owner/ Consultant in writing at least 10 days in advance of the date of final inspection/tests. Manufactures inspection or testing certificates for equipment and materials supplied, may be considered for acceptance at the discretion of Owner/ Consultant. All costs towards testing etc. shall be borne by the contractor within their quoted rates. All inspection of various items shall be carried out based on Quality

Assurance Plan, which will be submitted by the Contractor and duly approved by

Owner/ Consultant.

14.0

ESCALATION

The Unit Rates quoted shall be kept firm till completion of work, and no price Escalation shall be paid.

15.0 VIOD

16.0 INSURANCE FOR FREE ISSUE MATERIAL

Insurance for Free Issue Material

Contractor shall at his own expense arrange, secure and maintain insurance cover for Owner's supplied free issue materials as defined in Tender Document of adequate value as intimated by owner

/ consultant. Contractor's quoted price shall be inclusive of all costs on account of insurance liabilities covered under the Contract. Contractor to note that the beneficiary of insurance cover shall be HNGPL. The approximate cost of free issue material is Rs.. (Contract Value plus GST + Rs. 20 lakh)

The contractor may take the insurance as per the following schedule:

- a) Upto 3 months : 30%
- b) Upto 6 months: 60%
- c) Beyond 9 months: 100%

16.2. Insurances in India

16.2.1 Contractor shall at his own expense arrange, secure and maintain insurance with Indian 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 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 this responsibilities and obligations under Contractor.

16.2.2 Any loss of damage to the equipment during inland transportation, storage, erection and commissioning till such time the Work is taken over by Owner shall be to the account of Contractor. Contractor shall be responsible for preferring of all claims and make good for the damage or loss by way of repairs and/ or replacement of the parts of the Work damaged or lost. Contractor shall provide the Owner with a copy of all insurance policies and documents shall be submitted to the owner immediately upon the Contractor having taken such insurance coverage. Contractor shall also inform the Owner regarding the expiry cancellation and/ or changes in any of such documents and ensure revalidation/ renewal etc., as may be necessary well in time.

16.2.3 The risks that are to be covered under the insurance shall include, but not be limited to the loss or damage in handling, transit, theft, pilferage, riot, civil commotion, weather conditions, accidents of all kinds, fire, war risk etc. The scope of such insurance shall cover the entire value of supplies of equipments, plants and materials.

16.2.4 All cost on account of insurance liabilities covered under this Contract will be to Contractor's account and will be included in Contract Price. However, the Owner may from time to time, during the currency of the Contract, ask the Contractor in writing to limit the insurance coverage risk and in such a case, the parties to the Contract will agree for a mutual settlement, for reduction in Value of Contract to the extent of reduced premium amounts.

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

17.0 SPECIAL POINTS PERTAINING TO SPECIFICATION :-

The technical specification & safety standards as prescribed in PNGRB is to be followed further

The minimum pipeline cover shall be kept as follows:

Pipeline Burial Requirement

The entire pipeline shall be buried and provided with a minimum cover as given in Table below:

Pipeline Burial Requirements	
Location	Min. Cover (m)
a) minor water crossing (below firm bed level)	1.5
b) Cased/ Uncased Road/ cart track crossings	1.2
c) Drainage, ditches at roads crossings	1.0
d) Residential and other locations including rocky areas	1.0

Note:

- i) The depth of cover shall be measured from the top of the pipe to the top of the undisturbed surface of soil or the top of graded working strip, whichever is lower. The fill material in the working strip shall not be considered in the depth of cover.
- ii) The cover shall be measured from the top of road or top of rail, as the case may be;
- iii) For water courses that are prone to scour and erosion, adequate safe cover as mentioned above or as advised by concerned authorities (whichever is stringent) shall be provided below the predicted scour profile expected during the life time of the pipeline.
- iv) When scour level is not known, an additional cover of at least 1 m or as advised by concerned authorities shall be provided from the existing firm bed of the river / watercourse except in case of rocky river bed;
- v) Minimum cover mentioned above against Sl. no. a), b), c), d) & e) category may be increased based on the statutory requirements from concerned authorities and authorities requirement shall be final and binding to the contractor.
- vi) Soft soil / sand padding of minimum 150 mm thickness or as mentioned in standard drawing (whichever is stringent) to be provided around the pipeline where gravel /hard soil or rocky area **if** encountered.
- Piping at consumer ends, connection at existing tap-off location and for future

connections along with bill of materials.

Contractor shall develop General Arrangement Drawings (GADs) good for construction for size 32 / 20mm and locations based on typical sketches/ drawings Along with bill of materials and submit to Owner for reviews/approval. Construction work shall be carried out based on construction drawings duly approved by Owner/ Consultant.

- The detailed engineering for above ground installation shall include detail engineering pertaining to all disciplines (if required) along with bill of materials.
- All the documents/ drawings prepared by the Contractor shall be submitted to Owner/ Engineer-in-charge for review and approval. All works shall be executed based on the approved drawings/ documents only.
- Contractor shall obtain all clearance from Government authorities (if required). However bank guarantee/ required fee or charges shall be submitted by Owner.

17a. If any ambiguity arises between SCC (Tech.) & Particular Job Specification in that case later shall govern. However in some cases, decision of Engineer-in-charge shall be final and binding to the contractor.

17b **Following points shall be taken care by the contractor before during execution works.**

- i) Contractor shall be responsible for taking necessary precautions regarding traffic (installation of notice/ warning boards).
- ii) Contractor shall be totally responsible for the occurrence of any accident during excavation of road and shall be liable for damages / expenses due to the same.
- iii) Concerned authority / Owner shall not be responsible for any loss / damage.
- iv) One copy of the permission shall be made available with contractor's responsible workman (if required) at the place where excavation is undertaken.
- v) While executing the subject work, excavation shall be done in consultation with the concerned authority engineer of that area.
- vi) Necessary safety measures shall be taken for the gas pipeline, since high tension lines and other services carriers are running along with in gas pipeline route in the area.

18.0 **SPECIAL NOTES PERTAINING TO SCHEDULE OF RATES (SOR)**

- i) All SOR item shall be quoted by the bidder in the price part of the bid, other-wise bid will

be rejected.

- ii) The quantities given above against individual items are indicative and shall not be considered to be binding. The quantities may be increased, decreased or deleted at site at the time of actual execution and as per discretion of Owner/ Engineer-in- charge. The unit rate shall be operated to work out the final payment due to Contractor.
- iii) The payment will be made as per actual certified measurement at site.
- iv) The scope as mentioned in the SOR is of indicative nature only and shall include all activities as detailed in the relevant clauses of the respective Particular Job Specifications, Technical Specifications, Data Sheets & drawings, etc.
- v) Installation of PE Pipes of size 32 / 20 mm is to be laid underground considering for domestic consumers as required in respective city.
- vi) Restoration works of pipeline trench made by open cut method are included in Contractor's scope as indicate in SOR. Owner's / Engineer-in-Charge's decision in this regard shall be final and binding to the contractor.

LIST OF APPROVED SUPPLIER FOR BOUGHT OUT ITEMS**PE FITTINGS & PE VALVES**

- 1) M/s George Fisher
- 2) M/s Kimplas, (PE Fittings only)

HDPE PIPES & DUCT

- 1) M/s Climax Synthetics (P) Ltd., Vadodra
- 2) M/s Indian Poly Pipes, Calcutta
- 3) M/s Jain Irrigation Systems Ltd., Jalgaon
- 4) M/s Kirti Industries (India) Ltd., Indore
- 5) M/s Ori Plast Limited, Calcutta
- 6) M/s Phoel Industries Limited, Delhi
- 7) M/s Sangir Plastics (P) Ltd., Mumbai
- 8) M/s Veekay Plast, Jaipur
- 9) M/s Kisan Irrigation
- 10) M/s Dutron Polymers Ltd.
- 11) M/s Manikya Plastichem (P) Ltd
- 12) M/s Mangalam pipes pvt. Ltd., Bengaluru
- 13) M/s Shand pipe industry pvt. Ltd., Bengaluru
- 14) M/s Varun pipes pvt. Ltd., Bengaluru
- 15) M/s EPP Composite pvt. Ltd., Rajkot
- 16) M/s DM Engineering co. , mumbai

GI PIPE

1. M/s Goodluck steel tubes ltd, Ghaziabad
2. M/s Indus tubes ltd , New Delhi
3. M/s Jindal pipes ltd , New Delhi
4. M/s Jyotindra steel & tubes ltd, Firozabad
5. M/s Rama Steel tubes ltd, New Delhi
6. M/s Surya Roshni ltd, Bhadurgarh
7. M/s Vishal Pipes Ltd.
8. M/s Advance Steel Ltd.
9. M/s Swastik Pipe Ltd.
10. M/s Fortune pipe ltd.
11. M/s Indian seamless metal tubes ltd., Pune
12. M/s Appolo tubes, Bengaluru
13. M/s Nezone tubes ltd., Kolkata
14. M/s Topworth pipes & tubes pvt. Ltd., Navi mumbai

WARNING TAPE

1. M/s Sparco Multiplast Pvt. Ltd., Ahmedabad
2. M/s Singhal Industries , Ahemdabad
3. M/s Raychem RPG ltd.
4. M/s Pooja packings, Mumbai
5. M/s Bina enterprises, Mumbai
6. M/s Shree Vijay wire & cables industries, jaipur

GI FITTINGS

- 1 M/s Jainsons Industries,jalandhar
- 2 M/s Jupiter Metal Industries Ltd.
- 3 M/s RAJNESH Malleables ltd.,Delhi
- 4 M/s Industrial Valves &Components,Delhi
- 5 M/s Sarin industries, Delhi
- 6 M/s Mehta Brother & Co., Mumbai-(Make: M/s Jinan Meide Casting Co.Ltd., Japan) confirming to IS 1879:2010 latest standard

BRASS FITTING

1. M/s Chandan Enterprises
2. M/s Paras Industries Ltd.
3. M/s Umesh Enterprises
4. M/s Om brass enterprises
5. M/s KPC flexi tubes
6. M/s Mehta bros, Mumbai

FLEXIBLE HOSE (anaconda)

1. M/s KPC Flex Tubes
2. M/s Vestas Hose Division
3. M/s Alfa Flexi Tubes
4. M/s Bengal industries pvt. Ltd.
5. M/s Vikram & co.
6. M/s Gaytri industrial corporation, Thane (w)
7. M/s Chandan ENterprises

STEEL REINFORCED RUBBER HOSE

- a) M/s Suraksha products pvt. Ltd.
- b) M/s Vansh industries
- c) M/s T &L Gases
- d) M/s Vikram & co.
- e) M/s Gayatri
- f) M/s Luxmi Rubtech

Isolation Valves and Appliance Valve.

1. M/s Universal srl
2. M/s Tiemme Raccorderie Sede
3. M/s Jainson Industries
4. M/s Enolgas Bonimu s.a.s.
5. M/s Fratelli Fortis s.r.l
6. M/s Giacomo Climbrio
7. M/s Parker Hannifin S.P.A.
8. M/s Singapore Valve & Amp; Fittings Pte Limited, Singapore
9. M/S Rubinetteria Utensilerie Bonomi (RUB)
10. M/s Mehta Brothers, Mumbai.
11. M/s Chokawala distributors.

PAINT

1. M/s Asian Paints
2. M/s Berger Paints
3. M/s Kansai Nerolac Paints

I List of approved supplier for bought out items for “PE Pipeline laying “works

A) PE FITTINGS

- 1) M/s George Fisher
- 2) M/s Kimplas Piping Systems Ltd., Nashik

B) ISOLATION (PE) VALVES

- 1) M/s Friatech AG, Germany
- 2) M/s George Fisher, Germany
- 3) M/s Plasson Ltd., Israel
- 4) M/s Agru, Austria
- 5) M/s Aliaxis Utilities & Industry Pvt. Ltd (Formerly Glynwed pipesystems)

C) HDPE PIPES & DUCT

- 1) M/s Mangalam Pipes Pvt. Ltd., Bengaluru
- 2) M/s Shand pipe Industry Pvt. Ltd., Bengaluru
- 3) M/s Varuna pipes Pvt. Ltd., Bengaluru
- 4) M/s Manikya Plastichem (P) Ltd., Mysore
- 5) M/s Jain Irrigation systems Ltd. Jalgaon
- 6) Godavari Polymers Pvt. Ltd. Secunderabad.

Note:

- 1) For procuring the above listed bought out item(s) from the vendor/supplier, whose name is not appearing in the above preferred make list, bidders can supply those item(s) from such vendors/suppliers who have earlier supplied same item(s) for the intended services and the offered item(s) is in their regular manufacturing/ supply range and the same may be accepted subject to following:-
 - a) The Vendor/ Supplier of bought out item(s) is a Manufacturer/ Supplier of the said item(s) for intended services and the same are in their regular manufacturing/supply range.
 - b) The vendor/supplier should not be in the Holiday list of Client/ BPCL/ GAIL GAS/ Other PSU.
 - c) For items to be purchased with measurement unit either in length or in weight:- Should

have supplied for intended services at least 15% of SOR quantity of same size, thickness, schedule, pressure & temperature ratings, SDR, etc. or higher (as applicable) as per technical details should have been supplied within last seven (07) year from the date of approval request made by the contractor.

- d) For items to be purchased with measurement unit in number:- Should have supplied for intended services at least 15% of SOR quantity of same size, thickness, schedule, pressure & temperature ratings, SDR, etc. or higher (as applicable) as per technical details mentioned in SOR & Tender specification and the same should have been supplied within last seven (07) year from the date of approval request made by the contractor.
- 2) For procuring any other item(s) {i.e. not listed above} for which the vendor/ supplier name is not appearing in above preferred make list, bidders can supply those item(s) from such vendors/suppliers who have earlier supplied same item(s) for the intended services and the offered item(s) is in their regular manufacturing/ supply range and the same may be accepted subject to following:-
- a) The Vendor/ Supplier of bought out item(s) is a Manufacturer/ Supplier of said item(s) for intended services and the same are in their regular manufacturing/supply range.
 - b) The vendor/supplier should not be in the Holiday list of Client/ BPCL/ GAIL GAS/ Other PSU.
 - c) For items to be purchased with measurement unit either in length or in weight:- Should have supplied for intended services at least 15% of SOR quantity of same size, thickness, schedule, pressure & temperature ratings, SDR, etc. or higher (as applicable) as per technical details mentioned in SOR & Tender specification and the same should have been supplied within last seven (07) year from the date of approval request made by the contractor.
 - d) For items to be purchased with measurement unit in number:- Should have supplied for intended services at least One (01) number of same size, thickness, schedule, pressure & temperature ratings, SDR, etc. or higher (as applicable) as per technical details mentioned in SOR & Tender specification and the same should have been supplied within last seven (07) year from the date of approval request made by the contractor.

Remarks for Note 1 & 2:

To meet the criterion mentioned above, the successful bidder/ contractor is required to submit documentary evidences such as copy of FOA/ Purchase Order (PO)/ sub-purchase order and their supply record like Inspection certificates/report, Inspection release note, Tax paid invoice, performance certificates (if available), etc. from which it can be established that vendor have executed supplied the order.

- i. These documents shall require to be submitted by them within 30days from date of Placement of Order for approval to CLIENT / HNGPL.

- ii. The details of vendors indicated in this list are based on the information available with HNGPL, Contractor shall verify the capabilities of each vendor for producing the required quantity and the items are in their regular manufacturing range. HNGPL does not take any guarantee / responsibility on the performance of the vendor. It is the contractor's responsibility to verify the correct status of vendor and their quality control before proposing to CLIENT / HNGPL for approval of vendor name. It is also the responsibility of contractor to expedite the material in time.

- iii. For those vendors name are not appearing in the above listed items but registered with HNGPL can also be considered for the supply of the items. Contractor has to propose such vendors name along with their valid registration letter issued by HNGPL or further approval of EIC.

Section 3
Scope of Work

C O N T E N T S
LIST OF SPECIFICATION/STANDARDS
SECTION 4 OF TENDER NO.:

TECHNICAL SPECIFICATION

- 1) LAYING OF UNDERGROUND MDPE MAIN PIPELINE
- 2) INSTALLATION OF ABOVEGROUND GI PIPING FOR DOMESTIC & COMMERCIAL CONSUMERS
- 3) HDPE PIPES
- 4) MDPE FITTINGS AND ELECTRO-FUSION
- 5) POLYETHYLENE PIPES
- 6) GI PIPE
- 7) GI FITTING FOR NATURAL GAS
- 8) BRASS FITTING
- 9) ISOLATION AND APPLIANCE VALVE
- 10) WARNING MAT
- 11) FLEXIBLE HOSE
- 12) QULITY ASSURANCE
- 13) HEALTH SAFETY AND ENVIROMENT
- 14) DATA SHEETS
- 15) DRAWINGS

TECHNICAL SPECIFICATION
FOR
LAYING OF MDPE MAIN PIPELINES
AND SERVICE PIPELINES

CONTENTS

- 1.0 GENERAL INFORMATION
- 2.0 SCOPE OF WORK
- 3.0 MATERIAL, LABOUR, PLANT AND EQUIPMENT
 - 3.1 Supplied by Contractor
 - 3.1.1 Plant and Equipment
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- 21.0 PURGING
- 22.0 VALVE PIT
- 23.0 PERMANENT MARKER
- 24.0 ASSISTANCE IN COMMISSIONING
- 25.0 STANDARD OF WORK
- 26.0 INSURANCE
- 27.0 RECORDING (AS-BUILT DRAWINGS)

TECHNICAL SPECIFICATION

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

1.2

HARIDWAR NATURAL GAS PVT. LTD. (HNGPL), a joint venture (JV) of Bharat Petroleum Corporation Limited (BPCL), A Govt. of India Enterprise and GAIL Gas Limited, a fully owned subsidiary company of GAIL (India) Limited has been set up to provide CNG (Compressed Natural Gas) as fuel to commercial & private vehicles through filling stations and PNG (piped Natural Gas) to Industrial, household and commercial sector in Haridwar GA.

1.2 Nature of Contract

The contractor shall be paid on a Schedule of Rates basis. He shall execute the work and perform his obligations under the contract, and HNGPL shall pay the contractor for measured quantity of each item of work actually carried out under the contract. Payment shall be at the rate for the work set out in the agreed Schedule of Rates.

2.0 SCOPE OF WORK

Generally the following shall constitute the Contractor's scope of work:

- 2.1** Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by HNGPL. Contractor has to submit the Construction/ Execution procedures before commencement of work.
- 2.2** Assist in obtaining permissions from land owing agencies for road cutting for laying of pipelines. Liaisoning with concerned authorities during execution of the job.
- 2.3** Prior to start of Construction activities, Contractor shall carry out area and crossings survey and prepare drawings for proposed gas pipe line laying and submit to HNGPL for approval.
- 2.4** Receipt of free issue items from HNGPL's designated stores, loading, transportation, unloading at Contractor's stores near project sites.
- 2.5** Proper storing, stacking, identification, providing security, and insurance, during storage, laying and upto handing over of pipelines.
- 2.6** 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 routes and depths for laying the pipelines based on the route plans provided in the tender.
- 2.7** Obtaining the approval for optimum route and ROU from the concerned authority and EIC. Grading the ROU as per requirement for proper movement of workmen, equipment and QA/QC personnel.

- 2.8** Wherever required the grass/ turfing, pavement, linings, drains roads and other such

'pucca' area shall be locally removed to facilitate trenching and pipe laying works. The same is to be reinstated as original.

2.9

Supply & Installation of Safety/ Warning Signs, barricading of the entire route to be trenched. Pits to be similarly barricaded along the warning sign.

- 2.10** To make trenches with stable slopes but restricting minimum disturbance to above ground/underground services/ installation as per specifications and approved route plans; keep the trenches free from water and soil till placement of pipes;
- 2.11** Uncoiling/ stringing the PE pipes of required sizes (i.e. 20, 32, 63, 90, 125) pipes into trenches as per specification.
- 2.12** Joining the pipe ends with fittings and valves by approved electro fusion techniques as per specification.
- 2.13** Installation of pipe fittings/installation like elbow, tee, reducers, tapping saddles, joints, connectors, transition fittings, valves, sleeves etc. including construction of supports, valves pits, inspection chambers etc. as per specification.
- 2.14** Laying pipeline using trench less technology methods with or without casing pipes as per specification and as directed by EIC.
- 2.15** Supply & Laying of HDPE duct as casing pipe wherever applicable, along with MDPE Pipe.
- 2.16** Supply of good quality GI sleeves, MS enamel coated sleeves, concrete casing pipes, sand and other material, fittings to be supplied by the Contractor as per provisions of tender.
- 2.17** Back filling and compaction by jumping jack compactor using approved 'good' soil or using excavated earth or borrow earth as per requirement and specification and replacement of tiles, slabs removed during the excavation. Cleaning all unserviceable material, debris, excess earth near trenches etc to designated disposal area.
- 2.18** 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.
- 2.19** Nitrogen purging (including supply), commissioning & gas charging of tested pipeline as per approved procedure.
- 2.20** 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 upto the entire satisfaction of HNGPL any other third party agency designated by HNGPL and local authorities, failing which, it will be done at the risk and cost of the contractor. Obtaining satisfactory completion certificates for the restoration work done from the concerned authorities.
- 2.21** Installing of permanent site markers, warning signs, valve chamber etc.
- 2.22** Returning surplus material to HNGPL stores, reconciliation of free issue material/ consumables if supplied by HNGPL and obtaining 'no objection certificates' from HNGPL.
- 2.23** Handing over the completed works to HNGPL for their operation / use purposes.
- 2.24** Maintaining the completed pipelines/installation for any defect, failures during defect liability period.
- 2.25** Preparation and submission of As-built drawings, details of crossings, utility graphs, measurement sheets and deviation statements on completion / commissioning of work by way of drawing, sketches and tables.

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

3.0 MATERIAL, LABOUR, PLANT AND EQUIPMENT

3.1 Owner's Scope of Supply (Free Issue Item)

Owner's scope of supply shall be limited to the following

- **MDPE Pipes of sizes from 32 mm Dia to 20 mm dia**
- **Regulators (Service, Domestic & Commercial)**
- **Meters (Domestic and Commercial)**

In order to speed up the project Free Issue Materials shall be issued to the Contractor from the designated store(s) of HNGPL. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

3.2 Supplied by the Contractor

Contractor will supply all size HDPE casing pipe, GI fittings and PE fittings other materials as per SOR & scope of supply necessary to complete the laying of gas main pipelines and service pipelines.

The contractor is to procure all bought out items from approved vendors and accordingly keep HNGPL informed. The inspection of bought out items would be carried out by HNGPL / Third Party Inspection or as instruction by EIC.

In general PE pipe shall be of the following

lengths indicated. 20mm/32mm 100 to 300 Mtrs.

coils	
63 mm	100 Mtrs. Coils
90 mm	50 Mtrs Coils
125 mm	50 Mtrs. Coils

The Contractor shall provide the skilled labour, tools, material and equipment necessary for the proper execution of the Work. This will include but not be limited to list of specialized items included in the enclosure furnished herewith.

3.2.1 Equipment & Machinery

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.

In addition to above, the contractor must have dedicated bar coded electro-fusion (Automatically readable) machine with power generator (at any point of time minimum 2 nos.), Pipe Cutters (like circular guillotine), End Scrapers, Pipe Straightener, approved 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 of following diameters 180mm, 125mm, 90mm, 63mm, 32mm & 20mm for this project. Contractor has to arrange his own all equipments for trenchless crossings such as HDD, Moling & rock cutting equipment, HDPE fusion equipment at the site whenever required.

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

In case there is non availability of approved equipments, tools and tackles during the work at site, suitable penalties, as per special terms and condition of the contract, will be levied and deducted from the running bills.

3.2.2 Imported Backfill and Material

The Contractor shall be responsible to arrange the supply of approved soft soil / Coarse Sand free from any impurities like clay, mica and soft flaky pieces as per the instruction of EIC/Owner.

For supply of sand in trench for rocky terrain, no separate charges are payable and is included in SOR item for excavation of hard rock/Morrum.

Also supply of sand in valve chambers, Normal chambers & Built up surface, if required, as per the instruction of EIC, is not separately payable.

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

3.2.3 Other Materials

The Contractor shall supply the following items where required.

- All materials required for form work, trench support, temporary trench crossings.
- All sign boards, barricades, tin sheets, lights and protective equipment.
- Permanent markers as shown in the drawings enclosed in the tender.
- Material required for installation of valve chambers.
- GI, Half Round concrete sleeves
- 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.

3.2.4 Manpower

The contractor shall provide the skilled labour, tools, materials, and equipment necessary for the proper execution.

3.2.5 Acquisition, Receipt, & Storage Of Materials

In case of material supplied by owner than the contractor shall collect

all materials from HNGPL store between working hours following all documentation procedures laid down and as directed by EIC. The contractor shall at the time of receipt of material physically examine all materials and notify the EIC immediately of any damage. Any damage not recorded at the time of inspection done by contractor will be deemed not to have existed at the time of receipt of material. Cost of repair, rectification, replacement will be borne by the contractor. Any defective material found during the time of installation will be noted and forwarded to stores for replacement immediately with P.O reference and only with written approval of EIC. The contractor shall ensure that no defective material shall be returned to store at the time of closure of contract.

The contractor shall maintain permanent locked store preferably near site in so that all the material are stored in such a manner so as to prevent and damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects and chemicals.

The contractor shall maintain log book at their respective stores stating issue and availability of free issue material as a given day. Further the contractor is required to undertake and submit an inventory of materials every month to Owners/Owners Representative (mandatory).

4.0 **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.

Contractor has to regularly submit daily progress reports, weekly progress reports, graphs with utilities, testing reports, material consumption and inventory reports, deviation statements etc.

5.0 **APPROVALS**

Contractor has to assist in getting permissions, obtain statutory approval/clearances for laying of pipelines. However, HNGPL will pay the departmental charges and Bank Guarantees for getting the clearances. It is the contractor's responsibility to inform and co-ordinate the concerned local authorities and also other utility agencies before commencement of work at site. To ensure smooth execution of the work on a day to day basis, the contractor has to liaison with respective authorities and obtains necessary approvals.

6.0 **REFERENCE SPECIFICATION, CODES AND STANDARDS**

The contractor shall carry out the work in accordance with the requirement of latest relevant applicable standards, this specification, HNGPL's Engineering Standards; relevant Oil India Safety Directorate (OISD) norms,

Latest PNGRB Guidelines, 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 HNGPL'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.

7.0

SAFETY

The Contractor shall conform to the requirements outlined elsewhere in the tender document. In addition, the Contractor shall observe safe working practices in the storage and handling of cleaning fluids, flammable fluids, etc, and ensure smoking or naked flames are not permitted in the vicinity when these materials are being used.

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

The Contractor shall also protect all work sites with warning signs, barricades and night lighting. The Contractor shall inspect all fenced excavations daily, and maintain them in good order.

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.

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

Any accident causing injury to any person or damage to property or equipment shall be reported to the EIC.

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.

For further details refer Attached HSE technical specification.

8.0 **ROUTE SURVEY**

8.1 Plans detailing the size, operating pressure and approximate location of the proposed mains, connections and associated regulator installations will be issued to the contractor at the start of the works.

8.2 The final alignment of mains will be worked out at site in consultations with the site engineers after route survey and trial pits, at his cost, have been carried out. Any change in routing from the issued drawings due to site constraint will be notified to EIC & his specific written approval shall be obtained before carrying out the job.

8.3 **Service Lines**

8.3.1 A survey will be conducted jointly by HNGPL/ third party inspection and the contractor at each premises or housing colony to be supplied. The survey record will note customer details, the potential gas supply points and proposed regulator positions and estimates of material quantities. The contractor's representatives will make as sketch of the agreed pipe routes if necessary.

8.3.2 The contractor will be responsible for contacting the customer and making the necessary arrangements for access, and appointments to carry out the work. Contractor shall maintain job card and complaint books at site. HNGPL will not be responsible for any time lost due to broken appointments or disputes with customers.

9.0 **ORGANIZATION OF WORK**

9.1 All construction work will be carried out as per direction of EIC, and this will be the primary point of contact between the contractor and HNGPL on site. All work will be issued and sanctioned through the EIC and site control exercised by Site Engineer HNGPL. 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 of

HNGPL is maintained.

- 9.2** Contractor shall designate RCM who will be the single point coordinator to interact with EIC/Consultant/TPIA and authorized to attend review meetings, receive materials, authorized to sign documents, claims and receive payments etc. Contractor shall submit the organization chart stating that in charge of projects, store, QA/QC and take approval from the owner.
- 9.3** The contractor will appoint his own supervisors of minimum number instructed by EIC. These personnel will be responsible to the SE for monitoring construction standards and for ensuring that all detailed technical requirements are met on each and every job which is undertaken. The contractor's supervisor(s) will have day to day liaison with the SE, and will provide the SE with technical reports and audits, and other management information as is required on work progress and construction quality standards.
- 9.4** The contractor's supervisor shall have mobile telephones or pagers to ensure that they can be contacted at all times. The contractor will also nominate one person who can be contacted if necessary out of 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 HNGPL as is required. The normal day to day issue of work instructions, communication between HNGPL and the contractor 's supervisor and the SE.No deviation from the approved technical specification
/ issued construction drawings shall be undertaken without written approval of EIC.
- 9.5** Contractor shall maintain a Project site office, Material store with following facilities:
- Telephone, Mobile phones, Fax machine, printers/Scanning/Xerox machines, Computer with e-mail facility.
 - 1 No. four wheeler with driver for suit survey, meetings etc, with Owner/Owners representative. Also it shall be well equipped with tools and tackles for attending any emergency complaints and ongoing execution work.

On award of the contract, The contractor shall establish and submit documentary evidence for above Which will be verified by owner before of the work order. Any delay and non-compliance of above may result into the termination of contract

10.0 **STRUCTURES, SERVICES AND OTHER PROPERTY**

10.1 **Location of Underground Utilities**

The contractor shall locate all buried utility pipes, underground cables, water mains and other obstructions intersecting or adjacent to the Works, and shall make available the necessary labour to expose and record the depth of cover over all obstructions in advance of excavation. This shall be done far enough in advance of excavation to facilitate gradual change in grade or position found necessary to clear any obstructions.

In addition, the contractor shall excavate trial pits as necessary to determine the pipe route. The number of trial pits will be agreed with the EIC in advance of any excavation. In any event, trial pits shall be made at intervals of a maximum of 30 meters. Restoration of the abandoned trial pits and trenches shall be the contractor's responsibility. No payments

shall be made for such type of jobs.

It is contractor's responsibility to interact with other utility agencies regarding their existing utilities and finalize the route along with these agencies and Owner/Owner's representative

There will be no additional payments in respect of abandoned trenches incurred because of insufficient or inadequate trial pits, or any associated lost time or delays.

10.2 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 laying Pipelines near the trees.

10.3 Interference with Traffic, Street Drainage and General Public

The Work shall be executed in such a manner as to cause a minimum of inconvenience to persons requiring to use public or private roads, lanes, thoroughfares, walkways, rights-of use or passages through which the Works are to be executed. The trench shall be back filled, compacted, leveled and extra earth shall be removed immediately after laying of pipeline 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.

Wherever the pipe route crosses driveways, access tracks or entrances to private properties, the Contractor shall give the owner, occupier or relevant authority at least 24 hours prior notice of intended commencement of excavation and shall be restricted to pass through.

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 Works, the Contractor shall provide for the necessary movement of plant and equipment in accordance with the requirements of the relevant authority.

The Contractor shall not obstruct any drainage pipes or channels in any road but shall deviate them where necessary and use all proper measures to provide for the free passage of water.

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

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

11.0

TRENCHING

The schematic diagram with the detail of trench is enclosed as Annexure.

The Contractor shall perform the excavation works so as to enable the pipe to be laid 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 centerlines 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. HNGPL may require excavation by hand tools, local rerouting and limiting the period of executing of the works. 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 from the bottom and sidewalls of the trench.

11.1 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.

The depth of the trench will be such as to provided minimum cover as stipulated below:

* Refer PJS clause No. 17.0 SPECIAL POINTS PERTAINING TO SPECIFICATION.

The minimum depth as mentioned above may be greater than 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.

In cases of Drain/ Culvert crossing through open cut where excavation cut is more than 1.5m, the extra excavation shall be paid in quantity basis. The rate shall include backfilling as specified. 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 extra cost to HNGPL.

11.2 Width of Trench

The width of the trench shall be wide enough to provide bedding around the pipe 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 drawing enclosed herewith.

11.3 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 placement of the pipe.

Hard rock is defined as trench material with a single piece dimension exceeding 1.5 m in length which cannot be removed other than by the use of pneumatic chisel/drill or sledge hammer and chisel.

Excavation through soil mixed with boulders that have been used for a road base will not be considered as hard rock for the purposes of payment.

1.4 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 in the vicinity of the Works.

- 150-300 mm where the gas pipe crosses other assets, other than electric cables, whereupon the clearance shall be 300 mm.
- 300mm where the gas pipe is on a similar alignment to the other assets. Where

the above clearances cannot be achieved, 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.

11.5 Under Ground Interferences

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

All sewers, drains, ditches and other natural waterways encountered while trenching shall be 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 HNGPL to open cut paved road crossing, or where line is routed within the road pavement, the Contractor shall remove the paving in accordance with the restrictions and requirements of the authorities having jurisdiction thereof as directed by HNGPL. After laying the pipeline, backfilling shall be immediately performed and all the areas connected with the 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 satisfaction of concerned authorities, resident and HNGPL.

11.6**Others**

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

For all roads, paths, walkways etc. that are open-cut, the Contractor shall provided 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 the pipeline is installed.

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 trench is required at the approaches to crossings of roadways, railroads, rivers, streams, drainage ditches without any extra cost implication to HNGPL.

The Contractor shall excavate all such aforesaid depths as may be required at no extra cost of HNGPL.

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 HNGPL or relevant authorities.

Where the pipeline crosses underground utilities/ structures, Contractor shall first manually excavate to a depth and in a 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 maintain proper distances and perform the work to the satisfaction of HNGPL and other utility agencies. 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.

11.7 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 EIC, the size distribution of the sand/ shall be the same as per soil. The packing sand shall be placed to a minimum thickness of 150mm around the pipe in case of rocky terrain.

Unless directed by the EIC the quantity of bedding & surrounding sand shall confirm to specifications. There shall be no void space in packing sand around the pipe.

12.0 LAYING

Laying of MDPE pipelines shall commence 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 upto 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 before lowering of pipeline. The trench after this can be released for back filling leaving adequate lengths open at the ends, for jointing.

Where given specific approval by the EIC a pipe may pass through an open drain or nallah. Where this is permitted the pipe shall be installed inside a concrete or steel sleeve for protection. The sleeve material shall be procured and laid by the Contractor. In general the GI Sleeve and MS sleeves material specification shall be confirming to IS 1239 (Heavy Duty) specification of reputed make. The payment for the length of pipe in the sleeve will be made as per SOR. All other work necessary to break through the walls of the obstruction, and to seal the annulus between the pipe and

the sleeve and the sleeve and the wall, shall be deemed to be included in the rates.

Open ends of pipe placed in the trench shall be securely capped or plugged to 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.

Service lines shall be installed in accordance with the drawing enclosed. Note that the service pipe rises out of the ground at the customer's premises within a GI sleeve pipe. The vertical portion of the sleeve shall be fixed to the wall of the premises in a secure manner. 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 bending of the sleeve, its fitting and clamping, and the installation of the transition fitting excluding service-isolating valve, is all included in the service connection rate. A rate is included in the SOR for the provision of sleeves for PE laying. Any installation without inspection and approval may lead to penalties as Special condition of contract

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 the GI sleeve for service lines shall be done by sealing the annulus, firm fixing of the GI sleeves with concrete mix, breaking through any obstructions & their subsequent restoration to the satisfaction of the EIC.

The contractor shall supply the GI sleeves (Heavy duty OF IS:1239 reputed make) respectively for domestic & commercial / Industrial installation. The vertical portion of the sleeves shall be fixed to the wall of the premises in a secure manner. The service line shall be installed in accordance with drawing enclosed. The material test certificates / inspection reports shall be inspected by TPIA/PMC before installation.

Valves shall be installed at locations shown on the Design Plan or as directed by the EIC and joined with PE pipes by electro-fusion techniques. The valves shall be supported on a bed of fine fill of grit size not greater than 5mm to achieve equivalent support as the incoming and outgoing pipe work.

Laying graphs with details of depth, length, offsets from fixed references, other utility crossings, fittings, size of casing pipe used for the pipeline shall be prepared on daily basis and submitted to Site Engineers of the Owner for approval. These details will be further incorporated into As-Built Drawings.

used for jointing of MDPE pipe / 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 instruction of owner. Contractor shall ensure that the machine are always available at site, no stoppage of work due to the non availability of machines.

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. Alignment clamps with the correct size shells should be used to align the pipe during the electro-fusion cycle.

The Contractor shall ensure that polyethylene pipe is only cut with an approved PE pipe cutting tool. Before fusion is attempted he shall remove the oxidized surface of the pipe to be inserted into the electro-fusion coupling. The tool must remove a layer of 0.1 mm to 0.4 mm from the outer surface of the polyethylene pipe. **It may also be noted that no fusion will be allowed without clamping device and only the approved cutting tools (Hack Saw shall not be allowed for cutting the Pipe) shall be used.**

The contractor has to supply all the consumables required for carrying fusion of the joints (like cloth/ 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 this work shall be borne by the Contractor.

For electro-fusion jointing, the contractor must bring own tools, tackles and equipments.

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

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 . All approved Jointers shall bear Identity cards signed by Owner/Owner's representative..

Taking power connection from electric poles , connection without written permission from the concerned authorities or residential premises is strictly prohibited

15.0

BACKFILLING

Backfilling shall be done after ensuring that appurtenance have been properly fitted and the pipe is following the ditch profile at the required depth that will provide 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 HNGPL, 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 200mm of earth, free of

rock and hard lumps shall be placed over and around the pipe and coating.

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 HNGPL 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 land owner or authority having jurisdiction at no extra cost to HNGPL.

Where small pieces of rock, gravel, lumps of hard soil or like materials are encountered at the time of trench excavation, sufficient earth 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 are acceptable shall be screened soil, containing no gravel. All these works shall be carried out by Contractor at no extra cost to HNGPL. 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 sand padding is to be provided upto height of 150mm around the pipe.

When the trench has been dug through drive ways or roads, all backfilling shall be executed with suitable material in layers as approved by HNGPL 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 will be placed on distribution main and on service lines inside premises, after backfill of the trench upto a height of 300mm 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 and watering in layers of 150mm above the warning mat.

Proper crowning of not more than 150mm shall be done. All the excavated material required to 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 joint in completed.

Debris and other surplus material shall be removed immediately after the back filling.

The contractor shall not be entitled for 30% payment on laying &

backfilling till the above activities are completed.

16.0

MOLING:

The Moling shall be carried out as per the requirement specified by HNGPL, and approved procedures. The contractor has to carry out thorough survey of the under ground utilities before going for the Moling, to avoid the damage to the 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., Manual/ Machine with or without casing shall be at the discretion of HNGPL. A prior approval is to be taken before starting the Moling.

For manual Moling the contractor shall ensure that the size of the hole shall not be more than 20% of the size of the casing / carrier pipe which ever is applicable. After completion of Manual Moling the hole shall be properly compacted / filled with soil by watering and by approved procedures, the pits shall be backfilled, compacted & restored
. The rate for such crossing work by using casing pipe & carrier pipe or only carrier

pipe shall be payable as per Schedule of Rates. **No separate payment shall be made for pulling the carrier pipe.**

The rates for Moling, as indicated in SOR, are payable as per the size of the casing/ carrier pipe and are inclusive of excavation of pits, backfilling, compaction, restoration, jointing and insertion of carrier pie.

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

The length of the Hole (excluding the sizes of the pits on both ends) shall be considered for the measurement of Moling length. However, intermediate pits will consider in the moling length.

17.0

BORING/RAMMING/DIRECTIONAL DRILLING

One of the above techniques is required to be carried out by the Contractor where conventional trenching/Moling is not possible viz. railways, major waterways, highways, roads etc. Details of such crossings shall be obtained by the Contractor, and construction drawings shall be prepared by the Contractor in consultation with HNGPL. Execution of the work shall be based on the HNGPL approved drawings. The contractor has do the thorough survey of the under ground utilities before commencement of BORING/ RAMMING/ DIRECTIONAL DRILLING to avoid the damage to the other utilities. No extra payment will be made for any trail/ abandoned pits made during the survey. The supply of all equipments is in Contractors scope. Work to be carried out in accordance with API - 1102.

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.**

The type of HDD to be carried out i.e. conventional (with or without casing) shall be at the discretion of HNGPL. And prior approval is to be taken before starting the HDD.

The rates for HDD, as indicated in SOR, are payable as per the size of the carrier pipe and are inclusive of excavation of pits, backfilling, compaction, jointing and insertion of carrier pipe and restoration of pits. For HDD with casing pipe no separate payment shall be made for pulling of the carrier pipe, the rate quoted by the Contractor shall be inclusive of pulling carrier pipe.

Any damages occurred to other utilities during the HDD operation shall be immediately notified and rectified by the Contractor without any cost implications to HNGPL.

The length of the HOLE (excluding the sizes of the pits on both ends) shall be considered of HDD length.

18.0 **CASING PIPE**

The tentative sizes of the HDPE casing pipe for Molding/
HDD shall be as follows:-

Size of MDPE pipe	Size of HDPE pipe
20 mm	75mm
32 mm	75 mm
63 mm	125 mm
90mm	180mm
125mm	250mm
180 mm	315 mm

However, size of the casing pipe may vary according to length of the carrier pipe and requirement of laying of OFC Duct.

19.0

RESTORATION

Wherever the restoration is required, the roads, footpaths (including roads and footpaths inside colonies) shall be restored to original condition, and the same shall be done as per concerned local authorities norms and to the satisfaction of the concerned local Authority. To retard curing of the installed concrete, wet sack cloth 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 sketch for restoration of Road, Footpath, Channel is enclosed herewith and is indicative. However, the restoration shall be done in accordance with the norms of 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 pipe laying will only be authorized on initial- satisfactory restoration, and where the sites has been cleared of all surplus materials, etc.

Contractor has to obtain the clearance certificate from the concerned local authorities after completion of the restoration work. The restoration

specification specified in the tender is only a typical specification and the contractor has to carry out restoration as per latest version of the (PWD/ IRC) specification to its original condition and also to the entire satisfaction of land owner (Private/Public).

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

20.0

TESTING

Pressure testing will be carried out with compressed air.

Compressed air will be provided by Contractor for testing purposes and is to be included in the rates.

For main pipelines work the Contractor shall perform progressive pressure testing to avoid having to find leaks in long lengths of pipe. The test pressure shall be 6.0 bar(g), and there shall be no unaccountable pressure loss during the test period.

Test procedure with sketches showing the pipeline to be tested, vent points, gauge location, and inlet pressure print is to prepared & got approved by EIC.

For main line the test duration shall be 24 hrs . With these 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 24 hours. Measuring instruments shall have been calibrated and their accuracy and sensitivity confirmed. For testing of Network, calibrated pressure gauges of suitable range shall be supplied by the contractor. 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.

For service lines in some cases testing will be carried out independently of the testing of the mains for which the test duration may be reduced to 4 hrs. The service testing in this case will be performed after the service installation is complete but before the service tee has been tapped. Also in some cases the tapping of the service tee will be delayed pending the completion and purging of the main pipelines.

21.0 PURGING

Purging shall be carried out in accordance with the principles defined in the American Gas Association publication ‘Purging Principles and Practice’.

Nitrogen required for purging will also be provided by the Contractor. Nitrogen shall be supplied in labeled, tested and certified cylinders, and completed with all necessary regulators, hoses and connections, which will be in good condition and working order.

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 adapter, 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.

22.0

VALVE PIT

The valve pit shall be constructed in accordance with enclosed drawing & payment shall be as per relevant SOR item.

The construction of valve chambers shall be taken up immediately after installation of valve pit.

22.1 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.

Sandbags to be placed below pipeline without disturbing the layed pipe. Gunny bags and Sand should be of approved quality.

Precast RC slab shall be placed as indicated in the 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 precast concrete blocks are firmly placed.

Valve will be supplied without the operating stem. Contractor has to supply the operating stem with a handle for the valves of the different sizes. The Contractor has to take prior approval for design and material specification of the stem for installation. Approved quality sand is to be placed in between area.

Surrounding area to be properly cleared and PCC to be placed around the location where precast slab with CI Manhole cover is placed. The RC precast slab to be laid in level and finished smooth.

23.0 PERMANENT MARKERS

23.1 Permanent Marker (As per typical Drawings Placed at Tender) shall be installed on the ROU at regular intervals as per the instructions of the EIC immediately after laying of the pipeline. The installation of the type of the Permanent Marker shall be decided by the EIC depending on the site condition. The Markers shall be painted before installation as per the approved procedure. The supply of the paint and painting as per the specification is in contractor's scope. Separate payment for installation of the markers shall be paid to the Contractor as per the respective Item in SOR

23.2 The artwork shown in the drawing is typical for all the markers. The contractor must take prior approval for the artwork from EIC before installation of Markers. The artwork must have HNGPL's logo and specify the location of the pipeline from the marker.

Guidelines :

- The installation of these markers shall be such that in between two pole markers two RCC markers are installed with spacing of 50 Mtrs on either side. However, Pole markers shall be installed at all the tapping / Branching points in the mainline.
- Interval between any two RCC markers for mainline (180mm to 63mm) shall not be more than 50 m .
- Pole marker or RCC marker shall be installed near to valve chambers on mainline & inside the pockets respectively for indication.

- Pole marker with foundation shall be installed after two RCC marker as per drawings.
- The entry and exit pits for laying of pipeline by HDD/ Moiling for road crossings shall be marked by pole markers or RCC markers depending upon the site condition.

- In addition to the above, pole markers with foundation (As per drawings) shall be installed outside societies / Areas as per the instruction of the site in charge.
- For the distribution network 32 mm & 20 mm pipe, plate markers shall be installed as per the site condition and direction of the site in charge.

24.0 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 of HNGPL.

25.0 STANDARD OF WORK

25.1 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.

25.2 The manpower deployed on the respective work shall be adequately trained & 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.

25.3 Fusion operators and other skilled personnel shall be approved by HNGPL 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 joining of PE Pipes.

26.0 RECORDING (AS-BUILT DRAWINGS)

The Contractor will be required to submit computerized as-built drawings duly certified by EIC in A0/ A1 sheet form at 1:200 scale with six sets of prints plus soft copy. The as-built drawing shall be submitted on area wise as specified. The bill of materials used for the particular area shall be specified on the drawings. The Contractor shall use the area and crossing survey drawings prepared by them as reference. On-site sketches, picking up key reference points, shall be made during the installation of services. The lengths, depths of installed pipe work, changes in direction, major fittings, etc, shall be recorded together with appropriate references to other services crossed and in the proximity of the gas pipe.

Distance of pipeline from permanent property /structure should be provided at least every 20 meters. If there is any chance in alignment/orientation and offset distance etc. of the pipeline in between the above said 20 meters, the same shall be clearly mentioned in the as laid.

Gas objects (off valve, tees, elbows, couplers, T.F, etc shall be shown as block objects (which from a single node to connect) with respect

owners

symbol and legend. The as laid drawing shall be as per the legends provided by EIC.

Details & offset distances from other utilities present should be given in as laid drawing. If there is any change in the depth of pipeline, the same shall be clearly marked with details in the as laid drawings. The details of additional protection provided must be mentioned.

Details of the PE stop off valve and other fittings used should be shown with adequate information and orientation. Technical deviation (if any) should be provided with reference to the buildings and permanent structure around, and the same should be cited clearly with all relevant details.

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

Name of roads, major landmarks and buildings should be mentioned appropriately for reference.

Proper Chainage shall be mentioned on all the drawings to be referred with continuation reference.

Direction of gas flow should be indicated in each drawing.

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

The details shall be prepared in standard format using Map Info/AUTOCAD Map and submitted in CD ROM. 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.

27.0

Civil Works

The contractor has to supply the adequate materials and skilled manpower for the completion of all the civil works. The contractors shall also insure that the work carried out as per the detail mentioned in the schedule of rates.

Special care should be taken at the time of labours working in depths/lifting of the skids by hydras/ cranes considering all the safety guidelines.

The contractors has to ensure that sample of all the material shall be inspected and approved by EIC before carrying out installation or erection work. The contractor has to submit the test certificates for all the materials to be used at the site

. the construction shall be carried out strictly as per the drawings provided by the HNGPL. The party shall ensure extra / Surplus / malba shall be immediately removed from the site after completion of the job. Separate payment shall be made as per the SOR.

TECHNICAL SPECIFICATION

FOR

INSTALLATION OF ABOVE GROUND GI PIPING

FOR

**DOMESTIC, COMMERCIAL AND INDUSTRIAL
CONSUMERS**

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1.0 GENERAL INFORMATION

1.1 INTRODUCTION

The main intent of the specification is Supply and installation of above ground GI pipes, fittings, valves, meters and regulators, from the outlet of 'PE/GI transition fitting' up to the DOMESTIC consumers 'Appliance / stove/ oven valve' as per the Distribution Schedule.

The scope for commercial consumer includes installation of above ground GI pipes and associated fittings, valves, regulator up to and including meter. However, the piping may have to be carried out up to Appliance valve, in case of some commercial customers.

In case of large commercials and industries completely assembled metering skids would be supplied to the contractor who would be required to install and provide inlet & outlet connection.

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 SCOPE OF WORK

Generally the following shall constitute the contractor's scope of work:

- 2.1** Plan and prepare a detailed execution schedule and procedure for implementation based on QA / QC formats plans issued by HNGPL.
- 2.2** Contractor has to submit the Construction/Execution procedures before commencement of work to owner / owner's representative for approval.
- 2.3** Selection of route and marking 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. Providing safety equipment to workers / plumbers.
- 2.4** Receipt of regulators, domestic meters, 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 approvals for optimum route and permission for work from the concerned authority and EIC.
- 2.5** Contractor shall procure all material, except free issue material from the outlet of PE/GI transition fitting up to the Domestic/Commercial customers "Appliance/Stove/Oven valve for satisfactory completion to the owner/Owner's representative.
- 2.6** Installation of GI pipes of 1/2", 3/4", 1" dia. between transition fittings (installed by PE contractor) and customer's kitchen which would include NPT threading of pipes, and jointing of fittings such as elbows, tees, connectors, regulators, meters, isolation valves etc., as per laid procedures and specification including supply of GI fittings & Teflon tapes for sealing of joints.

Painting of GI Pipes & fittings as per specification.

- 2.7** Installation of Copper pipes of ½" (12 mm) OD from the downstream of Meter upto the isolation valve prior to the customers appliance, including the installation of isolation valves, brass fitting at the downstream of meters and at the entry of isolation valves with application of lacquer paint etc. to the satisfaction of EIC.

- 2.8** Supply & Installation of clamps for fixing pipes, isolation valve, appliance valve, box for regulator, Sleeves wherever required, painting of steel pipes & fittings. Providing consumables grout material, repair / restoration of walls / floors / holes including the materials required for conversions along with tools and tackles etc., complete as per specification.
- 2.9** Conversion of all types of LPG kitchen appliances to NG based appliances inclusive of supply of nozzles. Signing of Joint Meter Records (JMRs).
- 2.10** To demonstrate to the customer regarding use, safety and maintenance related aspects of NG based appliances and installations.
- 2.11** Testing & Commissioning of installations including p urning as per specification an d handling over the installation of HNGPL / customer to the entire satisfaction of HNGPL.
- 2.12** Dismantling of scaffolding / temporary structures and cleaning of site.
- 2.13** Restoration of walls, flooring and other damages while executing the above ground installation.
- 2.14** Preparation and submission of above ground installation card for each house / commercial establishment indicating the list of materials used, reasons of not providing connections, testing pressure and date etc. Deviation statements, if any, on completion / commissioning of work.
- 2.15** Any other activity 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 HNGPL.
- 2.16** Following activities are also in contractor scope
- Receive customer's request and complaints logged
 - Carry out joint technical feasibility survey for request received.
 - Attend and resolve customer complaint

3.0 MATERIAL, LABOUR, PLANT AND EQUIPMENT

3.1 Owner's Scope of Supply (Free Issue Item)

In order to speed up the project Free Issue Materials shall be issued to the Contractor from the designated store(s) of HNGPL. Contractor shall be responsible for lifting the free issue materials from Owner's storage point(s) and transporting the same to work site(s) at his own cost.

3.2 Supplied by the Contractor

The contractor has to supply all GI pipes, GI Fittings, meters, regulators, flexible hose, suraksha hose, Valves, Fittings, Clamps, Cu pipes, GI Pipes, Appliance Valves

½" and isolation Valves ½", ¾", sleeves, etc. and other materials required for said works.

The contractor shall provide the labour, tools (such as Hammer Drill, Piston

Drill, Pipe cutters, Dies for threading, Pipe wrenches, spanners, 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 specialized tools & tackles enclosed herewith. Contractor shall submit the specification of all the material to be supplied by him to EIC for approval and get the material checked & approved by him before commencement of execution.

The contractor is to be procure all bought out items from approved vendors and accordingly keep HARIDWAR NATURAL GAS PVT. LTD. informed. The inspection of bought out items would be carried out by

HNGPL/ Third Party Inspection or as instruction by EIC.

3.2.1 Plant and Equipment

All vehicular type machinery shall be in 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.

3.2.2 Sealant, grout

The contractor shall be responsible to arrange the supply of any consumable sealant or ready mix grout material required for execution of work. 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.

3.2.3 Clamps, Rawal Plugs, Screws, Nozzles etc.

The Clamps, Rawal Plugs, Screws, Nozzles, etc shall be approved lot wise by EIC prior to installation. Re-drilling of existing appliance nozzles is strictly not permitted.

The indicative sketch of the Brackets for Meter and GI Pipe Clamps is enclosed herewith.

3.2.4 Consumable Items

Special consumables such as Teflon Tapes, Solder wire, Flux, lacquer, thinner, shall be supplied by the contractor and are included for within the rates.

These consumables shall be of reputed companies and required grades / class and duly approved by EIC.

3.2.5. Other Materials

The contractor shall supply the following items where required. All materials required for formwork, NPT threading, testing etc.

All signs, barricades, lights and protective equipment.

All material required for working at higher floor levels (i.e., scaffolding, Ladder, safety belts etc.).

Special consumable such as grease for maintenance of domestic appliances and all paints or painting of G.I pipes, clamps, sleeves, brackets for meters, consumables

such as Teflon Tapes, Petrol, diesel, fuels and oils required are to be

supplied by the contractor and are included for within the rates.
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. Acquisition, Receipt, & Storage Of Materials

In case of materials supplied by owner, than the contractor shall collect all materials from HNGPL store between working hours following all documentation procedures laid down and as directed by EIC. The contractor shall at the time of receipt of material physically examine all materials and notify the EIC immediately of any damage. Any damage not recorded at the time of inspection done by contractor will be deemed not to have existed at the time of receipt of material. Cost of repair, rectification, replacement will be borne by the contractor. Any defective material found during the time of installation will noted and forwarded to stores for replacement immediately with P.O reference and only wit written approval of EIC. The contractor shall ensure that no defective materials hall be returned t o s tore a t the time of closure of contract .

The contractor shall maintain permanent locked store preferably near site in so that all the material are stored in such a manner so as to prevent and damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects and chemicals.

The contractor shall maintain log book at their respective stores stating issue and availability of free issue material as a given day. Further the contractor is required to undertake and submit an inventory of materials every month to Owners/Owners Representative (mandatory).

5.0 ISSUE OF WORK INSTRUCTIONS

- 5.1** The contractor will be required to carry out GI installation in the areas where MDPE laying is under progress. However, testing of GI installation shall be done in conjunction with laying of MDPE Service Lines to respective premises. A general scheme of distribution to domestic consumer is indicated in the sketch enclosed herewith, for reference. It may vary in case of individual and multistoried flats. A general scheme of distribution to small commercials consumers is indicated in the sketch enclosed herewith for reference.
- 5.2** All skilled personnel like plumbers, conversion technicians shall be approved and certified by EIC. Those who are certified and possess the identify cards duly signed by EIC shall only be authorized to take up respective jobs. The contractor has to arrange the identify cards. **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, platforms, 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 SOR have been described in brief and shall be held to be complete in all respect including safety requirements as per clause 9.0, 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.
- 5.5** A general scheme of distribution to domestic consumer is indicated in enclosed drawing .It may vary in case of individual and multistoried flats.

6.0 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.

Weekly progress reports shall be submitted in the formats approved by HNGPL, indicating broadly the laying, testing, RFC, conversions and extra piping.

Material consumption statement to be submitted at least once a month.

7.0 WORK SHEETS

- 7.1** The quantities and other details will be checked by HNGPL's site engineer and the same shall be incorporated in measurement cards, signed & dated as certified on site. The cards will then be approved by the EIC.

7.2 Measurement sheets shall be prepared based on the measurement cards and checked and certified by the site engineers for billing purpose.

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

7.0 **PERMISSIONS/APPROVALS**

Contractor shall be responsible for obtaining approval from authorities like ADA / LDA and any other concerned authority, if required for completion of the work. Contractor must take the prior appointment from the resident for carrying out the work.

8.0 **REFERENCE SPECIFICATION, CODES AND STANDARDS**

The contractor shall carry out the work in accordance with this specification, HNGPL's Engineering Standards: ASME B31.8 - Gas Transmission and distribution piping systems; Australian standard 3723 - Installation and Maintenance of Plastics Pipe Systems for Gas; Oil India Safety Directorate Norms (OISD), Latest PNGRB guidelines and the American Gas Association Document -Purging Principles and Practice.

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.

9.0 **SAFETY**

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

All necessary care shall be taken while working at heights and workmen with proper skills and work permits 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.

No night working shall be permitted, without proper lighting and prior approval of EIC.

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 SE / 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 and 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 landowners 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 HNGPL.

A survey will be conducted jointly by HNGPL and the contractor at each premises or housing colony to be supplied. The survey record will note customer details, the potential gas supply points and proposed meter positions 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. HNGPL will not be responsible for any time lost due to broken appointments or disputes with customers.

The contractor shall confine its operations within limits of the Right-in-use. The contractor shall restore any damage to property outside ROU, attributable to him.

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 HNGPL 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.

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

12.0 G.I ABOVE GROUND SERVICE PIPE

The GI service pipe installation work includes all work necessary to connect from the PE / GI transition fitting on the down-stream of the PE service, to the customers appliance, including the installation of appliance valve and isolation valves, except, Suraksha hose, Meters, Regulator for which separate rate shall be paid as per SOR Item of this document . The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Amongst other things he will be required to provide ladders, scaffolding pipe, dies, tripods, vices, fittings and teflon tape, drills for concrete and other masonry, drills for timber and laminated surfaces inside customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, paint for pipe marking etc. GI pipes, fittings, valves and regulator shall be provided by HNGPL.

All GI risers on the outside of buildings shall be fully supported to carry the weight of piping. Risers shall be supported by a flanged foot, or similar device, capable of supporting the total weight of the riser. The riser shall rise in a vertical line from its point of support to its highest point with a minimum of changes in direction. The threading of GI pipe shall be NPT and conforming to ASME / ANSI B1. 20.1.

Contractor has to supply different types / sizes of approved clamps (Mild Steel) for fixing G I pipes suiting to the site conditions and the same shall be painted before fixing, as per the painting specifications. Every fresh lot of the clamps,

brackets, regulators boxes and other consumables shall be approved by the EIC prior to start of installation. All riser and lateral pipe shall be clamped to the building at intervals not exceeding two meters.

All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 meter. Maximum distance between clamps shall be 1.0-1.5m 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 center line of fittings at every sides. However, the same may be changed as per site conditions/as directed by E IC. Minimum gap between pipe and wall shall be 25 mm. The joints/fittings of the GI installations 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 the concrete with a mix of mortar and the void between the pipe

and sleeve filled with a suitable sealant. The sealant should be beveled such as to prevent an accumulation of water. Supply of clamps for all sizes of the GI pipes are in contractor's scope. Contractor has to take prior approval for design of clamps, paintings etc.

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

The rates are to be paid in bands as shown in SOR e.g., the ground floor to 2nd floor band covers pipe work laid from the ground floor level to ceiling level on the 2nd floor. Payment will be in incremental stages. e.g., if a pipe is laid from the ground floor to the 9th floor of a building, the length of pipe laid up to the 2nd floor will be paid in the first band, The length of pipe laid between 3rd and 5th floor will be paid in second band and the length of pipe from the 6th floor and above will be paid for in the third band. However, it may be noted that all the piping done inside the premises shall be considered as ground floor piping, the payment for such work shall be as per first band. The Pipe installation includes all fittings, Flexible hoses, clamps, Regulators etc. The contractor shall ensure that gas supply shall not be provided to the customer in any concealed piping.

13.0 COPPER ABOVE GROUND SERVICES PIPE

The Copper service pipe installation work includes all work necessary to connect from the downstream of Meter upto the isolation valve and flexible hose prior to the customers appliance, including the installation of valves, including application of lacquer paint etc. The contractor shall be required to provide all equipment, tools

and material necessary to execute the work in an efficient and effective manner. Amongst other things he will be required to provide ladders, scaffolding pipe, drills for concrete and other masonry, drills for timber and laminated surfaces inside customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, etc. Copper pipes, fittings, valves and regulator shall be provided by HNGPL.

During installation the COPPER pipe is to be cut to proper length with a 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 into the fitting, applying heat to the assembled joints using conventional Blow torch to melt Solder wire and lacquering.

Lacquer is to be applied to the copper tubes by mixing lacquer with thinner in approved proportions and applied by dipping method or with brush. It should be applied only once at a time and drying time of minimum one hr. is to be given.

Contractor has to supply different types / sizes of approved clamps for fixing COPPER pipes suiting to the site conditions and the same shall be painted, if required, before fixing, as per the painting specifications.

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.

All riser and lateral pipe shall be clamped to the building at intervals not exceeding one meter.

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 the concrete with a mix of mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be beveled such as to prevent an accumulation of water. Supply of clamps for all sizes of the COPPER pipes is in contractor's scope. Contractor has to take prior approval for design of clamps, painting etc.

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

The rates, mentioned in SOR are applicable from ground floor to 2nd floor. However, it may be noted that all the piping done inside the premises shall be considered as ground floor piping, the payment for such work shall be as per the SOR.

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

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

14.0 TESTING OF GI INSTALLATION

- 14.1** The installation from PE/ GI transition fitting up to regulator shall be tested at the [pressure of 6.0 bar (g)].
- 14.2** The testing of GI riser pipe up to regulator shall be done with the isolation valve in open condition and open end plugged.
- 14.3** The GI pipe shall be painted with one coat prior to installation in riser, however the ends / joints shall be painted only after carrying out testing of the installation.
- 14.4** The GI installation from regulator outlet to appliance valve (except meter) shall be tested at a pressure of 2.0 bar (g) for a hold period of 4 hours and all the joints shall be checked with soap solution.
- 14.5** The meters shall be removed while carrying out the testing and joints of the meter shall be tested on line with soap solution after completion of the work. Proper test ends shall be made along with gauges and got approved by EIC. For the installation to be tested by manometer or diaphragm gauge the meter shall not be dismantled/removed and testing shall be carried out at 100 m bar with holding period of 15 min with no pressure drop.
- 14.6** The calibrated pressure gauges of suitable range shall be supplied by the contractor for testing.
- 14.7** The pressure gauges shall be calibrated from time-to-time as desired by Engineer In-charge but positively once in every six months.
- 14.8** Valves supplied by HNGPL, shall not be used for testing purpose
- 14.9** The details of testing shall be properly recorded in the measurement cards

15.0 INSPECTION

Any defect noticed during the various stages of inspection shall be rectified by the contractor to the entire satisfaction of Engineer-in-Charge before proceeding further. 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.

16.0 PURGING & COMMISSIONING

Payment for the tapping of live mains and GI piping prior to the actual purge is included in normal laying & testing. The connection may involve the fitting of a temporary bypass, disconnection etc.

Purging shall be carried in accordance with the principles defined in the American Gas Association Publication "Purging Principles and Practice".

In addition the contractor shall submit and have approved 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 adapter, Purge stack with flame trap and gas sampling point, Gas sampling equipment (may be gas leak detector), squash-off tool, Polyethylene connecting pipe work etc.

The plan shall also include the purging process along with detail on the sequence of events. The process is to also specially / mention the need to lay a wet cloth over the GI pipe and in contact with the ground, to disperse static electricity during the purging work.

A purging 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.

The purging work 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.

17.0 **INSTALLATION OF METERS**

The work in this section includes :

- 17.1 Installation of domestic and non-domestic / small commercial meters with associated

inlet and outlet connections (GI/Brass fitting), on the wall with approved meter brackets and angles.

- 17.2 Supply of approved meter brackets and angle brackets, properly painted with one coat of Zinc primer and two coats of synthetic enamel paint of approved make. A sketch of the brackets is enclosed herewith. It is required that one sample of each type of bracket is got approved beforehand.
- 17.3 Firmly securing the meters on the wall with good quality supply of proper rowel plugs, s crews etc. In case the rowel plugs are not holding than wooden blocks or other fixing arrangements

like cement etc. to be used for proper grouting.

- 17.4 The same rates of respective SOR Item will apply irrespective of whether the meter is situated inside or outside the property. Where a bank of meters is constructed the rate shall be for each complete meter installed.
- 17.5 The above activities along with restoration of the area to original shall be carried out to the complete satisfaction of consumer and EIC.
- 17.6 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 installation will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.
- 17.7 The contractor shall ensure that GI installation and rubber hose shall not be exposed to direct heat of Gas burners. The installation should have minimum clearance of about 1 m from electric [point mains and switches. Minimum distance between appliance valve and Gas Burners shall be 0.3 meters. The isolation valve shall be installed after entering the customer premises /kitchen but before the meter installation.

18.0 PAINTING OF GI PIPES

The entire length of the pipeline along with fittings and clamps are to be painted after proper surface preparation and painting 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.

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.

Engineer-in-Charge at his discretion, may call for tests for paint formulations. Contractor shall arrange to have such tests performed including batch wise test of wet paints for physical & 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.

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

19.0 BOX FOR REGULATOR

Boxes will be supplied and installed outside for regulators after due approval of the sample. The boxes will be installed as per requirement and as per instructions of HNGPL.

The box brackets are to tightly secured to the wall with good quality proper Rowel plugs, screws etc. Wooden blocks to be used in case rowel plugs, do not hold properly.

All the boxes shall be thoroughly cleaned, painted with approved colour code.

As the boxes are installed outside it is to be ensured that they are painted properly to avoid rusting / weathering.

A sketch of regulator box is enclosed herewith.

20.0 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 of old appliance connection hoses and nozzles and re-greasing taps as necessary.
- 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 and the soundness and performance of the appliance.
- Instructing the customer in the safe use of natural gas and for fixing of safety and conversion labels.
- Contractor must attend the complaints regarding appliances till the total area is handed over to HNGPL's operation and maintenance.
- All consumables (Nozzles, greases etc.) are in contractor's scope.
- Changing or repairing of any items damaged during conversion.

It may be noted that the rates will apply to all appliance found in both domestic and commercial premises. The contractor will be required under the Rates to provide both Pin gauges and standard sized nozzles.

21.0 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 (PWD), contractor has to restore the area according to CPWD specifications. For government flats the contractor has to obtain a clearance certificate from the concerned authorities maintaining the flats, after completion of the work.

Where slabs and brick work are to be reinstated, the level of the compacted sub-base is to be adjusted according to the slab / block thickness. The slabs or brick work should be laid on moist bedding material, which should be graded sand, mortar or mortar mix. The slabs or brick work should be tapped into position.

The restored slabs or brick work 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 replaced 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 and proper. Where the required

standards are not achieved the contractor will be required to replace the defective reinstatement work.

Note that Payment for GI /Copper piping will only be authorized on satisfactory restoration, and where the sites has been cleared of all surplus materials etc.,

22.0 SUBMISSION OF FINAL RECORDS

Contractor shall submit the following documents in three sets each:

- a) Total list of houses & commercial establishments in the area allotted to him giving details of connections provided & reasons where connection could not be given / completed.
- b) The details recorded in measurement cards of every domestic house.
- c) Details of houses where extra piping done along with materials used.
- d) Total material consumption report.
- e) Material reconciliation with respect to the materials issued.
- f) Test reports & test certificates of gauges etc.
- g) Any other documents / records required.

TECHNICAL SPECIFICATION
FOR HDPE
PIPES

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1.0 **INTENT OF SPECIFICATION**

The intent of this specification is to establish minimum requirements to manufacture and supply of HDPE Pipes used for casing purpose of carrier pipe, supplying natural gas.

2.0 **SCOPE OF WORK**

2.1 The scope of the tendered will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of HDPE Pipes of ratings and grades as indicated in the Material Requisition & Schedule of Rates, as per IS:4984 (Specification for HDPE Pipes for water supply).

2.2 All codes and standards for manufacture, testing, inspection etc. shall be of latest edition.

2.3 Purchaser reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 **INSTRUCTION OF TENDERER**

3.1 Length of the Pipes and their supply will be as per following :-

- DN 50 – In each coils of 100 mtrs. Length
- DN 75 – Each pipe of 12 mtrs. length minimum
- DN 90 – Each pipe of 12 mtrs. length minimum
- DN 110 – Each pipe of 12 mtrs. length minimum
- DN 250 – Each pipe of 12 mtrs. length minimum
- DN 315 – Each pipe of 12 mtrs. length minimum

3.2 Protection

- i) The ends shall be protected by proper end caps to prevent from shocks and ingress of the foreign body.
- ii) Coils shall be covered by black PVC/ PE Film to prevent exposure to direct sun light.

3.3 The successful bidder shall submit following for approval of Purchaser/ Consultant after placement of order

- a) The Quality Assurance Plan (QAP & Sampling Plan)
- b) Material test report as per clause 5 of IS:4984.

c) Performance Requirements (clause 8 of IS:4984)

d) Type Test (clause 9.1 of IS:4984).

3.4 The bidder shall submit following documents at the time of bidding,

a) BIS Certification

b) List of current orders in hand for similar items with full details such as specification, name of purchaser etc.

c) Details of the largest supply executed

d) Name and address of proposed test laboratories alongwith their credentials/ past records for carrying out all required tests.

TECHNICAL SPECIFICATION
FOR
MEDIUM DENSITY
POLYETHYLENE FITTINGS
AND
ELECTRO-FUSION

FOR
NATURAL GAS DISTRIBUTION

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1.0 **SCOPE AND FIELD OF APPLICATION**

This specification elaborates the requirements for Electrofusion fittings in the nominal size range 16 to 180 mm made from PE compound used with PE pipes for supply of natural gas and to be used at operating temperature not more than 40°C.

The material grades to be used are PE 100. The fittings shall be yellow or black in colour.

Electro Fusion Fitting Jointing

1.1 For Electro Fusion fitting jointing an electrical resistance element is incorporated in the socket of fitting which when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

1.2 The effectiveness of this technique depends on attention to the preparation of the jointing surfaces , in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surface are clean. If ovality causes gap between concentrically located pipe and the fitting to exceed 1% of the pipe OD after re-rounding to ensure correct welding . If the gap still exceeds 1% of the pipe OD after re-rounding then a check should be made of the pipe OD dimensions to determine if it meets specification.

1.3 The maximum gap between eccentrically located pipe and fitting i.e. pipe touching fitting at one point must not exceed 2% of the pipe OD.

1.4 Sometimes coiled pipes may be too oval to fit into couplers, or the end of the pipe may make the alignment of the ends impossible. In such circumstances the use of a mechanical pipe straightener or rounding tool is necessary.

2. **EQUIPMENT**

2.1 The control box input supply is to be from a nominal 240V generator, which is normally of approximately 5kVA capacity. The Nominal output of the generator is to be 240V + 15%, -10% between no load and full load .

Control boxes are to include safety devices to prevent excessive voltages being present at the control box output. The safety devices shall operate in less than 0.5 s. Note that extension leads are not to be used on the control box outlet connections. Warning : Control boxes are not intrinsically safe and must therefore not be taken to trench.

A mechanical pipe surface preparation tool is to be used before fusion is attempted. The tool is capable of removing the oxidized surface of the pipe in excess of the insertion depth. The tool is to remove a layer of surface material 0.2-0.4 mm thick from outer surface of the pipe preferably in a continuous strip of swarf over that length and round of the pipe.

Pipe clamps for restraining, aligning and re-rounding the pipes in the fusion process are to be used.

Pipe cutters with saw and saw guide Protection

against adverse weather conditions.

2.2

Electro Fusion Jointing Method / Procedure

Preparation

- Ensure there is sufficient space permit access to the jointing area . In a trench a minimum clearance of 150 mm is required.
- Check that the pipe ends to be jointed are cut square to the axis of the pipe and any burrs removed.
- Wipe pipe ends clean lint free material to remove traces of dirt or mud
- Mark the area over which the oxidized pipe surface is to be removed I.e. by placing the socket of the bagged fitting along side the pipe end. Trace a line round the circumference at the appropriate distance from the end of the pipe using a felt tip pen or similar.

Note that the fitting should not be removed from the packaging at this stage.

- Connect the electro fusion control box input leads to the generator

- Check that the reset stop button, if fitted on the control box is in the correct mode.
- Check that reset stop button if fitted on the control box is in the correct mode
- Using the pipe end preparation tool, remove the entire surface of the pipe uniformly, preferably in continuous swarf over the area identified. i.e. in excess of insertion depth.
- A mechanical scraper could be used however there is a considerable risk that the end preparation will not be adequate with the use of such a tool.

Note that the prepared pipe surface should not be touched by hand.

- Remove the fitting from its packing and clean the scrapped area of the pipe surface and the bore of the fitting with a disposable wipe impregnated with Iso-propanol / Acetone. Ensure the prepared surfaces are completely dry before proceeding

Note that while Iso-propanol is a suitable cleaner, its use is subject to local health and safety regulation.

Check that the pipe clamps are of the correct size for the pipes to be jointed .

Insert the pipe ends into the fitting so that they are in contact with centre stop

Using the pipe clamps, secure the pipes so that they cannot move during the fusion cycle. Check that the pipes ends and the fitting are correctly aligned.

Connect the control box and check that they have been fully inserted.

If required by the control box enter the fusion jointing time into the control box timer. The jointing time is indicated on the fitting. Check the correct time as shown on the control box display.

Note 1: Automatic control box are available which obviate the need to enter the fusion time

Note 2: Gloves and goggles should be worn during the fusion process

**Note 3: If the fusion cycle terminates before completion of the countdown , check for faults as indicated by the control box warning lights and check that there is adequate fuel in the generator. DO NOT attempt a second fusion cycle within one hour
/ cooling of joint at Ambient temperature of the first attempt.**

2.3 **Records:** Records of appropriate servicing and calibration shall be kept.

2.4 **Training:** It is necessary that operators , inspection and supervisory personnel acquire the skills of Electro-fusion fitting .The necessary training should be carried out by qualified instructor with the objective of enabling participants to

- Understand the principles of electro-fusion fitting jointing
- Identify pipe and appropriate fitting markings
- Carry out pre jointing machine and equipment checks
- Make satisfactory Electro-fusion joints from pipes and fittings of different sizes
- Inspect for and identify joints of acceptable

Note that some form of assessment and certification should be associated with the training . The certificate should detail the pipe and fitting size range and the equipment used. A register of successful participants should be kept.

2.5 Electro-Fusion Saddle Jointing

For Electro Fusion fitting jointing an electrical resistance element is incorporated in the socket of fitting which when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

The effectiveness of this technique depends on attention to the preparation of the jointing surfaces , in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surface are clean.

Method of holding the tapping tee saddle during the fusion cycle are used namely top loading and under clamping space around the pipe . In a trench a minimum clearance of 150 mm is required.

2.6 Electro-Fusion Saddle Jointing Method / Procedure. Preparation

Expose the pipe onto which the aping tee is to be assembled , ensuring there is

sufficient clear space around the pipe . In a trench a minimum clearance of 150mm is required.

Clean the pipe over the general area on which the saddle is to be assembled using clean , disposable lint free material

Without removing the fitting from its packaging , place over the required position on the main . Mark the pipe surface all around and clear of the saddle base area using a felt tip pen or similar.

Remove the surface of the pipe to a depth of 0.2 to 0.4mm over the full area marked using a suitable tool , remove the swarf.

Connect the electro fusion control box input leads to the generator
Check that the reset stop button, if fitted on the control box is in the correct mode.

Check that reset stop button if fitted on the control box is in the correct mode.

Remove the fitting from its packing and clean the scrapped area of the pipe surface and the bore of the fitting with a disposable wipe impregnated with Iso- propanol / Acetone. Ensure the prepared surfaces are completely dry before proceeding

Note that while Iso-propanol is a suitable cleaner , its use is subject to local health and safety regulation.

Position the fitting base onto the prepared pipe surface , and bring the lower saddle into position then gradually and evenly tighten the nuts until the upper saddle makes firm contact with scrapped pipe.

Check that there is sufficient fuel for the generator to complete the joint . Start the generator and check that it is functioning correctly

Switch on the control box if applicable

Connect the control box output leads to the fitting terminals and check that have they have been fully inserted.

If required by the control box enter the fusion jointing time into the control box timer. The jointing time is indicated on the fitting . Check the correct time as shown on the control box display.

Note 1 : Automatic control box are available which obviate the need to enter the fusion time

Note 2 : Gloves and goggles should be worn during the fusion process

Press the start button on the control box and check that the heating cycle is proceeding as indicated on the display.

On completion of the heating cycle , the melt indicators where incorporated should have risen . If there is no apparent move in the melt indicators a new saddle joint should be made. Cut the tee of the faulty joints from its base.

If a satisfactory joint has been made , the joint is to be left in the clamps for the cooling time specified on the fitting label or any the automatic control box

Note 3 : If the fusion cycle terminates before completion of the countdown , check for faults as indicated by the control box warning lights and check that there is adequate fuel in the

The connection of the service pipe to the fitting outlet should be carried out in accordance with the procedure of the appropriate section of this item

Do Not attempt to tap the main with the integral cutter for at least 10 minutes after the completion of cooling cycle .

Records

Records of appropriate and calibration of electro fusion machines and joint shall be kept.

Trainings

AS PER 2.4

Note that some form of assessment and certification should be associated with the training. The certificate should detail the pipe and fitting size range and the equipment used. A register of successful participants should be kept.

2.7 STOPPING THE GAS FLOW

In the operation of a distribution system there is a periodic need to stop the gas flow for either routine or emergency maintenance. The flow may be stopped through the use of installed fitting such as valves. Where installed fittings are not available or the use of such would cause significant supply disruption, then one of the following methods may be employed.

2.8 SQUEEZE - OFF

- a. To control the gas flow a special tool may be used to squeeze the pipe walls together. Hydraulic jacks are used to supply the necessary force to compress the pipe walls for sizes 90 mm and above.
- b. As will be seen the squeeze-off equipment comprises two bars to apply pressure to outside of the pipe. The bars are brought together either manually or hydraulically, squeezing the pipe material together until a seal is formed where the upper and lower walls meet.
- c. The hydraulic machines should have a spring return for the jack and locking to prevent accidental release of pressure during operation. All squeeze – off machines should be fitted with check plate or stops to avoid over compression of the pipe.
- d. Where the pipe walls are compressed the polyethylene pipe will be severely deformed in the regions of maximum compression. The pipe will eventually regain its original shape after squeezing but there will be reduction in some pressure bearing properties.
- e. A complete stop may not always be obtainable because of wrinkling of the inside of the pipe. If a complete stop is required than a second squeeze can be used, with an intermediate vent to remove the gas which passes the first squeeze from say the trench of three pipe diameters area. A second squeeze

– off procedure should be a minimum of three pipe diameters and right angles to the squeeze.

- f. While not essential it would be good practice to fit a reinforcing stainless steel band / do not squeeze again adhesive tape around the pipe upon the completion of squeezing operation.

2.9 BENDING – BACK

Bending back of the pipe may be performed where the pipe has been served damaged and stopping they gas flow is imperative. Its application is of a temporary nature and will provide a relief until a permanent repair can be affected. The section of pipe, which has been bent back, will to be replaced because of the damage caused by the serve ness of the band back operation. The need of any bend back operation is most likely to occur as a consequence of damage caused to a PE service pipe.

While it is not the prime function of a saddle tee , controlling the flow in the service may be achieved by opening upon an installed saddle tee and winding down the internal tapping tool to shut off the flow to the service pipe.

3. SYMBOLS & DEFINITIONS

3.1 Symbols for Electro fusion Fittings

3.1.1 Symbols for Electro fusion Socket Fittings

The dimensions and main symbols used in this part of ISO 8085 are shown in figure 1, where

D1 is the mean inside diameter in the fusion zone comprising the mean inside diameter measured in a plane parallel to the plane of the mouth at a distance of $L3 + 0.5 L2$ from the plane at the mouth.

D2 is the minimum bore comprising the minimum diameter of the flow channel through the body of the fitting.

L1 is the depth of penetration of the pipe or of the male end of a spigot fittings.

L2 is the nominal length of the fusion zone corresponding to the heated length.

L3 is the nominal unheated entrance length of the fitting comprising the distance between the mouth of the fittings and the near end of the fusion zone.

3.1.2. Symbols for Electro fusion Tapping Tees

The main symbols used for tapping tees are shown in Figure 2, where. **h** is the height of the service pipe and comprising the distance between the axis of the main pipe and the axis of the service pipe.

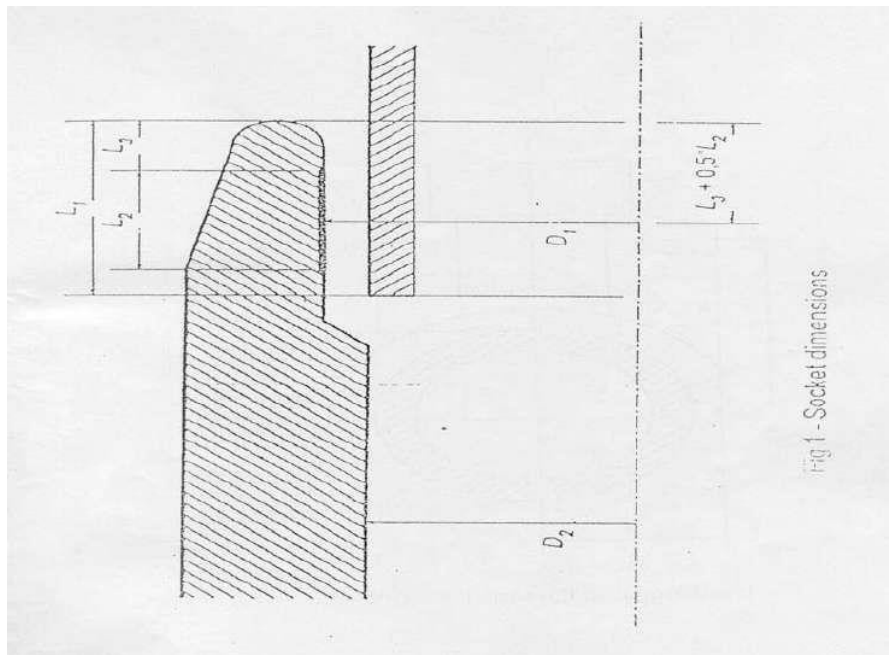


Fig 1 - Socket dimensions

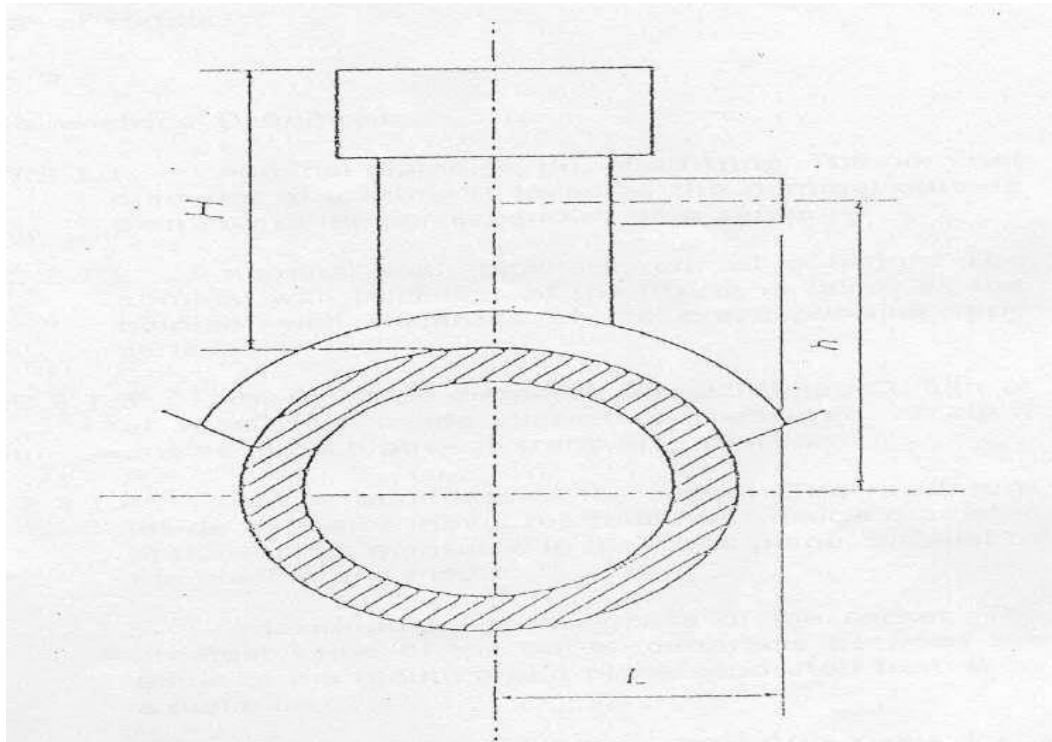


Fig 2 - Tapping Tee Dimensions

L is the width of the tapping tee and comprising the distance between the axis of the main pipe and the plane of the mouth of the service pipe.

H is the height of the saddle which comprises the distance from the top of the main to the top of the tapping tee or saddle.

3.2 Definitions

3.2.1. Geo metrical Definitions

3.2.1.1 Nominal diameter, dn, of a fitting:

The nominal diameter of a fitting is taken as the nominal outside diameter of the corresponding pipe series

3.2.1.2 Nominal wall thickness, en, of a fitting:

The nominal wall thickness of the fittings is taken as the nominal wall thickness of the corresponding pipe series.

3.2.1.3 Mean inside diameter:

The arithmetic mean of at least two inside diameter measured at right angles to each other in transverse planes.

3.2.1.4 Out of roundness of the Socket:

The maximum inside diameter minus the minimum inside diameter of the socket, measured in the same plane, parallel to the plane of the mouth.

3.2.1.5 Maximum out of roundness of the socket:

The greatest value of the out of roundness between the plane of the mouth and a plane separated from it by a distance L1.

3.2.1.6 SDR value for a fitting:

The SDR value for a fittings is taken as being the same as that for the corresponding pipe series.

Where, $SDR = d_n/e_n$

3.2.1.7 Wall thickness, Eofafitting:

The wall thickness of a fittings at any point of the body of the fitting which could be submitted to a stress inducted by the pressure of the gas in the piping system.

3.2.2 Material Definition

3.2.2.1 Virgin Material :

Materials in form such as granules or powder that has not been subjected to use or processing other than that required for its manufacturer and to which no re-processable or recyclable materials have been added.

3.2.2.2 Own Reprocessable Material :

Material prepared from rejected unused pipes, fittings or valves, including trimmings from the production of pipes, fittings or valve, that will be reprocessed in a manufacturer's plant after having been previously processed by the same manufacturer by a process such as injection moulding or extrusion.

3.2.2.3 Compound:

A homogenous mix of base polymer (PE) and additives, i.e. antioxidants, pigments, UV-stabilisers and others..., at a dosage level necessary for the processing and of components of this standards. The additives shall not have a negative influence on the performance with respect to feasibility. All additives shall be uniformly dispersed.

3.2.3 Definition related to Material Characteristics

3.2.3.1 Lower Confidence Limit (LCL):

A quantity with the unit in mega Pascals (MPs), which can be considered as a property of the material representing the 97.5% lower confidence limit of the predicted long-term hydrostatic strength at a temperature 20° C for 50 years in water.

3.2.3.2 Overall Service (Design) Coefficient(C):

An over all coefficient with a value larger than 1.0 which takes into consideration service conditions as well properties of the components of a piping system other than those represented in lcl. For gas applications, C can have any value equal to or greater than 2.0.

3.2.3.3 Minimum Required Strength (MRS):

The value of the lcl rounded down to the next lower value of the R 10 series when the lcl is less than 10 Mpa, or to the next lower value of the R 20 series when the lcl is greater than or equal to 10 Mpa.

Note: R10 and R 20 series are the Renard number series according the ISO 3 and ISO 497

3.2.3.4 Melt Mass Flow Rate (MFR):

A value relating to the viscosity of the molten material at a specified temperature and rate of shear.

3.2.4 Definitions Related to Service Conditions

3.2.4.1 Gaseous Fuel:

Any fuel which is in the gaseous state at a temperature of + 15° C and a pressure of 1 bar.

3.2.4.2 Maximum Operating Pressure (MOP)

The maximum effective pressure of the gas in the piping system, expressed in bar, which is allowed in continuous use. It takes into account the physical and the mechanic characteristics of the components of a piping system.

Note : It is given by the equation :
$$MOP = \frac{20 * MRS}{C*(SDR-1)}$$

3.2.5 Definition on Design of Electrofusion Fittings:

3.2.5.1 Electrofusion Socket Fitting:

A polyethylene (PE) fittings which contains one or more integral heating elements, that are capable of transforming electrical energy into heat to realise a fusion joint with a spigot – end or a pipe.

3.2.5.2 Electrofusion Saddle Fitting:

A polyethylene (PE) fitting (top loading or wrap around) which contains one or more integral heating elements, that are capable of transforming electrical energy into heat to realise a fusion joint onto a pipe.

3.2.5.3 Tapping Tee:

An Electrofusion saddle fitting which contains an integral cutter, to cut through the pipe wall. The cutter remains in the body of the saddle after installation.

3.2.5.4 Branch Saddle:

An Electrofusion saddle fitting which requires an ancillary cutting tool for drilling a hole in the adjoining main pipe.

3.2.5.5 U Regulation :

Control of the energy supplied during the fusion process of an Electrofusion fitting, by means of the voltage parameter.

3.2.5.6 I Regulation:

Control of the energy supplied, during the fusion process of an electrofusion fitting by means of the current parameter.

4. DESIGNATION

4.1 Fittings shall be designed according to the grade of material, nominal diameter and Standard Dimension Ratio (SDR).

4.2 Grade of Material:

4.2.1. Fittings shall be classified according to the grade of material as given in following table:

Table-1

Material	M.R.S. Mpa	1 cl (20° C, 50 Yrs 97.5%) Mpa	Maximum Allowable Operating Pressure
PE 80	8.0	$8.00 \leq 1 \text{ cl} \leq 9.99$	5.5 Bar
PE 100	10.0	$10.00 \leq 1 \text{ cl} \leq 11.19$	7.0 Bar

4.3 Nominal Diameter

The Nominal Diameter for fittings covered in this standard are 16, 20, 25, 32, 40, 63, 75, 90, 110, 125, 140, 160 ,180 mm.

4.4 Material

4.4.1 Polyethylene Compound:

The Polyethylene compound used in the manufacture of fitting shall be a cadmium free compound. It shall be free from visible water, shall comply with the requirements as specified in Table – 2.

Table-2 : Characteristics of PE Compound

Characteristics	Units	Requirements	Test Parameters	Test Method
Conventional Density	Kg/m ³	≥ 930 (base polymer)	23 °C	ISO 1183 - ISO 1872/1
Melt Mass-flow Rate	g/10 min	± 20% of value nominated by compound producer	190 °C condition 18	ISO 1133
Thermal Stability	Minutes	> 20	200 °C (2)	ISO TR 10837
Volatile Content at Extrusion	mg/kg	≤ 350		ISO 4437 Annex. A
Water Content (3)	mg/kg	≤ 300		ASTM D 4019
Carbon Black Content	% (m/m)	2,0 ≤.....≤ 2,5		ISO 6964
Carbon Black Dispersion (4)	Grade	≤ 3		ISO DIS 11420
Pigment Dispersion (5)	Grade	≤ 3		ISO DIS 13949
Resistance to Gas Constituents	h	≥ 20	80 °C 2 Mpa	ISO 4437 Annex. B
Resistance to rapid crack propagation (RCP) (6)	Mpa	The critical pressure in the FS test shall be greater than or equal to the value of the MOP of the system multiplied by 1:5	0°C	ISO DIS 13478
Full Scale (FS) test : d ≥ 250mm				
Or		The critical pressure in the S4 test shall be equal to or greater than the value of the MOP of the system divided by 2,4 (8)	0°C	ISO DIS 13477
S4 Test : in principle according to all diameters (7)	Mpa			
Resistance to slow crack growth en > 5mm	h	165	80 °C, 8,0 bar (f) (9) 80 °C, 9,2 bar (f) (10)	ISO DIS 13479

- 1) Non black compound shall conform to the weathering requirements to ISO 4437
- 2) Test may be carried out at 210°C providing that there is a clear correlation to the results at 200°C, in case of dispute the reference temperature shall be 200°C

- 3) Only applicable if the compound does not conform to the requirement for volatile content. In case of dispute the requirements for water content shall apply
- 4) Carbon black dispersion for black compounds only.
- 5) Pigment dispersion method for non-black compounds only.
- 6) Only applicable for fittings which incorporate extruded pipe elements.
- 7) Shall be performed on pipe with a wall thickness of ≥ 15 mm.
- 8) This factor 2.4 is still under study and may be subject to change. If the requirement is not met, then retesting by using the Full Scale (FS) test shall be performed
- 9) Test parameter for PE 80.
- 10) Test parameter for PE 100.

5.0 DESIGN

- Fittings shall be designed for system operation at the pressures given in Table – I
- Fittings shall be free from cracks, voids, blisters, distortion, dent or other defects.
- Fittings shall be capable of being fusion jointed to pipes using control boxes. The fittings shall exhibit the strengths and fusion compatibility with, pipes of respective sizes.
- Each fitting shall be bar coated and shall have a permanent fusion indicator.
- Heating coil design shall be such that it should not be damaged during assembly leading to short circuit of heating coil.

5.1 Electrofusion Socket Fittings

Electrofusion Socket Fittings shall incorporate a method of controlling pipe penetration within each socket. The inner cold zone of each socket shall not be less than $(0.1 d + 5)$ mm for sizes upto 125 mm & $0.1 d$ for sizes greater than 125 mm.

5.2 Tapping Tees

Tapping tees shall be capable of installation by a force between 1 kN and 1.5 kN applied from above and on the centre line of the tapping tees stack. The tapping tees shall provide a means of cutting through the pressurised main pipe and allowing the gas flow into the outlet pipe.

5.3 Transition Pieces

To make connection between steel pipe and MDPE pipe specially fabricated transition pieces consisting of steel and MDPE pipes should conform to the requirements mentioned herein.

5.3.1 MDPE Pipe:

The MDPE pipe with one end plain should conform to the specification (IS:14885/ SDR 11)

5.3.2 Steel Pipe:

Black ERW steel pipe should conform to the specifications as laid in API STD 5L (latest revision)

5.3.2.1 Pipe End:

One end of the pipe should be bevelled for welding angle of bevel should be $30^{\circ} + 5^{\circ}$.

5.3.3 Jointing between Steel and MDPE Pipes:

Steel and MDPE pipes should be so jointed in the factory so as to have a monolithic joint which is leak free and should be mechanically as strong or stronger than the PE Pipe.

5.4 **Transition Fittings (MDPE Pipes to threaded G.I. Fitting):**

Transition fitting for jointing of MDPE Pipes conforming to specification IS:14855/ SDR 11 to threaded G.I. tubing conforming to specification. The MDPE end of the transition fitting shall be jointed with MDPE Pipe with the electrofusion method.

6.0 **ELECTRICAL CHARACTERISTICS**

For each size and type of fitting, the manufacturer shall declare the nominal resistance of the heating element and specify the production tolerances.

The manufacturer shall demonstrate that satisfactory joint can be made using the extremes of these tolerances.

All fittings shall have mechanically shrouded male electrical terminals. The fittings terminals connections shall be suitable for use with voltage less than or equal to 48 volts. Considerations should be given to the design of the shroud with respect to impact damage. When hollow terminal pins are used, the hole at the top of the pin shall be less than 1 mm diameter. The terminal pin material shall be corrosion resistant and the surface finish shall be N7.

Fittings incorporating two electrofusion sockets shall have both sockets fused in a single operation.

The heating elements shall be suitable designed to prevent short circuiting or local overheating/ under heating during the fusion operation. Protective coating applied to the heating element shall not have a detrimental effect on the joint.

The heating element wire shall not be disturbed during assembly.

7.0 DIMENSIONS

7.1 Measuring Temperature

Fittings shall not be measured within 24 hrs. of manufacture to allow for normalization. The fittings shall be measured at an ambient temperature of $23 \pm 2^{\circ}\text{C}$, after a conditioning period of 5 Hrs.

Methods of measurements shall provide the appropriate degree of accuracy, and the reference conditions specified in this clause 6 apply in case of disputes in dimensional measurement.

7.2 Dimensional Stability

7.2.1 Couplers (Including all forms of socket fittings)

All coupler dimensions shall conform to their specified value when the fitting has been stored for a period of 12 months at a temperature of $30 \pm 2^{\circ}\text{C}$.

7.2.2 Tapping Tees and Branch Saddles:

All tapping tee and branch saddle dimensions shall conform to their specified agreed values when the fitting has been stored for a period of 12 month at a temperature of $30 \pm 2^{\circ}\text{C}$.

TABLE 3: SOCKET DIMENSIONS

Pipe Size d mm	Limits for average diameter d on each fitting measured over apparent fusion length L mm		Apparent fusion length L mm	Penetration depth L mm
	Maximum	Minimum	Minimum	Maximum
16	16.6	16.4	15	41
20	20.6	20.4	16	41
25	25.6	25.4	18	41
32	32.9	32.5	18	41
40	41.0	40.6	18	49
50	51.1	50.7	20	55
55	56.1	55.7	21	63
63	64.1	63.7	23	63
75	76.3	75.9	25	70
90	91.5	91.1	28	79
110	111.3	111.1	32	82
125	126.7	126.2	35	87
140	141.7	141.2	38	92
160	162.1	161.4	42	98
180	182.1	181.5	46	105

Notes:

1. The apparent fusion length, L, is the length of the integral heating elements, from the first regular section of the element to the end of the regular section, on one side of the fitting. This dimension to be measured from outside edge to outside edge of wire.
2. Any protrusions into the bore of the fitting (e.g. centralization ribs) shall not prevent easy assembly in the field.
3. The overall length of a straight coupler is equal to twice the quoted maximum penetration depth L.

TABLE 4: OVERALL LENGTH OF REDUCERS

Major Diameter mm	Maximum Length mm
25	90
32	90
63	120
90	180
125	215
180	280
200	245
225	260
250	280
280	300
315	320

TABLE 5: BRANCH SADDLE ASSEMBLY OUTLET LENGTH

Off-take Size mm	Shut-off method	Dimension from flange face to crown of main		Dimension from pipe end to crown of main	
		Class B fitting mm	Class B fitting mm	Class B fitting mm	Class B fitting mm
63	Valve	-	-	-	-
63	Squeeze	-	260*	-	-
90	Valve	-	-	400	-
90	Squeeze	400	180**	-	-
125	Valve	-	-	550	-
125	Squeeze	360	180***	-	-
180	Valve	-	-	750	-
180	Squeeze	360	180+	-	-
250	Valve	-	-	-	-
250	Squeeze	360	180++	-	-

* Flange size DN 50
** Flange size DN 100
*** Flange size DN 150
+ Flange size DN 250
++ Flange size DN 250

8 PERFORMANCE REQUIREMENTS

8.1 Mechanical Characteristics

Fittings shall be tested using pipes, which conform to ISO 4437, Test samples shall be assembled in accordance with ISO DIS 11413, following the technical instruction of the manufacturer and using fusion equipment conforming ISO DIS 12176.2.

When tested in accordance with the test methods as specified in table – 6 using the indicated parameters, the fittings have mechanical characteristics confirming to the requirements given in Table 6.

TABLE 6: MECHANICAL PROPERTIES

Characteristics	Units	Requirements I	Test	Parameters	Test Method
Hydrostatic strength at 20°C	H	Failure time \geq 100	End caps orientation conditioning time. Type of test circumferential (hoop) stress pipe PE 80, PE 100, Test temperature.	Type a) free 1 h 9 Mpa, 12.4 Mpa, 20°C	ISO DIS 9356
Hydrostatic strength at 80°C	H	Failure time \geq 165	End caps orientation conditioning time. Type of test circumferential (hoop) stress pipe PE 80, PE 100, Test temperature.	Type a) free 12 h water-in-water 4.6 Mpa 5.5 Mpa 80°C	ISO DIS 9356
Hydrostatic strength at 80°C	H	Failure time \geq 1000	End caps orientation conditioning time. Type of test circumferential (hoop) stress pipe PE 80, PE 100, Test temperature.	Type a) free 12 h water-in-water 4 Mpa, 5 Mpa, 80°C	ISO DIS 9356
Cohesive resistance	mm	Length of initiation of brittle fracture L/3	Test temperature choice of method	23°C	ISO 13954 (A) ISO 13955 (A) ISO 13956 (B)
Impact strength (B)		No failure No leakage	Test temperature Falling height Mass of the striker	20°C 23°C 5m 5kg	ISO DIS 13957

Characteristics	Units	Requirements I	Test	Parameters	Test Method
Pressure drop (B)	M ³ /h	0.5 mbar : dn ≤ 63 0.1 mbar : dn ² > 63	Air flow rate Test medium Test pressure	Indicated by the manufacturer Air source 25 mbar	PrEN 12117

(A) Electrofusion Socket Fittings

(B) Tapping Tees

For hydrostatic strength test at 80°C only brittle failure shall be taken into account. If ductile failure occurs before the required time, a lower stress shall be selected and the minimum test time will be obtained from the line through the stress/ time points given in Table – 7.

TABLE 7
Hydrostatic strength (80°C) – Stress/ Minimum
Failure Time Correlation

PE-80		PE-100	
Stress Mpa	Minimum Failure Time h	Stress Mpa	Minimum Failures Time h
4.6	165	5.5	165
4.5	219	5.4	233
4.4	293	5.3	332
4.3	394	5.2	476
4.2	533	5.1	688
4.1	727	5.0	1000
4.0	100	-	-

8.2 Physical Characteristics

When tested in accordance with the test methods as specified in Table 8 using the indicated parameters, the fittings shall have physical characteristics conforming to the requirements given in Table 8.

TABLE 8 : Physical Characteristics of Fittings

Property	Units	Requirements	Test Parameters	Test Method
Thermal Stability	Minutes	> 20	200 °C (1)	ISO TR 10837

Property	Units	Requirements	Test Parameters	Test Method
Melt Mass-flow Rate (MFR)	g/10 min	$0.2 \leq \text{MFR} \leq 1.4$ and after processing maximum deviation of $\pm 20\%$ of the value measured on the batch compound	Condition 18	ISO 4440.1

- (1) Test may be carried out at 210 °C providing that there is a clear correlation to the results at 200 °C, in case of dispute the reference temperature shall be 200 °C.

8.3 Technical File

The manufacturer of the fittings shall make availability of a technical file (generally confidential) with all relevant data to prove the conformity of the fittings to this specification. It shall include all results of the type testing and shall conform to the specification relevant technical brochure (e.g. ISO 12093 for electro fusion fittings).

The technical description of the manufacturer shall include the following information:

1. Field of appliance (pipe and fitting temperature limits SDR's and out of roundness):
2. Assembly instructions:
3. Fusion instruction (fusion parameters with limits)
4. For saddles and tapping tee:
 - The means of attachment (tools and/ or under clamp).
 - The need to maintain the under clamp in position in order to ensure the performances of the assembly.

For electrofusion fitting, the format of the technical brochure shall conform to ISO DIS 12093.

In the event of modification of the fusion parameters, the manufacturer shall ensure that the joint conforms to this standard.

9. MARKING

Following information shall be embossed upto height of 0.15 mm onto the fitting and also in the form of bar code:

- a) The manufacturer's identity
- b) The size of the fitting in mm
- c) Material and Designation
- d) The date of manufacturer (code may be used)
- e) Fusion time in seconds
- f) Cooling time in minutes
- g) Fusion parameters in BAR code
- h) Lot Number.

The information may be printed on a label associated with the fitting.

10 . PACKING

The fittings shall be packaged in bulk or individually protected where necessary in order to prevent deterioration. Whenever possible, they shall be placed in airtight plastic bags in card board boxes or cartons.

The cartons and/or individual bags shall bear at least one label with the manufacturer's name, date of manufacturer, type and dimensions of the part, number of units in the box, and any special storage conditions and storage time limits.

Note:

All the fittings required shall be bar coded electrofusion fitting type. In case bidder is quoting for spigot fittings, the necessary electrofusion coupler for all non electrofusion ends shall be included in the complete package

The transition fittings shall also be bar coded electrofusion type for PE connection, NPT Female threading confirming to ANSI B 20.1 for G.I connection & butt welded for carbon steel end.

The carbon steel material of transition fittings shall be confirming to APL 5L x 42 and thickness shall be of 4.8 mm.

All the fittings shall be used for the network operating at 4.0 Bar(g) Pressure.

TECHNICAL
SPECIFICATION FOR
POLYETHYLENE
PIPES

C O N T E N T S

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1.0 **INTENT OF SPECIFICATION**

The intent of this specification is to establish minimum requirements to manufacture and supply of Polyethylene Pipes used for supply of natural gas.

2.0 **INSTRUCTION TO THE TENDERER**

2.1 The PE pipes are to be supplied as per IS:14885.

2.2 The length of the Pipes and their supply will be as per following :-

- 20mm OD – In each Coils of 100 mtrs. length
- 32mm OD – In each Coils of 100 mtrs. length
- 63mm OD – In each Coils of 100 mtrs. Length
- 90mm OD – In each Coils of 50 mtrs, Length
- 125mm OD – In each Coils of 50 mtrs. length
- 180mm OD – Each pipe of 12 mtrs. length minimum & above

2.3 **PROTECTION**

- i) The ends shall be protected by proper end caps to prevent from shocks and ingress of the foreign body.
- ii) Coils shall be covered by black PVC/ PE Film to prevent exposure to direct sun light.

2.4 The successful bidder shall submit following for approval of Purchaser/ Consultant after placement of order

- a) The Quality Assurance Plan (QAP & Sampling Plan)
- b) Certified test result of PE Compound (clause 5 of IS:14885)
- c) Performance Requirements (clause 8 of IS:14885)
- d) Type Test (clause 9.1.2 of IS:14885).

2.5

The bidder shall submit following documents at the time of bidding,

- a) BIS/ ISO Certification if obtained already, or documentary evidence of applying for the same
- b) List of current orders in hand for similar items with full details such as specification, name of purchaser etc.
- c) Details of the largest supply executed
- d) Name and address of proposed test laboratories alongwith their credentials/ past records for carrying out all required tests.
- e) The names of standards/ codes being followed in manufacture and supply
- f) Any accreditation certificates obtained or applied for.

2.6

MARKING

The pipe shall be marked in continues length in addition to the requirement of the applicable code.

TECHNICAL SPECIFICATION
FOR
GI PIPES

TECHNICAL SPECIFICATION FOR GI PIPES

Service	:	Natural Gas
Working Pressure	:	4 bar (g)
Hydrostatic Test Pressure	:	6 bar (g)
Working Temperature	:	0°C to 50°C
Material Description	:	IS:1239 (Part-I) Heavy Duty, Continuous Welded
Min. Tensile Strength	:	30 kgf/sq.mm
Min. Elongation	:	6%
Tolerance	:	+ Not limited, - 10%
Protective Coating	:	Galvanised uniformly to protect from corrosion as per IS:4736/ ASTM A53 or by Electro Galvanising
Ends of Pipes	:	Plain End
Inspection	:	Inspection shall be carried out as per applicable code & approved QAP and 100% Pressure Testing shall be carried out at factory.

1.0 GENERAL NOTES

- 1.1 All pipes and their dimensions, tolerance, chemical composition, physical properties, heat treatment, hydrotest and other testing and marking shall conform to the codes and standards.
- 1.2 Material test certificates (physical property chemical composition & heat treatment report) shall also be furnished for the pipes supplied.
- 1.3 All pipes shall be supplied with length between 5 to 7 mtr but average length of pipes supplied shall not be less than 6 meter. Overall length tolerance shall be (-) zero and (+) one length to complete the ordered quantity.
- 1.3 Pipes shall be galvanised uniformly to protect from corrosion as per IS:4736 / ASTM A53 or by electro galvanising.

2.0 MARKING AND DESPATCH

- 2.1 All pipes shall be marked in accordance with the IS 1239 codes, standards and specifications.
- 2.2 Paint or ink for marking shall not contain any harmful metal or metallic salts, such as zinc lead or copper which causes corrosive attack in heat.
- 2.3 Pipes shall be dry, clean and free from moisture, dirt and loose foreign materials of any kind.
- 2.4 Pipes shall be protected from rust, corrosion and mechanical damage during transportation, shipment and storage.
- 2.5 Both ends of the pipe shall be protected with the following material.

Plain End	:	Plastic Cap
Bevel End	:	Wood, Metal or Plastic Cover
Threaded End	:	Metal or Plastic Threaded Cap

SPECIFICATION FOR PURE POLYESTER POWDER COATING OF GI PIPES

Encl.-II

This Specification specifies the requirements for powder coating (Pure Polyester) of GI Pipes suitable to use for carrying Natural Gas directly exposed to sunlight.

Specification For Powder coating:

Powder Material	:	Pure Polyester.
Application	:	Electrostatic Spraying. (40 & 90 kV, Manual / Automatic)
Baking Schedule	:	180°C to 200°C for 10 minutes (Metal Temperature)
Coating Thickness	:	50 – 60 Microns (For GI Pipes) 70 – 80 Microns (For ERW Pipes (Heavy Class))*

- * ERW pipes are generally obtained from the manufacturers with a protective layer like a varnish applied on the pipe, to prevent corrosion. In order to obtain a proper application of pure polyester powder coating on the ERW pipes, the varnish has to be removed by use of a suitable method approved by /HNGPL.

TESTING:

Film Type	:	Glossy / Satin
Gloss 60° (ASTM D-523- 60)	:	86 & 95%
Cross Hatch Adhesion 0/100. (ASTM D-5870)	:	GT =
Cylindrical bending Test (ASTM D-522) 5 mm rod dia.	:	Passes.
Enrichsen cupping (minimum):	:	8
Passes. Pencil Hardness (minimum)	:	2H.
Scratch Resistance (Kg. Min)	:	3
Impact Resistance Kg. Min (ASTM D-2794)	:	Direct – 150 Indirect – 150
Salt Spray Resistance (minimum). (ASTM B-117)	:	1000 hours

Porosity : Passes.
(DIN -53161)

Humidity Resistance : 1000 hours
(minimum). (ASTM D-2247)

Weathering : 60 – 70%
Gloss retention after
1000 hours (Sun test
with water immersion,
Xenon 150 K.lux)

Color : YELLOW.

Bidder should use powder of reputed manufacturers only (like Berger, Southfield, etc.) and the same should be approved by HNGPL prior to commencement of the powder coating activity.

TECHNICAL SPECIFICATION
FOR
GI FITTINGS

**STANDARD TECHNICAL
SPECIFICATION
FOR
GI FITTINGS**

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1.0 SCOPE

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 MATERIAL

The material used for the manufacturing of GI fittings shall conform to IS 14329 – 1995 with latest amendments Grade BM 300. Relevant test certificates conforming to all the test agreements of IS 14329 shall be provided with fittings.

3.0 DIMENSIONS AND DIMENSIONAL TOLERANCES

1. Dimensions of various types of fittings shall be as specified in sections 2 to 10 of IS 1879 – 1987 with latest amendments, as applicable.
2. Wall thickness of fittings and tolerances on them shall be as given in Table 1.2 of IS 1879 – 1987 with latest amendments,
3. In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.
4. All GI fittings shall be of reinforced type. Reinforcement shall be provided as per Table 1.2 of IS: 1879.

4.0 WEIGHT

Weights of various types of fittings shall be as specified in sections 2 to 10 of IS 1879 – 1987 with latest amendments, as applicable.

5.0 THREADS

1. Threads shall be NPT type and conforming to ASME B1.20.1.
2. Outlets of fittings shall be threaded to dimensions & the tolerances as specified in ASME B1.20.1.
3. All internal & external threads shall be tapered.
4. For checking conformity of threads gauging practice in accordance with ASME B1.20.1 shall be followed.
5. 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 any defects such as cracks, injurious flaws, fine sand depth etc.

7.0 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 g/m².
- 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. **Sampling plan and testing for Galvanization:**
 - 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.
- vii. Criteria for conformity: As per Clause 8.3 of IS: 4759-latest edition.
- viii. Test procedure shall be as per Clause 9 of IS: 4759-latest edition.

8.0 PRESSURE TEST

Vendor shall carry out pneumatic pressure test as per Clause 12.1b of IS:1879 – 1987 with latest amendments on each & every fittings. Vendor has to submit the Internal Quality control certificate for the same.

9.0 COMPRESSION TEST

This test shall be conducted to judge the malleability of the pipe fittings & shall be carried out as per Clause 13 of IS:1879 – 1987 with latest amendments.

10.0 SAMPLING

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per Appendix-B of IS 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.

11.0 MARKING

1. Each fitting shall be embossed with Client's logo, manufacturer's name or trademark and the size designation to the extent possible depending upon available space. Detailed marking arrangement shall be submitted by vendor for approval.
2. Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.
3. Manufacturer's name or trade mark.
4. Designation of fittings.
5. Lot number.
6. Each fitting conforming to this standard shall also be marked with BIS standard mark.

12.0 PACKAGING

Packing size is 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

1. Inspection shall be carried out as per Owner Technical Specification/ referred codes.
2. Owner Representative/ Consultant or Third Party Inspection Agency appointed by Owner shall carry out inspection during manufacturing / final inspection.
3. 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 Technical Specification & specified code for 100% material, at the time of final inspection of each supply lot of material.
4. 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.

STANDARD SPECIFICATION
FOR
BRASS FITTINGS

**STANDARD TECHNICAL
SPECIFICATION
FOR BRASS
FITTINGS**

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1.0 SCOPE

This specification covers the requirements for Brass Capillary fittings (End feed fittings). Unless modified by this specification, requirement of EN 1254 Part 1 shall be valid.

2.0 MATERIAL

- i) The material used for the manufacturer of Brass Capillary Fittings shall conform to IS 319 Grade-2 or CW 602N as per EN12164.
- ii) Material used for the solder should conform to BSEN 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 NPT (ASME 1.20.1).

3.0 DIMENSIONS

- I. 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)

Diameter	Tolerance on the mean diameter with respect to the nominal diameter		Resulting Diametrical difference	
	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	0.0

The minimum wall thickness of a fitting shall be in accordance as given below (Ref table 5 of EN 1254 Part 1)

Nominal Dia mm, D

Minimum wall thickness (mm) Brass

12

1.1

- II. Minimum length of engagement shall be as per table-3 of BS EN 1254-1.
- III. Minimum bore area of fittings shall be corresponding to minimum bore as per table-4 of BS EN 1254-1.
- IV. Tube abutment shall be shown in the drawing submitted for approval as per guidelines of BS EN 1254- 1.

4.0 END CONNECTION

End connection of the fitting must be capable of end feeding to the NPT x 12 mm. Integral solder ring type fitting is not acceptable.

5.0 CHEMICAL PROPERTIES

Chemical composition & mechanical properties of Brass shall be as mentioned in IS:319 Grade-2/ CuZn36Pb2As or CW602N as per EN12164. The material shall be Dezincification- resistant.

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/dm². The test shall be carried out as per clause no. 5.4 and Annexure- A of EN 1254 -1.

7.0 RESISTANCE TO DEZINCIFICATION

The fittings shall be manufactured from alloys containing more than 10% Zinc. Accordingly resistance to dezincification test shall be carried out as per Cl. 5.5 of EN 1254 -1. The acceptance criteria shall be as per Clause 4.5.3.

8.0 STRESS CORROSION RESISTANCE TEST

A stress corrosion resistance is to be carried out on fittings 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 client's logo, manufacturer's name and 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) 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 comply with at the time of delivery.

14.0 INSPECTION / DOCUMENTS

- (i) Inspection shall be carried out as per design codes/standards, Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.
- (ii) Client's representative or third party inspection agency appointed by client/ vendor shall carry out random 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, in ternal test/ inspection reports as per Technical Specification, at the time of final inspection of each supply lot of material.
- (iv) Even after third party inspection, Client 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 Technical specification, then client reserves the rights to reject all production supplied from the batch.
- (v) Vendor s hall prepare and submit the detail drawings of required brass fitting and QAPfor approval by Client/ consultant before starting production.
- (vi) For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter s hall be in formed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

TECHNICAL SPECIFICATION
FOR
ISOLATION & APPLIANCE BALL VALVES

Contents

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1.0 **INTENT OF SPECIFICATION**

The intent of this specification is to establish minimum requirements to manufacture and supply of Isolation & Appliance Ball Valves used for supply of natural gas.

2.0 **SCOPE OF WORK**

2.1 The scope of the tenderer will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of Isolation & Appliance Ball Valves, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in ASME B16.33 and should be approved by any certified agency for Gas application.

2.2 All codes and standards for manufacture, testing, inspection etc. shall be of latest edition.

3.0 **MATERIAL SPECIFICATION**

3.1 Metallic parts of Valves shall be manufactured as per material specified in respective datasheets.
3.2 Lubricants and Sealants. Lubricants and/or sealants shall be resistant to the action of fuel gases such as natural, manufactured, and LP gases. The valve manufacturer is responsible for the selection of lubricants and sealants, and for the determination of their suitability for the service conditions specified in the scope of this Standard.

3.3 Seating and Stem Seal Materials. The valve manufacturer is responsible for selection of seating and stem seal materials and for determination of their suitability for the service conditions specified in the scope of this Standard.

3.4 Air Aging Tests. Elastomer parts that are exposed to fuel gas shall be made from materials that, following 70-hr air aging in accordance with ASTM D573 at 212°F (100°C), meet elongation, tensile, and hardness property requirements as per ASME B16.33.

3.5 Elastomeric components' material shall qualify swell test and compression set tests as per requirement of ASME B16.33.

4.0 **DESIGN AND CONSTRUCTION**

4.1 DESIGN QUALIFICATION: Manufacturer shall qualify the design of the valves as per clauses mentioned below. Relevant documents for establishment of design qualification shall be submitted along with bid.

4.1.1 Each basic valve design shall be qualified and demonstrated as suitable for the service by testing randomly selected production valves of each size, type, and pressure shell material.

4.1.2 Following tests shall be carried out for design qualification as per ASME B 16.33 a) Gas tightness
b) Temperature resistance

- c) Structural tests viz. Strength test, Twist test, Bend Test, Tensile Test, Turning Torque test
- d) Flow Capacity

- 4.2 Production Testing
Each Valve shall be tested to a test pressure of 1.5 times the pressure rating of the valve according to test method of gas tightness. No leakage is permitted during production testing.
- 4.3 Valve ends shall be as specified in respective datasheets.

5.0 Inspection and Testing

- 5.1 Each valve shall be tested for leakage as specified in cl. 4.2 above. Test certificate shall be provided for production testing.
- 5.2 Test certificates for physical and chemical properties of all the components of valves shall be provided as per agreed QA/QC requirements.
- 5.3 Test certificates of all the tests conducted for design qualification as per ASME B16.33 shall be submitted for review.
- 5.4 Type of inspection documents as per EN 10204 shall be as defined in respective QAP/ Datasheet.

6.0 Packing and Marking

- 6.1 Valves shall be marked as mentioned below.
- 6.1.1 The manufacturer's name or trademark and, where space permits, the designation "B16.33." The B16.33 mark is the manufacturer's acknowledgement that the valve was manufactured in conformance with ASME B16.33.
- 6.1.2 Pressure Rating.
- 6.1.3 Open and close indication. when a 1/4 turn valve is in the open or closed position (if flat head, longitudinal axis of the head shall be perpendicular to the longitudinal axis of the valve when valve is in the closed position)
- 6.2 Each Valve shall be packed in individual card board boxes so as to avoid wear and tear during transport.
- 6.3 For threaded end valves, end caps shall be provided.

Data Sheet - Isolation Ball Valve		
S.NO	Description	Details
	Process Data	
1.01	Fluid	Natural Gas
	Operating Condition	
2.01	Pressure	4 Bar (g)
2.02	Temperature (°C)	0-48
	Design Condition	
3.01	Pressure	-
3.02	Temperature (°C)	-29 to 65
	Valve Data	
4.01	Size	1/2" and 3/4"
4.02	Type	Isolation Ball Valve of Full Bore with NPT Female (Confirming to ANSI B1.20.1) as an inlet with operating Knob and locking arrangement with provision for sealing wire and lead seal (without Key).metallic operating Knob for full open/close at 90 position.
4.03	Rating	125#
4.04	End Connections	NPT Female (Confirming to ANSI B1.20.1)
4.05	Body Material	Total Body Including the Nozzle shall be of forged Brass (ASTM B 283, Alloy UNSC37700) with Nickel/ Chrome plated.
4.06	Ball Material	Hard Chrome/ Nickel Plated, ASTM B 283
4.07	Stem	ASTM B283
4.08	Seat	Teflon
4.12	Extension Stem	Not required
4.13	Operator	Butterfly Arrangement
	Painting	
5.01	Surface Preparation	Not Required
5.02	primer	Not Required
5.03	finish	Not Required
5.04	insulation	Not Required
	Test	
	Production Test	-
6.01	Production Test Pressure	1.5 times of design class pressure
6.02	Test Medium	As per ASME B16.33
6.05	Tes duration	15 seconds
Note	1. Lever type handle not acceptable.	
	2. Minimum Nickel/ Chrome Plated on the ball & body of Isolation ball valve shall be 25 micron	
	3. The above specified tests in TS/ Data sheet are minimum however, the other remaining/ specified test shall be done as per ASME B.16.33	

Data Sheet - Appliance Ball Valve		
S.NO	Description	Details
Process Data		
1.01	Fluid	Natural Gas
Operating Condition		
2.01	Pressure	4 Bar (g)
2.02	Temperature (°C)	0-48
Design Condition		
3.01	Pressure	-
3.02	Temperature (°C)	-29 to 65
Valve Data		
4.01	Size	1/2"
4.02	Type	Appliance Ball Valve of Full Bore with ½" NPT (Confirming to ANSI B1.20.1) Female as an inlet and the outlet shall be having Ni/ Cr plated brass or steel a nozzle (Serrated to suit ¼" rubber tubing/ hose connection) and the material is required for Domestic Natural Gas Service with a metallic operating Knob for full open/close at 90° position.
4.03	Rating	125#
4.04	End Connections	Female as an inlet and the outlet shall be having Ni/ Cr plated brass or steel as nozzle
4.05	Body Material	Total Body Including the Nozzle shall be of forged Brass (ASTM B 283, Alloy UNSC37700) with Nickel/ Chrome plated.
4.06	Ball Material	Hard Chrome/ Nickel Plated, ASTM B 283
4.07	Stem	ASTM B283
4.08	Seat	Teflon
4.11	Extension Stem	Not required
4.13	Operator	Knob Arrangement.
Painting		
5.01	Surface Preparation	Not Required
5.02	primer	Not Required
5.03	finish	Not Required
5.04	insulation	Not Required
Test		
Production Test		
6.01	Production Test Pressure	1.5 times of design class pressure
6.02	Test Medium	As per ASME B16.33
6.03	Test duration	15 seconds
Note	1. Minimum Nickel/ Chrome Plated on the ball & body of Isolation ball valve shall be 25 micron	
	2. The above specified tests in TS/ Data sheet are minimum however, the other remaining/ specified test shall be done as per ASME B.16.33	

TECHNICAL SPECIFICATION
FOR WARNING
MATS

SPECIFICATION FOR THE WARNING MATS

Purpose	:	For using as a warning sign for Under Ground Natural Gas Pipeline and HDPE Duct/ OFC
Width	:	150mm for HDPE Duct/ OFC 300mm for Underground Gas Pipeline
Thickness	:	0.25mm thk. for HDPE Duct/ OFC 1.00mm thk. for Underground Gas Pipeline
Material of the mat	:	The material shall be of high density Polyethylene
Colour of the mat	:	Red for HDPE Duct/ OFC Golden Yellow for Underground Gas Pipeline
Art Work	:	A sample piece of 30mm wide and 200mm long of every batch shall be checked by immersing in 20% solution of Ammonium Sulphide for period of 2 weeks at a temperature of 15°C for colour intactness of the strip. Art work would be finalized after placement of order.
Mechanical Properties of HDPE		
Tensile Strength	:	Minimum 1.8 kg/cm ²
Elongation at Break	:	Minimum 125%
Bundle Length	:	1.0mm thick warning mat shall be supplied as 50 mtrs. bundle. 0.25mm thick warning mat shall be supplied as 100 mtrs. each bundle.
Test Certificates	:	Vendor has to submit the all test certificates to Purchaser
Inspection	:	The manufacturer has to submit the QAP and get the sample approved before commencement of production

**HIGHLY INFLAMMABLE GAS PIPELINE BELOW
HARIDWAR NATURAL GAS PRIVATE LIMITED**

**IN EMERGENCY PLEASE CONTACT
PHONE NOS.**

TECHNICAL SPECIFICATION

FOR

FLEXIBLE HOSE PIPE

(Anaconda)

STANDARD TECHNICAL SPECIFICATION
FOR
CORRUGATED FLEXIBLE METAL HOSE
(ANACONDA)

CONTENTS

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2.0	SCOPE OF WORKS
3.0	TECHNICAL SPECIFICATIONS
4.0	TESTING, CLEANING & PACKAGING
5.0	MARKING
6.0	PACKAGING
7.0	INSPECTION / DOCUMENTS

1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of corrugated flexible metal hose used for supply of domestic natural gas.

2.0 SCOPE OF WORKS

The scope of the tender will include manufacture/ supply, inspection, testing, marking, packaging handling and dispatch of corrugated flexible metal hose assembly, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard BS: 6501 Part 1(latest)/ ISO 10380.

All codes and standard for manufacture, testing, inspection etc. shall be of latest edition.

Owner/ Owner's Representative reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 TECHNICAL SPECIFICATIONS

Item : Corrugated Flexible metal Hose Assembly (Type-A flexibility) for Natural Gas Service

Applicable Code : BS: 6501 Part-I: (latest)/ ISO 10380 Specification for Corrugated Hose Assemblies

Nominal Size : DN 12

Total Length of Hose Assembly : 350mm end to end

Movement Required : Static

Medium Flowing through Hose assembly : Natural gas (PNG)

Nominal Pressure/Design Pressure : 0.25 bar (g) at 20°C

Temperature Range : 0–65°C

Cyclic Life : 30 Bends minimum when tested in accordance with Cl.14.2 Of BS: 6501 Part-I (latest)/ ISO 10380.

Static Bend Radius : 25mm

Type & Material of End Fitting : ¾” NPT SS316L Female Swivel Nut with Flat Seat

Nipple with Rubber Gasket / `O` Ring (and second end shall be SS Male ¾” NPT and threads shall be conforming to ANSI B1.20.1 .
Fittings shall be conforming to

SS316L. Note: TIG welding shall be carried out for welding SS fittings to corrugated hose.

Material of rubber gasket : Polymer NBR / nitrile with thickness 3-4 mm

Material of Hose : SS316L, 0.3 mm thickness

Braiding : Not required

Product to be conveyed : Natural Gas

Heat Treatment Requirement : Parent sheet or the finished hose must undergo annealing. The purpose of this is to relieve stress due to cold working.

Surface Coating & welded : No zinc plating is required on SS hose, SS fittings portion. At the welded portion suitable anti rusting provision shall be made. .

4.0 TESTING, CLEANING & PACKAGING

Tests : Pneumatic Test at a pressure of 1.5 kg/cm²(g) & Type testing as per Cl.Nos. 14.1, 14.2, 14.5 & 14.6 of BS: 6501 Part-I (latest)/ ISO 10380

Cleaning & Packaging : As per Cl.No. 17.0 of BS:6501 Part-I (latest)/ ISO 10380

Test Certificate : As per Cl.No. 18.0 of BS:6501 Part-I (latest)/ ISO 10380

5.0 MARKING

Each corrugated flexible metal hose and SS316 fittings shall be embossed with owner's logo, manufacturers name or trade mark BS: 6501 part I (latest)/ ISO 10380 and designation of fittings.

Each packing containing corrugated flexible metal hose shall carry the following stamped or written in indelible ink.

- Indication of the source of manufacture/Trade mark/Type
- Designation of fittings
- Maximum working pressure
- Nominal bore
- Month and year of manufacture

6.0 **PACKAGING**

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured.

Bidder shall submit the packaging details like numbering of pieces per package, along with QAP and also complied with at the time of delivery. One package will consist of one corrugated flexible metal hose assembly (metal hose + end fitting on both sides) & two gaskets for each end.

7.0

INSPECTION / DOCUMENTS

- a) Inspection shall be carried out as per design code/standard, Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by Owner/Owner's representative.
- b) Owner representative or third party inspection agency appointed by owner shall carry out random inspection during manufacturing/ final inspection.
- c) 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 Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.
- d) Even after third party inspection, owner reserves the right to select a sample of flexible metal hose randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in Technical specification, then owner reserves the rights to reject all production supplied from the batch.
- e) 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.
- f) Vendor shall submit the dimensional drawing for Hose, end fittings and Rubber Gasket along with the technical bid.

**SPECIFICATION FOR
QUALITY ASSURANCE SYSTEMS
REQUIREMENTS**

CONTENTS

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ATTACHMENTS

TITLE	NUMBER
FORMAT FOR QUALITY PLAN	FORMAT 00001
FORMAT FOR OBSERVATION ON	FORMAT 00002

1.0 INTRODUCTION

This specification establishes the Quality Assurance Requirements to be met by the sub-contractors (including turnkey Contractors) and their sub-vendors.

In case of any conflict between this specification and other provisions of the contract/ purchase order, the same shall be brought to the notice of HNGPL, at the stage of bidding and shall be resolved with HNGPL, prior to the placement of order.

2.0 DEFINITION

Bidder

For the purpose of this specification, the word "Bidder" means the person(s), firm, company or organisation who is under the process of being contracted by HNGPL/ Owner for delivery of some products (including service). The word is considered synonymous to supplier, contractor or vendor.

Correction

Action taken to eliminate the detected non-conformity.

Refers to repair, rework or adjustment and relates to the disposition of an existing non-conformity.

Corrective Action

Action taken to eliminate the causes of an existing non-conformity, defect or other undesirable situation in order to prevent recurrence.

Preventive Action

Action taken to eliminate the causes of a potential non-conformity, defect or other undesirable situation in order to prevent its recurrence.

Process

Set of inter-related resources and activities which transform inputs into outputs.

Special Process

Processes requiring pre-qualification of their process capability.

3.0 CONTRACTORS SCOPE OF WORK

3.1 Prior to award of contract

The bidder shall understand scope of work, drawings, specifications and standards etc., attached to the tender/ enquiry document, before he makes an offer.

The bidder shall submit milestone chart showing the time required for each milestone activity and linkages between different milestone activities alongwith overall time period required to complete the entire scope of work.

The bidder shall develop and submit manpower and resource deployment chart.

The bidder shall submit, alongwith the bid, a manual or equivalent document describing/ indicating/ addressing various control/ check points for the purpose of quality assurance and the responsibilities of various functions responsible for quality assurance.

3.2 After the award of contract

The bidder shall submit the schedule for submission of following documents in the kick-

off meeting or within two weeks of the placement of order, whichever is earlier.

- Detailed Bar Chart
- Quality plan for all activities, required to be done by the bidder, to accomplish offered scope of work.
- Inspection and test plans, covering various control aspects.
- Job procedures as required by HNGPL/ Owner.
- Procurement schedule for items to be supplied by contractor covering inspection of the same.

Various documents submitted by the bidder shall be finalised in consultation with HNGPL. Here it shall be presumed that once a bidder has made an offer, he has understood the requirements given in this specification and agrees to comply with them in totality unless otherwise categorically so indicated during pre-award stage through agreed deviation/ exception request. All Quality Assurance Plan (QAP) documents shall be reviewed by concerned functional groups of HNGPL and the bidder shall be required to incorporate all comments within the framework of this specification at this stage of the contract. It is also obligatory on the part of the bidder that obtains approval on every Quality Assurance Plan (QAP) documents, before he starts using a particular document for delivery of contracted scope of work. Participation of HNGPL/ Owner in review/ approval of quality plan/ QAP documents does not absolve the contractor of his contractual obligations towards specified and intended use of the product (or service) provided/ to be provided by him under the contract.

3.3 During job execution

During job execution, the bidder shall fully comply with all quality document submitted and finalised/ agreed against the requirements of this specification. Approval of MECO N on all these documents shall be sought before start of work.

Bidder shall produce sufficient quality records on controlled/ agreed form such that requirements given in this specification are objectively/ demonstrable.

Bidder shall facilitate HNGPL/ Owner during quality/ technical audits at his works/ sites.

Bidder shall discharge all responsibilities towards enforcement of this specification on all his sub-contractors for any part of the scope which is sub-contracted.

4.0 QUALITY ASSURANCE SYSTEM REQUIREMENTS

- 4.1 The bidder shall nominate an overall incharge of the contract titled as "Project Manager" for the scope of work of agreed contract. The name of this person shall be duly intimated to HNGPL including all subsequent changes, if any. HNGPL shall correspond only with the project manager of the bidder on all matters of the project. The project manager of the bidder shall be responsible for co-ordination and management of activities with bidder's organisation and all sub-vendors appointed by the bidder.

After award of work, the bidder may review augmentation of manpower and resources deployment chart (submitted earlier), detail it out, if so consented by HNGPL/ Owner and resubmit the same as "issued for effective implementation of the project".

- 4.2 The bidder shall plan the contract scope of work on quality plan format such that no major variation is expected during delivery of contract scope of work. These quality plan shall be made on enclosed format complete in all respect. The quality plan shall be assumed to be detailing bidder's understanding and planning for the contract/ offered scope of work. The bidder shall plan the type of resources including various work methodology which he agrees to utilize for delivery of contract scope of work.
- 4.3 The bidder is required to review the contract at all appropriate stages to evaluate his capabilities with respect to timely and quality completion of all activities pertaining to contracted scope of work and shall report for constraints, if any to HNGPL/ Owner.
- 4.4 The design activities, if any, performed during delivery of contract scope of work shall be so controlled that the outputs is reliable enough. It is expected that during development of design, the bidder shall take recourse to detailed checking, inter departmental reviews and documented verification methods.
- 4.5 For all documents which the bidder is likely to utilise for delivery of contract scope of work, a system must exist which assures that latest/ required version(s) of the document(s) is available at all location/ point of use.
- 4.6 In case the bidder decides to sub-contract any part/ full of the contract scope of work (without prejudice to main Contractual condition), the bidder shall :
- Evaluate the technical and financial capabilities and past performance of the sub-contractor(s) and their products and/ or services before awarding them with the sub-contracted scope of work. Selection of a sub-contractor should meet HNGPL approval in documented form.

Requirement of this specification shall be enforced on sub-contracted agency also. The bidder shall choose sub-contractor based on their capability to meet requirements of this specification also.

Note: It may so happen that, in a given situation, a sub-contractor may not have a system meeting the requirements of this specification. In all such eventualities, bidder may lend his system to sub-contractor for the contract such that sub-contractor effectively meets the requirements of this specification. In all such cases HNGPL shall be duly informed.

- 4.7 Bidder shall establish adequate methodology such that the materials supplied by the

Owner/ HNGPL shall be adequately preserved, handled and made use of for the purpose for which they are provided.

- 4.8 All output delivered against contract scope of work shall be suitably identified in such a manner that either through identification or some other means, sufficient traceability is maintained which permits effective resolution of any problem reported in the outputs.
- 4.9 Critical activities shall be identified and the bidder is required to have documented methodologies which he is going to utilize for carrying out such activities under the contract scope of work. Wherever it is difficult to fully inspect or verify the out put (special process), bidder shall pre-qualify, the performers and methodologies.
- 4.10 All inspections carried out by the bidder's surveillance/ inspection staff shall be conformity to quality plans and/ or inspection and test plans. All inspection results shall be duly documented on controlled/ agreed forms such that results can be co-related to specific product, that was inspected/ tested.
- 4.11 All inspection, measuring & test equipments (IMTEs) shall be duly calibrated as per National/ International standards/ codes and only calibrated and certified IMTEs shall be utilized for delivery of contract scope of work.
- 4.12 All out puts/ products delivered against contract scope of work shall be duly marked such that their inspection status is clearly evident during all stage s/ period of the contract.

All non-conformities (NCs) found by the contractor's inspection/ surveillance staff shall be duly recorded, including their disposal action. The deficiencies observed during stage of the product, shall be recorded and resolved suitably. Effective corrective and preventive action shall be implemented by the bidder for all repetitive NCs, including deficiencies.

- 4.14 All deficiencies noticed by HNGPL/ Owner representative(s) shall be recorded on a controlled form (Format No. 00002). Such deficiencies shall be analysed by the bidder and effective and appropriate correction, corrective and preventive actions shall be implemented. Bidder shall intimate HNGPL/ Owner of all such corrective and preventive action implemented by him.
- 4.15 Bidder s hall establish appropriate methodologies for safe and effective handling, storage, preservation of various materials/ inputs encountered during delivery of contract scope of work.
- 4.16 Bidder shall prepare sufficient records for various processes carried out by him for deli very of contract scope of work such that requirements of this specification are objectively demonstrable. In case HNGPL/ Owner finds that enough objective evidence/ recording is not available f or any particular process, bidder shall be oblige d to make additional records so as to provide sufficient objective evidence.

The decision of HNGPL/ Owner shall be final and binding on such issues.

- 4.17 The bidder shall arrange internal quality audits at quarterly intervals, to independently assess the conformance by various performers to the requirements of this specification. The findings of such assessment shall be duly recorded and a copy shall be sent to HNGPL/ Owner for review.

For all special processes, bidder shall deploy only qualified performers. Wherever HNGPL/ Owner observes any deficiency, the bidder shall arrange the adequate training to the performer(s) before any further delivery of work

OBSERVATION OF QUALITY ASPECTS**FORMAT - 00002**

Job No. and Description		No.		Date:	
Issued to : M/s					
Location of Work : Item of Work :					
Details of Observation(Deficiency)			Recommended Course of Action		
			Time Allowed for Correction :		
Issued by : _____ Name of Signature of , HNGPL Site					
Corrective Action taken report by Contractor/ Vendor :					
Date:		Name and Signature			
Distribution (before resolution) :					
Project Manager Owner	Chief Business Executive HNGPL	HNGPL Inspection		Resident Construction Manager, HNGPL Site	
Verification of Resolution by HNGPL :					
Date:		Name of Signature			
Distribution (before resolution) :					
Project Manager Owner	Chief Business Executive HNGPL	HNGPL Inspection		Resident Construction Manager, HNGPL Site	

FORMAT – 00001

Bidder's Quality Plan		Project Name :				PO/ Contract Ref:				
General		Performing Functions			Inspection Functions			Audit Function		
Activity Description	Procedure Number	Code of Conformance	Performer	Checker	Reviewer/ Approver	Sampling Plan	Testing and Inspection Code	Type of (Approval) Surveillance	Audit Scope	Owner's/ HNGPL Review/ Audit Requirement

Note: 1) The bidder ensures that the filled up format conforms to minimum requirements on Quality Plan/ Quality Assurance, specified by HNGPL on drawings/ standards/ specifications/ write-up.

2) The bidder confirms that document is issued for information/ approval of Owner/ HNGPL for the project implementation

**SPECIFICATION
FOR
HEALTH, SAFETY
AND
ENVIRONMENT (HSE)
MANAGEMENT**

CONTENTS

<u>SL. NO.</u>	<u>DESCRIPTION</u>
1.0	SCOPE
2.0	REFERENCES
3.0	REQUIREMENT OF HEALTH, SAFETY & ENVIRONMENT (HSE) MANAGEMENT SYSTEM TO BE COMPLETED BY BIDDERS.
4.0	DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR
5.0	RECORDS
	ANNEXURE-A
	ANNEXURE-B
	ANNEXURE-C
	ANNEXURE-D
	ANNEXURE-E

1.0

SCOPE

This specification establishes the Healthy, Safety and Environment (HSE) management requirement to be complied with by the Contractors during construction.

This specification is not intended to replace the necessary professional judgement needed to design & implement an effective HSE system for construction activities and the contractor is expected to exceed requirements given in this specification.

Requirement stipulated in this specification shall supplement the requirement of HSE management given in relevant Act (S)/ legislations. General Condition of Contract (GCC) Special Condition of Contract (SCC) and Job Specifications. Where different documents stipulate different requirements, the most stringent shall be adopted.

2.0

REFERENCES

This document should be read in conjunction with following:

- General Conditions of Contract (GCC)
- Special Conditions of Contract (SCC)
- Building and other construction workers (regulation of employment and condition of service) Act, 1996
- Job Specifications
- Relevant IS Codes (refer Annexure-A)
- Reporting Formats (refer Annexure-B)
- Statutory requirements

3.0

REQUIREMENT OF HEALTH, SAFETY & ENVIRONMENT (HSE) MANAGEMENT SYSTEM TO BE COMPLETED BY BIDDERS.

3.1

Management Responsibility

3.1.1

The Contract should have a document HSE policy to cover commitment of the organization to ensure health, safety and environment aspects in their line of operations

3.1.2

The HSE management system of the Contractor shall cover HSE requirement including but not limited to what specified under clause 1.0 & 2.0 mentioned above

3.1.3

Contractor shall be fully responsible for planning and implementing HSE requirement to the satisfaction of the company. Contractor as a minimum requirement shall designate/deploy the following to co-ordinate the above:

No. Of workers deployed
Up to 250

- Designate one safety supervisor who will guide the workers from time to time, as well as impart training basic guidelines at least weekly once.

- | | | |
|--------------------------------------|---|--|
| Above 250 & upto 500 | - | Deploy one qualified and experienced safety Engineer/ Officer who will guide the workers from time to time as well as impart basic guideline & training at least weekly once. He / She shall possess a recognized Degree in any branch of engineering or technology or architecture and had a post qualification construction experience of minimum two years or possess a recognized Diploma in any branch of engineering or technology or Graduate in Science stream and had a post qualification construction experience of minimum five years. |
| Above 500
(for every 500 or less) | - | One additional safety engineer/Officer whose function will be as mentioned above |

Contractor shall indemnify and hold harmless OWNER/ HNGPL & their representative's from any and all liabilities arising out of non fulfillment of HSE requirements.

Above is the minimum requirement and the Contractor shall ensure physical presence of a safety personnel at each place where Hot work permit is required. No work shall be started at site until above safety personnel are physically present at site. The contractor shall submit a safety organogram clearly indicating the lines of responsibility and reporting system. He shall furnish Bio-Data/Resume/Curriculum Vitae of the safety personnel he intends to mobilize, at least 1 month before the intended mobilization, for HNGPL/Owner's approval.

- 3.1.4 The Contractor shall ensure that the Health, Safety and Environment (HSE) requirements are clearly understood & faithfully implemented at all levels, at each and every site/ work place.
- 3.1.5 The Contractor shall promote and develop consciousness for Health, Safety and Environment among all personnel working for the Contractor. Regular awareness programs and fabrication shop/work site meeting shall be arranged on HSE activities to cover hazards involved in various operations during construction.
- 3.1.6 Arrange suitable first aid measures such as First Aid Box, trained personnel to give First Aid, Stand by Ambulance or Vehicle and install fire protection measures such as: adequate number of steel buckets with sand and water and adequate fire extinguishers to the satisfaction of OWNER/ HNGPL. In case the number of workers exceeds 500, the Contractor shall position an ambulance /vehicle on full time basis very close to the worksite.
- 3.1.7 The Contractor shall evolve a comprehensive planned and documented system for implementation and monitoring of the HSE requirements. This shall submitted to OWNER & HNGPL for approval well in advance, prior to start of work. The monitoring for implementation shall be done by regular inspection and compliance to the observations thereof. The Contractor shall get similar HSE requirements implemented at his sub-contractor (s) work site/ Office. However, compliance of HSE requirement shall be the sole responsibility of the Contractor. Any review/ approval by OWNER/ HNGPL shall not absolve the Contractor of his responsibility/ liability in relation to all HSE requirements.

3.1.8 Non-Conformance on HSE by the Contractor (including his Sub-contractors) as brought out during review/ audit by HNGPL/ OWNER representative shall be resolved forthwith by Contractor. Compliance report shall be possibility submitted to HNGPL/ OWNER at the earliest.

3.1.9 The Contractor shall ensure participation of his Resident Engineer/Site-in-Charge in the Safety Committee/HSE Committee meetings arranged by OWNER/ HNGPL. The compliance of any observation shall be arranged urgently. Contractor shall assist OWNER/HNGPL to achieve the targets set by them on HSE during the project implementation.

The contractor shall ensure that his staff members & workers (permanent as well casual) shall not be in a state of intoxication during working hours and shall abide by any law relating to consumption & possession of intoxicating drinks or drugs in force. Awareness about local laws on this issue shall form part of the Induction Training.

The contractor shall ensure that all personnel working for him comply with No- smoking requirements of the owner as notified from time to time. Cigarettes, lighters, auto ignition tools or appliances shall not be allowed inside the plant complex. Smoking shall be permitted only inside smoking booths expressly designated & authorized by the Owner/HNGPL.

3.1.10 The Contractor shall adhere consistently to all provisions of HSE requirements. In case of non-compliance or continuous failure in implementation of any of HSE provisions; OWNER/ HNGPL may impose stoppage of work without any Cost & Time implication to Owner and/or impose a suitable penalty for non-compliance with a notice of suitable period, upto a cumulative limit of 1.0% (one percent) of Contract value with a ceiling of Rs. 10 lakhs.

0.2% (Zero decimal two percent) of the contract value for LSTK, EPC, EPCC or Package contracts with an overall ceiling of Rs. 1,00,00,000/- (Rupees one crore).

S. No.	Violation or HSE norms	Penalty Amount
1.	For not using personal protective equipment (Helmet, Shoes, Goggles, Gloves, Full body harness, Face shield, Boiler suit, etc.)	Rs. 250/- per day / item / person
2.	Working without Work Permit / Clearance	Rs.5,000/- per occasion

S. No.	Violation or HSE norms	Penalty Amount
3.	Unsafe electrical practices (not installing ELCB, using poor joints of cables, using naked wire without top plug into socket, laying wire / cables on the roads, electrical jobs by incompetent person, etc.)	Rs.3,000/- per item per day.
4.	Working at height without full body harness, using non-standard / rejected scaffolding and not arranging fall protection arrangement as required like Safety Nets.	Rs.1,000/ per case per day.
5.	Unsafe handling of compressed gas cylinders (No trolley, jubilee clips double gauge regulator, improper storage / handling).	Rs. 100/- per item per day
6.	Use of domestic LPG for cutting purpose.	Rs.1,000/- per occasion
7.	No fencing / barricading of excavated areas.	Rs.1,000/- per occasion
8.	Not providing shoring / strutting / proper slope and not keeping the excavated earth at least 1.5 M away from excavated area.	Rs.5,000/- per occasion
9.	Non display of caution boards, list of hospitals, emergency services available at work locations.	Rs.500/- per occasion
10.	Traffic rules violations like over speeding of vehicles, rash driving, wrong parking, not using seat belts, vehicles not fitted with reverse warning alarms.	Rs.1,000/- per occasion
11.	Absence of Contractor's top most executive at site in the safety meetings whenever called by HNGPL / Owner	Rs.1,000/- per occasion
12.	Failure to maintain safety records by Contractor Safety personnel.	Rs.1,000/- per month.
13.	Failure to conduct daily safety site inspection, HSE meeting and HSE audit at predefined frequencies.	Rs.1,000/- per occasion
14.	Failure to submit the monthly HSE report by 5 th of subsequent month to Engineer-in-Charge.	Rs. 1,000/- per occasion and Rs. 100/- per day for further delay.
15.	Poor House Keeping	Rs.1,000/- per occasion
16.	Failure to report & follow up accident (including Near Miss) reporting system.	Rs. 10,000/- per occasion

S. No.	Violation or HSE norms	Penalty Amount
17.	Degradation of environment (not confining toxic spills oil / lubricants onto ground)	Rs.1,000/- per occasion
18.	Not medically examining the workers before allowing them to work at height, not providing ear muffs while allowing them to work in noise polluted areas, made them to work in air polluted areas without respiratory protective devices, etc.	Rs.1,000/- per occasion
19.	Violation of any other safety condition as per job HSE plan, work permit and HSE conditions of contract (using crowbar on cable trenches, improper welding booth, not keeping fire extinguisher ready at hot work site, unsafe rigging practices, non-availability of First-Aid box, etc.)	Rs.1,000/- per occasion
20.	Any violation not covered above.	To be decided by HNGPL / Owner

This penalty shall be in addition to all other penalties specified else where in the contract. The decision of imposing stoppage of work, its extent & monetary penalty shall rest with HNGPL/OWNER & binding on the Contractor.

3.1.11 All fatal accidents and other personnel accidents shall be investigated by a team of Contractor's senior personnel for root cause and recommend corrective and preventive actions. Findings shall be documented and suitable actions taken to avoid recurrences shall be communicated to OWNER / HNGPL. OWNER / HNGPL shall have the liberty to independently investigate such occurrences and Contractor shall extend all necessary help and co-operation in this regard. HNGPL / Owner shall have the right to share the content of this report with the outside world.

3.2 House Keeping

3.2.1 Contractor shall ensure that a high degree of house keeping is maintained and shall ensure the followings:

- a. All surplus earth and debris are removed/disposed off from the working site to identified location (s).
- b. Unused/Surplus Cables Steel items and steel scrap lying scattered at different places within the working areas are removed to identified location (s).
- c. All wooden scrap, empty wooden cable drums and other combustible packing materials shall be removed from work place to identified location(s).

- d. Roads shall be kept clear and materials like pipes, steel, sand, boulders, concrete chips and bricks, etc. shall not be allowed in the roads to obstruct free movement of men & machineries.
- e. Fabricated steel structurals, pipes & piping materials shall be stacked properly for erection.
- f. Water logging on roads shall not be allowed.
- g. No parking of trucks/ trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movements.
- h. Utmost care shall be taken to ensure overall cleanliness and proper upkeep of the working areas.
- i. Trucks carrying sand, earth and pulverized materials etc. shall be covered while moving within the plant areas.
- j. The contractor shall ensure that the atmosphere in plant area and on roads is free from particulate matter like dust, sand, etc. by keeping the top surface wet for ease in breathing.
- k. At least two exits for any unit area shall be assured at all times.

3.3

Healthy, Safety and Environment

- a) The Contractor shall provide safe means of access to any working place including provision of suitable and sufficient scaffolding at various stages during all operations of the work for the safety of his workmen, and OWNER/ HNGPL. Contractor shall ensure deployment of appropriate equipment and appliances for adequate safety and healthy of the workmen and protection of surrounding areas.

Contractor shall ensure identification of all Occupational Health, Safety & Environmental hazards in the type of work he is going to undertake and enlist mitigation measures. Contractor shall carry out Job Safety Analysis (JSA) specifically for high risk jobs like working at height & in confined space, deep excavations, radiography jobs, electrical installations, blasting operations, demolishing / dismantling activities, welding / gas cutting jobs and submit the findings to HNGPL / Owner. The necessary HSE measures devised shall be in place prior to start of an activity by the contractor.

- b) The Contractor shall ensure that all their staff workers including their sub- Contractor (s) shall wear Safety Helmet and Safety shoes. Contractor shall also ensure use of safety belt, protective goggles, gloves etc. by the personnel as per jobs requirements. All these gadgets shall conform to relevant IS specification equivalent.

The Contractor shall ensure that all their staff, workers and visitors including their sub-contractor(s) have been issued (records to be kept) & wear appropriate PPEs like nape strap type safety helmets preferably with head & sweat band with ¾" cotton chin strap (made of industrial HDPE), safety shoes with steel toe cap and antiskid sole, full body harness (CE marked and conforming to EN361), protective goggles, gloves, ear muffs, respiratory protective devices, etc. All these gadgets shall conform to applicable IS Specifications / CE or other applicable international standards.

Owner may issue a comprehensive color scheme for helmets to be used by various agencies. The Contractor shall follow the scheme issued by the owner. All Safety / Fire personnel shall preferably wear red colour helmet so that workmen can approach them for guidance during emergencies.

For shot blasting, the usage of protective face shield and helmets, gauntlet and protective clothing is mandatory.

For offshore jobs/contracts, contractor shall provide PPEs (new) to HNGPL & Owner's personnel, at his (contractor's) cost. All personnel shall wear life jacket at all time.

An indicative list of HSE standards/codes is given under Appendix-A.

The contractor shall issue height permit for working at height after verifying and certifying the checkpoints as specified in the attached permit (Format No. HSE-6). He shall also undertake to ensure compliance to the conditions of the permit during the currency of the permit including adherence to personal protective equipments.

The permit shall be issued initially for one week or expected duration of an activity and extended further for the balance duration. This permit shall be applicable in areas where specific clearance from Owner's operation Deptt. / Safety Deptt. is not required. HNGPL field Engineers / Safety Officers / Area Coordinators may verify and counter sign this permit (as an evidence of verification) during the execution of the job.

In case work is undertaken without taking sufficient precautions as given in the permit, HNGPL Engineers may cancel the permit and stop the work till satisfactory compliance is arranged. Contractors are expected to maintain a register for issuance of permit and extensions thereof including preserving the used permits for verification during audits etc.

Contractor shall arrange (at his cost) and ensure use of Fall Arrester Systems by his workers. Fall arresters are to be used while climbing / descending tall structures. These arresters should lock automatically against the anchorage line, restricting free fall of the user. The device is to be provided with a double security opening system to ensure safe attachment or release of the user at

any point of rope. In order to avoid shock, the system should be capable of keeping the person in vertical position in case of a fall.

Contractor shall ensure that Full body harnesses conforming EN361 and having authorized CC marking is used by all personnel while working at height. The lanyards and life lines should have enough tensile strength to take the load of the worker in case of a fall. One end of the lanyard shall be firmly tied with the harnesses and the other end with life line. The harness should be capable of keeping the workman vertical in case of a fall, enabling him to rescue himself.

Contractor shall provide Roof Top Walk Ladders for carrying out activities on sloping roofs in order to reduce the chances of slippages and falls.

- c) Contractor shall ensure that a proper Safety Net System shall be used at appropriate locations. The safety net shall be located not more than 30 feet (9.0 metres) below the working surface at site to arrest or to reduce the consequences of possible fall of persons working at different heights.
- d) Contractor shall ensure that flash back arrestors conforming to BS:6158 or equivalent are installed on all gas cylinders as well as at the torch end of the gas hose, while in use. All cylinders shall be mounted on trolleys and provided with a closing key. The burner and the hose placed downstream of pressure reducer shall be equipped with Flash Back Arrestor / Non Return Valve device. The hoses for acetylene and oxygen cylinders must be of different colours. Their connections to cylinders and burners shall be made with a safety collar. At end of work, the cylinders in use shall be closed and hoses depressurized. All welding machines shall have effective earthing. In order to help maintain good housekeeping, and to reduce fire hazard, live electrode bits shall be contained safely and shall not be thrown directly on the ground.
- e) The Contractor shall assign to his workmen, tasks commensurate with their qualification, experience and state of health for driving of vehicles, handling and erections of materials and equipment's. All lifting equipments shall be tested certified for its capacity before use. Adequate and suitable lighting at every work place and approach there to shall be provided by the contractor before starting the actual work/operation at night.

Contractor shall ensure installation of Safe Load Indicator (SLI) on all cranes (while in use) to minimize overloading risk. SLI shall have capability to continuously monitor and display the load on the hook, and automatically compare it with the rated crane capacity at the operating condition of the crane. The system shall also provide visual and audible warnings at set capacity levels to alert the operator in case of violations.

The contractor shall be responsible for safe operations of different equipments mobilized and used by him at the workplace like transport

vehicles, engines, cranes, mobile ladders, scaffoldings, work tools, etc.

- f) Hazardous and/or toxic material such as solvent coating or thinners shall be stored in appropriate containers.
- g) All hazardous materials shall be labeled with the name of the materials, the hazards associated with its use and necessary precautions to be taken.

The work place shall be checked prior to start of activities to identify the location, type and condition of any asbestos materials which could be disturbed during the work. In case asbestos material is detected, usage of appropriate PPEs by all personnel shall be ensured and the matter shall be reported immediately to HNGPL / Owner.

- h) Contractor shall ensure that during the performance of the work all hazards to the health of personnel have been identified assessed and eliminated.
- i) Chemical spills shall be contained & cleaned up immediately to prevent further contamination.
- j) All personnel exposed to physical agents such as ionizing or non-ionizing radiation ultraviolet rays or similar other physical agents shall be provided with adequate shielding or protection commensurate with type of exposure involved. For ionizing radiation, requirements of Bhabha Atomic Research Centre (BARC)/ Atomic Energy Regulatory Board (AERB) shall be followed.
- k) Where contract or exposure of hazardous materials could exceed limits or could otherwise have harmful affects, appropriate personal protective equipment's such as gloves, goggles, aprons, chemical resistant clothing and respirator shall be used.
- l) Contractor shall ensure the following facilities at work sites:
 - l) A Crèche where 10 or more female workers are having children below the age of 6 years.

II) Reasonable Canteen facilities are made available at appropriate location depending upon site conditions.

- m) Suitable facilities for toilet, drinking water, proper lighting shall be provided at site and labor camps, commensurate with applicable Laws/Legislation.
- n) Contractor shall ensure storage and utilization methodology of material that are not detrimental to the environment. Wherever required Contractor shall ensure that only the environment friendly material are selected.

Emphasize on recycling of waste materials such as metals, plastics, glass, paper, oil & solvents. The waste that can not be minimized, reused or

recovered shall be stored and disposed of safely. In no way, toxic spills shall be allowed to percolate into the ground. The contractor shall not use the empty areas for dumping the wastes.

- o) All person deployed at site shall be knowledgeable of and comply with the environmental laws, rules & regulation relating to the hazardous materials substance and wastes. Contractor shall not dump, release or otherwise discharge or dispose off any such materials without the authorization of OWNER/ HNGPL.

Suitable scaffoldings shall be provided to workmen for all works that cannot be safely done from the ground or from solid construction except such short period work that can be safely done using ladders. When a ladder is used, an extra workman shall be engaged for holding the ladder.

The contractor shall ensure that the scaffolds used during construction activities shall be strong enough to take the designed load. Owner / HNGPL reserves the right to ask the contractor to submit certification and or design calculations from his Engineering regarding load carrying capacity of the scaffoldings.

All scaffolds shall be inspected by a Scaffolding Inspector of the contractor. He shall paste a GREEN tag on each scaffold found safe and a RED tag on each scaffold found unsafe. Scaffolds with GREEN tag only shall be permitted to be used and RED ones shall immediately be removed from the site.

All electrical installations / connections shall be carried out as per the provisions of latest revision of following codes/standards, in addition to the requirements of Statutory Authorities and IE / applicable international rules & regulations:

- OISO SID 173 : Fire prevention & protection system for electrical installations
- SP 30 (BIS) : National Electric Code

All electrical installations shall be approved by the concerned statutory authorities.

- The contractor shall meet the following requirements:
 - i) Ensure that electrical systems and equipment including tools & tackles used during construction phase are properly selected, installed, used and maintained as per provisions of the latest revision of the Indian Electrical / applicable international regulations.
 - ii) Shall deploy qualified & licensed electricians for proper & safe installation and for regular inspection of construction power

distribution system / points including their earthing. A copy of the license shall be submitted to HNGPL / Owner for records. Availability of at least one competent licensed electrician shall be ensured at site round the clock to attend to the normal / emergency jobs.

- iii) All switchboards / welding machines shall be kept in well-ventilated & covered shed. The shed shall be elevated to avoid water logging. No flammable materials shall be used for constructing the shed. Also flammable materials shall not be stored in and around electrical equipment / switchboard. Adequate clearances and operational space shall be provided around the equipment.
 - iv) Fire extinguishers and insulating mats shall be provided in all power distribution centers.
 - v) Temporary electrical equipment shall not be employed in hazardous area without obtaining safety permit.
 - vi) Proper house keeping shall be done around the electrical installations.
 - vii) All temporary installations shall be tested before energising, to ensure proper earthing, bonding, suitability of protection system, adequacy of feeders/cables etc.
 - viii) All welders shall use hand gloves irrespective of holder voltage.
 - ix) Multilingual (Hindi, English and local language) caution boards, shock treatment charts and instruction plate containing location of isolation point for incoming supply, name & telephone No. of contact person in emergency shall be provided in substations and near all distribution boards / local panels.
 - x) Operation of earth leakage device shall be checked regularly by temporarily connecting series test lamp (2 bulbs of equal rating connected in series) between phase and earth.
 - xi) Regular inspection of all installations (at least once in a month)
- The following features shall also be ensured for all electrical installations during construction phase by the contractor:
 - i) Each installation shall have a main switch with a protective device, installed in an enclosure adjacent to the metering point. The operating height of the main switch shall not exceed 1.5 M. The main switch shall be connected to the point of supply by means of armoured cable.
 - ii) The outgoing feeders shall be double or triple pole switches with fuses / MCBs. Loads in a three phase circuit shall be balanced as far as

possible and load on neutral should not exceed 20% of load in the phase.

- iii) The installation shall be adequately protected against overload, short circuit and earth leakage by the use of suitable protective devices. Fuses wherever used shall be HRC type. Use of rewirable fuses shall be strictly prohibited. The earth leakage device shall have an operating current not exceeding 30 mA.
- iv) All connections to the hand tools / welding receptacles shall be taken through proper switches, sockets and plugs.
- v) All single phase sockets shall be minimum 3 pin type only. All unused sockets shall be provided with socket caps.
- vi) Only 3 core (P+N+E) overall sheathed flexible cables with minimum conductor size of 1.5 mm² copper shall be used for all single phase hand tools.
- vii) Only metallic distribution boxes with double earthing shall be used at site. No wooden boxes shall be used.
- viii) All power cables shall be terminated with compression type cable glands. Tinned copper lugs shall be used for multistrand wires / cables.
- ix) Cables shall be free from any insulation damage.
- x) Minimum depth of cable trench shall be 750 mm for MV & control cables and 900 mm for HV cables. These cables shall be laid over a sand layer and covered with sand, brick & soil for ensuring mechanical protection. Cables shall not be laid in waterlogged area as far as practicable. Cable route markers shall be provided at every 25 M of buried trench route. When laid above ground, cables shall be properly cleated or supported on rigid poles of atleast 2 M high. Minimum head clearance of 6 meters shall be provided at road crossings.
- xi) Under ground road crossings for cables shall be avoided to the extent feasible. In any case no under ground power cable shall be allowed to cross the roads without pipe sleeve.
- xii) All cable joints shall be done with proper jointing kit. No taped / temporary joints shall be used.
- xiii) An independent earthing facility should preferably be established within the temporary installation premises. All appliances and

equipment shall be adequately earthed. In case of armoured cables, the armour shall be bonded to the earthing system.

- xiv) All cables and wire rope used for earth connections shall be terminated through tinned copper lugs.
- xv) In case of local earthing, earth electrodes shall be buried near the supply point and earth continuity wire shall be connected to local earth plate for further distribution to various appliances. All insulated wires for earth connection shall have insulation of green colour.
- xvi) Separate core shall be provided for neutral. Earth / Structures shall not be used as a neutral in any case.
- xvii) ON/OFF position of all switches shall be clearly designated / painted for easy isolation in emergency.

The contractor shall identify all operations that can adversely affect the health of its workers and issue & implement mitigation measures.

For surface cleaning operations, sand blasting shall not be permitted even if not explicitly stated elsewhere in the contract.

To eliminate radiation hazard, Tungsten electrodes used for Gas Tungsten Arc Welding shall not contain Thorium.

Appropriate respiratory protective devices shall be used to protect workmen from inhalation of air borne contaminants like silica, asbestos, gases, fumes, etc.

Workmen shall be made aware of correct methods for lifting, carrying, pushing & pulling of heavy loads. Wherever possible, manual handling shall be replaced by mechanical lifting equipments.

For jobs like drilling / demolishing / dismantling where noise pollution exceeds the specified limit of 85 decibels, ear muffs shall be provided to the workers.

To avoid upper limb disorders and backaches, Display Screen Equipments' workplace stations shall be carefully designed & used with proper sitting postures. Power driven hand-held tools shall be maintained in good working condition to minimize their vibrating effects and personnel using these tools shall be taught how to operate them safely & how to maintain good circulation in hands.

The contractor shall arrange health check up for all the workers at the time of induction. Health check may have to be repeated if the nature of duty assigned to him is changed necessitating health check or doubt arises about his wellness. HNGPL / Owner reserve the right to ask the contractor to submit test reports.

Weather Protection

Contractor shall take appropriate measures to protect workers from severe storms, solar radiations, poisonous gases, dust, etc. by ensuring proper usage of PPEs like Sun glasses, Sun screen lotions, respirators, dust masks, etc. and rearranging / planning the construction activities to suit the weather conditions.

Communication

All persons deployed at the work site shall have access to effective means of communication so that any untoward incident can be reported immediately and assistance sought by them.

All health & safety information shall be communicated in a simple & clear language easily understood by the local workforce.

Unsuitable Land Conditions

Contractor shall take appropriate measures and necessary work permits / clearances if work is to be done in or around marshy areas, river crossings, mountains, monuments, etc.

Under Water Inspection

Contractor shall ensure that boats and other means used for transportation, surveying & investigation works shall be certified seaworthy by a recognized classification society. It shall be equipped with all life saving devices like life jackets, adequate fire protection arrangements and shall possess communication facilities like cellular phones, wireless, walkie-talkie. All divers used for seabed surveys, underwater inspections shall have required authorized license, suitable life saving kit. Number of hours of work by divers shall be limited as per regulations. HNGPL / Owner shall have the right to inspect the boat and scrutinize documents in this regard.

TOOL BOX MEETING (TBM)

Contractor shall conduct daily TBM with workers prior to start of work and shall maintain proper record of the meeting. A suggested format is given below. The TBM is to be conducted by the immediate supervisor of the workers.

TOOLBOX MEETING RECORDING SHEET

Date & Time		
Subject Presenter		
Hazards involved		
Precautions to be taken		
Worker's Name	Signature	Section
Remarks, if any		

The topics during TBM shall include

- Hazards related to work assigned on that day and precautions to be taken.
- Any forthcoming HSE hazards / events / instruction / orders, etc.

The above record can be kept in local language, which workers can read. These records shall be made available to HNGPL / Owner whenever demanded.

TRAINING

Contractor shall ensure that all his personnel possess appropriate training to carry out the assigned job safely. The training should be imparted in a language understood by them and should specifically be trained about

- Potential hazards to which they may be exposed at their workplace
- Measures available for prevention and elimination of these hazards

The topics during training shall cover, at the minimum;

- Education about hazards and precautions required
- Emergency and evacuation plan
- HSE requirements
- Fire fighting and First-Aid
- Use of PPEs
- Local laws on intoxicating drinks, drugs, smoking in force

Records of the training shall be kept and submitted to HNGPL / Owner whenever demanded.

For offshore and jetty jobs, contractor shall ensure that all personnel deployed have undergone a structured sea survival training including use of lifeboats, basket landing, use of radio communication etc. from an agency acceptable to Owner / HNGPL.

INSPECTION

The contractor shall carryout daily HSE inspection and record observations at a central location. These inspection records shall be freely accessible to Owner / HNGPL representatives. The contractor shall also assist Owner / HNGPL representatives during the HSE inspections conducted by them.

ADDITIONAL SAFETY REQUIREMENTS FOR WORKING INSIDE A RUNNING PLANT

As a minimum, the contractor shall ensure adherence to following safety requirements while working in or in the close vicinity of an operating plant :

- a) Contractor shall obtain permits for Hot work, Cold work, Excavation and Confined Space from Owner in the prescribed format.
- b) The contractor shall monitor, record and compile list of his workers entering the operational plant/unit each day and ensure & record their return after completing the job.
- c) Contractor's workers and staff members shall use designated entrances and proceed by designated routes to work areas only assigned to them. The workers shall not be allowed to enter units' area, tanks area, pump rooms, etc. without work authorization permit.
- d) Work activities shall be planned in such a way so as to minimize the disruption of other activities being carried out in an operational plant / unit and activities of other contractors.
- e) The contractor shall submit a list of all chemicals / toxic substances that are intended to be used at site and shall take prior approval of the Owner.
- f) Specific training on working in a hydrocarbon plant shall be imparted to the work force and mock drills shall be carried out for Rescue operations / First-Aid measures.
- g) Proper barricading / cordoning of the operational units / plants shall be done before starting the construction activities. No unauthorized person shall be allowed to trespass. The height and overall design of the barricading structure shall be finalized in consultation with the Owner and shall be got approved from the Owner.
- h) Care shall be taken to prevent hitting underground facilities such as electrical cables, hydrocarbon piping during execution of work.
- i) Barricading with water curtain shall be arranged in specific/critical areas where hydrocarbon vapors are likely to be present such as near horton spheres or tanks. Positioning of fire tenders (from owner) shall also be ensured during execution of critical activities.

- j) Emergency evacuation plan shall be worked out and all workmen shall be apprised about evacuation routes. Mock drill operations may also be conducted.
- k) Flammable gas test shall be conducted prior to any hot work using appropriate measuring instruments. Sewers, drains, vents or any other gas escaping points shall be covered with flame retardant tarpaulin.
- l) Respiratory devices shall be kept handy while working in confined zones where there is a danger of inhalation of poisonous gases. Constant monitoring of presence of Gas / Hydrocarbon shall be done.
- m) Clearance shall be obtained from all parties before starting hot tapping, patchwork on live lines and work on corroded tank roof.
- n) Positive isolation of line/equipment by blinding for welding/cutting/grinding shall be done. Closing of valve will not be considered sufficient for isolation.
- o) Welding spatters shall be contained properly and in no case shall be allowed to fall on the ground containing oil. Similar care shall be taken during cutting operations.
- p) The vehicles, cranes, engines, etc. shall be fitted with spark arresters on the exhaust pipe and got it approved from Safety Department of the Owner.
- q) Plant air should not be used to clean any part of the body or clothing or use to blow off dirt on the floor.
- r) Gas detectors should be installed in gas leakage prone areas as per requirement of Owner's plant operation personnel.
- s) An experienced full time safety personnel shall be exclusively deployed to monitor safety aspects in running plants.

HSE PROMOTION

The contractor shall encourage his workforce to promote HSE efforts at workplace by way of organizing workshops / seminars / training programmes, celebrating HSE awareness weeks & National Safety Day, conducting quizzes & essay competitions, distributing pamphlets, posters & material on HSE, providing incentives for maintaining good HSE practices and granting bonus for completing the job without any lost time accident.

4.0 DETAILS OF HSE MANAGEMENT SYSTEM BY CONTRACTOR

4.1 On Award of Contract

The Contractor shall prior to start of work submit his Health, Safety and Environment Manual of procedure and HSE Plans for approval by OWNER/HNGPL. The Contractor shall participate in the pre-start meeting with OWNER/HNGPL to finalize HSE plans including the following.

- Job procedure to be followed by Contractor for activities covering Handling of equipment's, Scaffolding, Electric Installation, describing the risks involved, actions to be taken and methodology for monitoring each.
- Organizations structure alongwith responsibility and authority records/ reports etc. on HSE activities.

4.2 During job execution

4.2.1 Implement approved Health, Safety and Environment management procedure including but not limited to as brought our under para 3.0. Contractor shall also ensure to:

- Arrange workmen compensation insurance, registration under ESI Act, third party liability insurance etc. as applicable.
- Arrange all HSE permits before start of activities (as applicable) like her work, confined space, work at heights, storage of Chemicals/explosives materials and its use and implement all precautions mentioned therein
- Submit timely the completed check list on HSE activities, Monthly HSE report, accident report, investigation report, etc. as per OWNER/HNGPL requirements. Compliance of instructions on HSE shall be done by Contractor and informed urgently to OWNER/HNGPL.
- Ensure that resident Engineers/Site-In-Charge of the Contractor shall amend all the Safety Committee/HSE meeting arranged by OWNER/ HNGPL only in case of his absence from site, a seconds senior most person shall be nominated by him in advance and communicated to OWNER/HNGPL.
- Display at site office and work locations caution boards, list of hospitals for emergency services available.
- Provided posters, banners, for safe working to promote safety consciousness
- Carryout audits/inspection at sub Contractor work as per approved HSE documents & submit the reports for OWNER/HNGPL review.

- Assist in HSE audits by OWNER/ HNGPL and submit compliance report.
- Generate & submit HSE records/ reports as per HSE Plan.
- Appraise OWNER/HNGPL on HSE activities at site.

5.0

RECORDS

At the minimum, the contractor shall maintain/ submit HSE records in the following reporting formats:

1.	Monthly HSE Checklist cum compliance report	HSE-1
2.	Accident / Incident Report	HSE-2
3.	Supplementary Accident / Incident Investigation report	HSE-3
4.	Near Miss Incident Report	HSE-4
5.	Monthly HSE Report	HSE-5
6.	Permit for working at height	HSE-6
7.	Permit for working in confined space	HSE-7
8.	Permit for radiation work	HSE-8
9.	Permit for demolishing / dismantling	HSE-9

A I.S. CODES ON HSE

SP:53	Safety code for the use, Care and protection of hand operated tools.
IS: 818	Code of practice for safety and health requirements in electric and gas welding and cutting operations
IS: 1179	Eye and Face precautions during welding, equipment etc.
IS: 1860	Safety requirements for use, care and protection of abrasive grinding wheels.
IS: 1989(Part-I & II)	Leather safety boots and shoes
IS: 2925	Industrial Safety Helmets
IS: 3016	Code of practice for fire safety precautions in welding and cutting operations.
IS: 3043	Code of practice for earthing.
IS: 3764	Code of safety for excavation work
IS: 3786	Methods for computation of frequency and severity rates for industrial injuries and classification of industrial accidents.
IS: 3996	Safety Code of scaffolds and ladders.
IS: 4082	Recommendation on stacking and storage of construction materials and components at site.
IS: 4770	Rubber gloves for electrical purposes
IS: 5121	Safety code for piling and other deep foundations
IS: 5216 (Part-I)	Recommendations on Safety procedures and practices in electrical works
IS: 5557	Industrial and Safety rubber lined boots.
IS: 5983	Eye protectors
IS:6519	Selection, care and repair of Safety footwear
IS: 6994 (Part-I)	Industrial Safety Gloves (Leather & Cotton Gloves)
IS: 7293	Safety Code for working with construction Machinery

IS: 8519	Guide for selection of industrial safety equipment for body protection
IS: 9167	Ear protectors
IS: 11006	Flash back arrestor (Flame arrestor)
IS:11016	General and safety requirements for machine tools and their operation
IS: 11057	Specification for Industrial safety nets
IS: 11226	Leather safety footwear having direct moulded rubber sole
IS: 11972	Code of practice for safety precaution to be taken when entering a sewerage system
IS: 13367	Code of practice-safe use of cranes
IS: 13416	Recommendations for preventive measures against hazards at working place

B. INTERNATIONAL STANDARDS ON HSE

Safety Glasses	:	ANSI Z 87.1, ANSI ZZ 87.1, AS 1337, BS 2092, BS 1542, BS 679, DIN 4646 / 58211
Safety Shoes	:	ANSI Z 41.1, AS 2210, EN 345
Hand Gloves	:	BS 1651
Ear Muffs	:	BS 6344, ANSI S 31.9
Hard Hat	:	ANSI Z 89.1 / 89.2, AS 1808, BS 5240, DIN 4840
Goggles	:	ANSI Z 87.1
Face Shield	:	ANSI Z 89.1
Breathing Apparatus	:	BS 4667, NIOSH
Welding & Cutting	:	ANSI Z 49.1
Safe handling of compressed Gases in cylinders	:	P-1 (Compressed Gas Association 1235 Jefferson Davis Highway, Arlington VA 22202 – USA)

DETAILS OF FIRST AID BOX

SL. NO	DESCRIPTION	QUANTITY
1.	Small size Roller Bandages, 1 inch wide (Finger Dressing small)	6 Pcs.
2.	Medium size Roller Bandages, 2 inch wide (Hand and Foot Dressing)	6 Pcs.
3.	Large size Roller Bandages, 4 inch wide (Body Dressing Large)	6 Pcs.
4.	Large size Burn Dressing (Burn Dressing Large)	4 Pkts.
5.	Cotton wool (20 gms packing)	4 Pkts.
6.	Antiseptic Solution Dettol (100 ml.) or Savlon	1 Bottle
7.	Mercurochrome Solution (100 ml.) 2% in water	1 Bottle
8.	Ammonia Solution (20 ml.)	1 Bottle
9.	A Pair of Scissors	1 Piece
10.	Adhesive Plaster (1.25 cm x 5 m)	1Spool
11.	Eye pads in Separate Sealed Packet	4 Pcs.
12.	Tourniquet	1 No.
13.	Safety Pins	1 Dozen
14.	Tinc. Iodine / Betadin (100 ml.)	1 Bottles
15.	Ointment for burns (Burnol 20 gms.)	1 Bottole
16.	Polythene Wash cup for washing eyes	1 No.
17.	Potassium Permanganate (20 gms.)	1 Pkt.
18.	Tinc. Benzoine (100 ml.)	1 Bottole
19.	Triangular Bandages	2 Nos.
20.	Band Aid Dressing	5 Pcs.
21.	Iodex / Moov (25 gms.)	1 Bottole
22.	Tongue Depressor	1 No.
23.	Boric Acid Powder (20 gms.)	2 Pkt.
24.	Sodium Bicarbonate (20 gms.)	1 Pkt.
25.	Dressing Powder (Nebasulf) (10 gms.)	1 Bottole
26.	Medicinal Glass	1 No.
27.	Duster	1 No.
28.	Booklet (English & Local Language)	1 No. each
29.	Soap	1 No.
30.	Toothache Solution	1 No.
31.	Eye Ointment	1 Bottle
32.	Vicks (22 gms.)	1 Bottle
33.	Forceps	1 No.
34.	Cotton Buds (5 nos.)	1 Pkt.
35.	Note Book	1 No.
36.	Splints	4 Nos.
37.	Lock	1 Piece
38.	Life Saving/Emergency/Over-the Counter Drugs	As decided at site
	Box size : 14" x 12" x 4"	

Note : The medicines prescribed above are only indicative. Equivalent medicines can also be used. A prescription, in this regard, shall be required from a qualified Physician.

TYPE OF FIRES VIS-À-VIS FIRE EXTINGUISHERS

Fire	Fire Extinguishers				
	Water	Foam	CO ₂	Dry Powder	Multi Purpose (ABC)
Originated from paper, clothes, wood	√	√	Can control minor surface fires	Can control minor surface fires	√
Inflammable liquids like alcohol, petrol, edible oils, bitumen	x	√	√	√	√
Originated from gases like LPG, CNG, H ₂	x	x	√	√	√
Electrical Fires	x	x	√	√	√

Legend : √ Can be used
 x Not to be used

Note : Fire extinguishing equipment must be checked atleast once a year and after every use by an authorized person. The equipment must have an inspection label on which the next inspection date is given. Type of extinguisher shall clearly be marked on it.

Indicative List of Statutory Acts & Rules Relating to HSE

- The Indian Explosives Act and Rules
- The Motor Vehicle Act and Central Motor Vehicle Rules
- The Factories Act and concerned Factory Rules
- The Petroleum Act and Petroleum Rules
- The Workmen Compensation Act
- The Gas Cylinder Rules and the Static & Mobile Pressure Vessels Rules.
- The Indian Electricity Act and Rules
- The Indian Boiler Act and Regulations
- The Water (Prevention & Control & Pollution) Act
- The Water (Prevention & Control of Pollution) Cess Act
- The Mines & Minerals (Regulation & Development) Act
- The Air (Prevention & Control of Pollution) Act
- The Atomic Energy Act
- The Radiation Protection Rules
- The Indian Fisheries Act
- The Indian Forest Act
- The Wild Life (Protection) Act
- The Environment (Protection) Act and Rules
- The Hazardous Wastes (Management & Handling) Rules
- The Manufacturing, Storage & import of Hazardous Chemicals Rules
- The Public Liability Act
- The Building and Other Construction Workers (Regulation of Employment and Condition of service) Act
- Other statutory acts Like EPF, ESIS, Minimum Wage Act.

CONSTRUCTION HAZARDS, THEIR EFFECTS & PREVENTIVE MEASURES

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
(A) EXCAVATION Pit Excavation up to 3.0m	➤ Falling into pit	➤ Personal injury	<ul style="list-style-type: none"> ➤ Provide guard rails/barricade with warning signal. ➤ Provide at least two entries/exits. ➤ Provide escape ladders.
	➤ Earth Collapse	<ul style="list-style-type: none"> ➤ Suffocation / Breathlessness ➤ Buried 	<ul style="list-style-type: none"> ➤ Provide suitable size of shoring and strutting, if required. ➤ Keep soil heaps away from the edge equivalent to 1.5m or depth of pit whichever is more. ➤ Don't allow vehicles to operate too close to excavated areas. Maintain at least 2m distance from edge of cut. ➤ Maintain sufficient angle of repose. Provide slope not less than 1:1 and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock. ➤ Battering/benching the sides.
	<ul style="list-style-type: none"> ➤ Contact with buried electric cables ➤ Gas/ Oil Pipelines 	<ul style="list-style-type: none"> ➤ Electrocutation ➤ Explosion 	<ul style="list-style-type: none"> ➤ Obtain permission from competent authorities, prior to excavation, if required. ➤ Locate the position of buried utilities by referring to plant drawings. ➤ Start digging manually to locate the exact position of buried utilities and thereafter use

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			mechanical means.
Pit Excavation beyond 3.0m	<ul style="list-style-type: none"> ➤ Same as above plus ➤ Flooding due to excessive rain/ underground water 	<ul style="list-style-type: none"> ➤ Can cause drowning situation 	<ul style="list-style-type: none"> ➤ Prevent ingress of water ➤ Provide ring buoys ➤ Identify and provide suitable size dewatering pump or well point system
	<ul style="list-style-type: none"> ➤ Digging in the vicinity of existing Building/ Structure 	<ul style="list-style-type: none"> ➤ Building/ Structure may collapse ➤ Loss of health & wealth 	<ul style="list-style-type: none"> ➤ Obtain prior approval of excavation method from local authorities ➤ Use under-pining method ➤ Construct retaining wall side by side
	<ul style="list-style-type: none"> ➤ Movement of vehicles / equipments close to the edge of cut. 	<ul style="list-style-type: none"> ➤ May cause cave-in or slides ➤ Persons may get buried 	<ul style="list-style-type: none"> ➤ Barricade the excavated area with proper lighting arrangements ➤ Maintain at least 2m distance from edge of cut and use stop block to prevent over-run. ➤ Strengthen shoring and strutting
Narrow deep excavations for pipelines, etc.	<ul style="list-style-type: none"> ➤ Same as above plus ➤ Frequent cave-in or slides 	<ul style="list-style-type: none"> ➤ May cause severe injuries or prove fatal 	<ul style="list-style-type: none"> ➤ Battering/benching of sides ➤ Provide escape ladders
	<ul style="list-style-type: none"> ➤ Flooding due to Hydrostatic testing 	<ul style="list-style-type: none"> ➤ May arise drowning situation 	<ul style="list-style-type: none"> ➤ Same as above plus ➤ Bail out accumulated water ➤ Maintain adequate ventilation
Rock excavation by blasting	<ul style="list-style-type: none"> ➤ Improper handling of explosives 	<ul style="list-style-type: none"> ➤ May prove fatal 	<ul style="list-style-type: none"> ➤ Ensure proper storage, handling & carrying of explosives by trained personnel. ➤ Comply with the applicable explosive acts & rules.
	<ul style="list-style-type: none"> ➤ Uncontrolled explosion 	<ul style="list-style-type: none"> ➤ May cause severe injuries or prove fatal 	<ul style="list-style-type: none"> ➤ Allow only authorized persons to perform blasting operations. ➤ Smoking and open

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			flames are to be strictly prohibited.
	➤ Scattering of stone pieces in atmosphere	➤ Can hurt people	➤ Use PPE like goggles, face mask, helmets etc.
Rock excavating by blasting (Contd)	➤ Entrapping of persons/ animals.	➤ May cause severe injuries or prove fatal	➤ Barricade the area with red flags and blow siren before blasting.
	➤ Misfire	➤ May explode suddenly	➤ Do not return to site for at least 20 minutes or unless announced safe by designated person.
Piling Work	➤ Failure of pile-driving equipment	➤ Can hurt people	➤ Inspect Piling rigs and pulley blocks before the beginning of each shift.
	➤ Noise pollution	➤ Can cause deafness and psychological imbalance	➤ Use personal protective equipments like ear plugs, muffs, etc.
	➤ Extruding rods / casing	➤ Can hurt people	➤ Barricade the area and install sign boards ➤ Provide first-aid
	➤ Working in the vicinity of 'Live-Electricity'	➤ Can cause electrocution / asphyxiation	➤ Keep sufficient distance from Live-Electricity as per IS code. ➤ Shut off the supply, if possible ➤ Provide artificial/rescue breathing to he injured.
(B) CONCRETING	➤ Air pollution by cement	➤ May affect Respiratory System	➤ Wear respirators or cover mouth and nose with wet cloth.
	➤ Handling of ingredients	➤ Hands may get injured	➤ Use gloves and other PPE.
	➤ Protruding reinforcement rods.	➤ Feet may get injured	➤ Use Safety shoes. ➤ Provide platform above reinforcement for movement of workers.
	➤ Earthing of electrical mixers,	➤ Can cause electrocution / asphyxiation	➤ Ensure earthing of equipments and proper functioning of

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	vibrators, etc. not done		electrical circuit before commencement of work.
	➤ Falling of materials from height	➤ Persons may get injured	➤ Use hard hats ➤ Remove surplus material immediately from work place ➤ Ensure lighting arrangements during night hours.
	➤ Continuous pouring by same gang	➤ Cause tiredness of workers and may lead to accident.	➤ Insist on shift pattern ➤ Provide adequate rest to workers between subsequent pours.
	➤ Revolving or concrete mixer/ vibrators	➤ Parts of body or clothes may get entrapped.	➤ Allow only mixers with hopper ➤ Provide safety cages around moving motors ➤ Ensure proper mechanical locking of vibrator
Super-structure	➤ Same as above plus ➤ Deflection in props or shuttering material	➤ Shuttering / props may collapse and prove fatal	➤ Avoid excessive stacking on shuttering material ➤ Check the design and strength of shuttering material before commencement of work ➤ Rectify immediately the deflection noted during concreting
	➤ Passage to work place	➤ Improperly tied and designed props / planks may collapse	➤ Ensure the stability and strength of passage before commencement of work ➤ Do not overload and under the passage.
(C) REINFORCEMENT	➤ Curtailment and binding of rods	➤ Persons may get injured	➤ Use PPE like gloves, shoes, helmets, etc. ➤ Avoid usage of shift tools
	➤ Carrying of rods for short distance/ at	➤ Workers may injure their hands and shoulders	➤ Provide suitable pads on shoulders and use safety

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	heights		<ul style="list-style-type: none"> ➤ gloves. ➤ Tie up rods in easily liftable bundles ➤ Ensure proper staging.
	<ul style="list-style-type: none"> ➤ Checking of clear distance/ cover with hands 	<ul style="list-style-type: none"> ➤ Rods may cut or injure the finger 	<ul style="list-style-type: none"> ➤ Use measuring devices tape, measuring rods, etc.
	<ul style="list-style-type: none"> ➤ Hitting projected rods and standing on cantilever rods 	<ul style="list-style-type: none"> ➤ Persons may get injured and fall down 	<ul style="list-style-type: none"> ➤ Use safety shoes and avoid standing unnecessarily on cantilever rods ➤ Avoid wearing loose clothes
	<ul style="list-style-type: none"> ➤ Falling of material from height 	<ul style="list-style-type: none"> ➤ May prove fatal 	<ul style="list-style-type: none"> ➤ Use helmets ➤ Provide safety nets
	<ul style="list-style-type: none"> ➤ Transportation of rods by trucks / trailers 	<ul style="list-style-type: none"> ➤ Protruded rods may hit the persons 	<ul style="list-style-type: none"> ➤ Use red flags/lights at the ends ➤ Do not protrude the rods in front of or by the side of driver's cabin. ➤ Do not extend the rods 1/3rd of deck length or 1.5 m which is less
(D) WELDING AND GAS CUTTING	<ul style="list-style-type: none"> ➤ Welding radiates invisible ultraviolet and infrared rays 	<ul style="list-style-type: none"> ➤ Radiation can damage eyes and skin. 	<ul style="list-style-type: none"> ➤ Use specified shielding devices and other PPE of correct specifications ➤ Avoid throated tungsten electrodes for GTAW.
	<ul style="list-style-type: none"> ➤ Improper placement of oxygen and acetylene cylinders 	<ul style="list-style-type: none"> ➤ Explosion may occur 	<ul style="list-style-type: none"> ➤ Move out any leaking cylinder ➤ Keep cylinder in vertical position ➤ Use trolley for transportation of cylinders and chain them ➤ Use flash back arrestors
	<ul style="list-style-type: none"> ➤ Leakage / cuts in hoses 	<ul style="list-style-type: none"> ➤ May cause fire 	<ul style="list-style-type: none"> ➤ Purge regulators immediately and then turn off ➤ Never use grease or

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<p>oil on oxygen line connections and copper fittings on acetylene lines</p> <ul style="list-style-type: none"> ➤ Inspect regularly gas carrying hoses ➤ Always use red hose for acetylene & other fuel gases and black for oxygen.
	<ul style="list-style-type: none"> ➤ Opening-up of cylinder 	<ul style="list-style-type: none"> ➤ Cylinder may burst 	<ul style="list-style-type: none"> ➤ Always stand back from the regulator while opening the cylinder ➤ Turn valve slowly to avoid bursting ➤ Cover the lug terminals to prevent short circuiting.
	<ul style="list-style-type: none"> ➤ Welding of tanks, container or pipes storing flammable liquids 	<ul style="list-style-type: none"> ➤ Explosion may occur 	<ul style="list-style-type: none"> ➤ Empty & purge them before welding ➤ Never attach the ground cable to tanks, container or pipe storing flammable liquids ➤ Never use LPG for gas cutting
(E) RADIOGRAPHY	<ul style="list-style-type: none"> ➤ Ionizing Radiation 	<ul style="list-style-type: none"> ➤ Radiations may react with the skin and can cause cancer, skin irritation, dermatitis, etc. 	<ul style="list-style-type: none"> ➤ Ensure safety regulations as per BARC/AERB before commencement of job. ➤ Cordon off the area and install Radiation warning symbols ➤ Restrict the entry of unauthorized persons ➤ Wear appropriate PPE and film badges issued by BARC/AERB
	<ul style="list-style-type: none"> ➤ Transportation and Storage of Radiography source 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Never touch or handle radiography source with hands ➤ Store radiography source inside a pit in an exclusive isolated

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<p>storage room with lock and key arrangement. The pit should be approved by BARC/AERB</p> <ul style="list-style-type: none"> ➤ Radiography source should never be carried either in a passenger bus or in a passenger compartment of trains. ➤ BARC/AERB have to be informed before source movement. ➤ Permission from Director General of Civil Aviation is required for booking radio isotopes with airlines.
	<ul style="list-style-type: none"> ➤ Loss of Radio isotope 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Try to locate with the help of Survey Meter. ➤ Inform BARC/AERB(*) <p>(*) Atomic Energy Regulatory Board (AERB), Bhabha Atomic Research Centre (BARC) Anushaktinagar, Mumbai – 400 094</p>
(F) ELECTRICAL INSTALLATION AND USAGE	<ul style="list-style-type: none"> ➤ Short circuiting 	<ul style="list-style-type: none"> ➤ Can cause Electrocutation or Fire 	<ul style="list-style-type: none"> ➤ Use rubberized hand gloves and other PPE ➤ Don't lay wires under carpets, mats or door ways. ➤ Allow only licensed electricians to perform on electrical facilities ➤ Use one socket for one appliance ➤ Ensure usage of only fully insulated wires or cables ➤ Don't place bare wire ends in a socket

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> ➤ Ensure earthing of machineries and equipments ➤ Do not use damaged cords and avoid temporary connections ➤ Use spark-proof/flame proof type field distribution boxes. ➤ Do not allow open/bare connections ➤ Provide all connections through ELCB ➤ Protect electrical cables / equipment's from water and naked flames ➤ Check all connections before energizing.
	<ul style="list-style-type: none"> ➤ Overloading of Electrical System 	<ul style="list-style-type: none"> ➤ Bursting of system can occur which leads to fire 	<ul style="list-style-type: none"> ➤ Display voltage and current ratings prominently with 'Danger' signs. ➤ Ensure approved cable size, voltage grade and type. ➤ Switch off the electrical utilities when not in use. ➤ Do not allow unauthorized connections. ➤ Ensure proper grid wise distribution of Power.
	<ul style="list-style-type: none"> ➤ Improper laying of overhead and underground transmission lines / cables 	<ul style="list-style-type: none"> ➤ Can cause electrocution and prove fatal 	<ul style="list-style-type: none"> ➤ Do not lay unarmored cable directly on ground, wall, roof of trees ➤ Maintain at least 3m distance from HT cables ➤ All temporary cables should be laid at least 750 mm below ground on 100 mm

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			fine sand overlying by brick soling ➤ Provide proper sleeves at crossings/ intersections ➤ Provide cable route markers indicating the type and depth of cables at intervals not exceeding 30m and at the diversions / termination.
(G) FIRE PREVENTION AND PROTECTION	➤ Small fires can become big ones and may spread to the surrounding areas	➤ Cause burn injuries and may prove fatal.	➤ In case a fire breaks out, press fire alarm system and shout "Fire, Fire" ➤ Keep buckets full of sand & water/fire extinguishing equipment near hazardous locations ➤ Confine smoking to 'Smoking Zones' only ➤ Train people for using specific type of fire equipments under different classes of fire ➤ Keep fire doors/ shutters, passages and exit doors unobstructed ➤ Maintain good house keeping and first-aid boxes (for detail refer Annex-2) ➤ Don't obstruct access to Fire extinguishers ➤ Do not use elevators for evacuation during fire ➤ Maintain lightning arrestors for elevated structures ➤ Stop all electrical motors with internal combustion. ➤ Move the vehicles from dangerous

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			locations. ➤ Remove the load hanging from the crane booms. ➤ Remain out of the danger areas.
	➤ Improper selection of Fire Extinguisher	➤ It may not extinguish the fire	➤ Ensure usage of correct fire extinguisher meant for the specified fire (for details refer Appendix-C) ➤ Do not attempt to extinguish Oil and electric fires with water. Use foam cylinders/CO ₂ /sand or earth.
	➤ Improper storage of highly inflammable substances	➤ Same as above	➤ Maintain safe distance of flammable substances from source of ignition ➤ Restrict the distribution of flammable materials to only min. necessary amount ➤ Construct specifically designed fuel storage facilities ➤ Keep chemicals in cool and dry place away from hat. Ensure adequate ventilation ➤ Before welding operation, remove or shield the flammable material properly ➤ Store flammable materials in stable racks, correctly labeled preferably with catchments trays. ➤ Wipe off the spills immediately

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	<ul style="list-style-type: none"> ➤ Short circuiting of electrical system 	<ul style="list-style-type: none"> ➤ Same as above ➤ Can cause Electrocutation 	<ul style="list-style-type: none"> ➤ Don't lay wires under carpets, mats or door ways ➤ Use one socket for one appliance ➤ Use only fully insulated wires or cables ➤ Do not allow open/bare connections ➤ Provide all connections through ELCB ➤ Ensure earthing of machineries and equipments
(H) VEHICULAR MOVEMENT	<ul style="list-style-type: none"> ➤ Crossing the Speed Limits (Rash driving) 	<ul style="list-style-type: none"> ➤ Personal injury 	<ul style="list-style-type: none"> ➤ Obey speed limits and traffic rules strictly ➤ Always expect the unexpected and be a defensive drive ➤ Use sat belts/helmets ➤ Blow horn at intersections and during overtaking operations. ➤ Maintain the vehicle in good condition ➤ Do not overtake on curves, bridges and slopes
	<ul style="list-style-type: none"> ➤ Adverse weather condition 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Read the road ahead and ride to the left ➤ Keep the wind screen and lights clean ➤ Do not turn at speed ➤ Recognize the hazard, understand the defense and act correctly in time.
	<ul style="list-style-type: none"> ➤ Consuming alcohol before and during he 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Alcohol and driving do not mix well. Either choose

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	driving operation		<ul style="list-style-type: none"> ➤ alcohol or driving. ➤ If you have a choice between hitting a fixed object or an oncoming vehicle, hit the fixed object ➤ Quit the steering at once and become a passenger. Otherwise take sufficient rest and then drive. ➤ Do not force the driver to drive fast and round the clock ➤ Do not day dram while driving
	<ul style="list-style-type: none"> ➤ Falling objects / Mechanical failure 	<ul style="list-style-type: none"> ➤ May prove fatal 	<ul style="list-style-type: none"> ➤ Ensure effective braking system, adequate visibility for the drives, reverse warning alarm. ➤ Proper maintenance of the vehicle as per manufacturer instructions
(I) PROOF TESTING (HYDROSTATIC/ PNEUMATIC TESTING	<ul style="list-style-type: none"> ➤ Bursting of piping ➤ Collapse of tanks ➤ Tanks flying off 	<ul style="list-style-type: none"> ➤ May cause injury and prove fatal 	<ul style="list-style-type: none"> ➤ Prepare test procedure & obtain CONSULTANT/ Owner's approval ➤ Provide separate gauge for pressurizing pump and piping/equipment ➤ Check the calibration status of all pressure gauges, dead weight testers and temperature recorders ➤ Take dial readings at suitable defined intervals and ensure most of them fall between 40-60% of the gauge scale range ➤ Provide safety relief valve (set at

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<p>pressure slightly higher than test pressure) while testing with air/nitrogen</p> <ul style="list-style-type: none"> <li>➤ Ensure necessary precautions, stepwise increase in pressure, tightening of bolts/nuts, grouting, etc. before and during testing <li>➤ Keep the vents open before opening any valve while draining out of water used for hydro testing of tanks <li>➤ Pneumatic testing involves the hazard of released energy stored in compressed gas. Specific care must therefore be taken to minimize the chance of brittle failure during a pneumatic leak test. Test temperature is important in this regard and must be considered when the designer chooses the material of construction <li>➤ A pressure relief device shall be provided, having a set pressure not higher than the test pressure plus the lesser of 345 KPa (50 psi) or 10% of the test pressure. The gas used as test fluid, if not air, shall be nonflammable and nontoxic.
(J) WORKING AT HEIGHTS	➤ Person can fall down	➤ May sustain severe injuries or	➤ Provide guard rails/barricade at the

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
		prove fatal	<ul style="list-style-type: none"> work place ➤ Use PPE like safety belts, full body harness, life line, helmets, safety shoes, etc. ➤ Obtain a permit before starting the work at height above 3 meters ➤ Fall arrest systems like safety nets, etc. must be installed ➤ Provide adequate working space (min. 0.6 m) ➤ Tie/weld working platform with fixed support ➤ Use roof top walk ladder while working on a slopping roofs ➤ Avoid movement on beams
		<ul style="list-style-type: none"> ➤ May hit the scrap / material stacked at the ground or in between 	<ul style="list-style-type: none"> ➤ Keep the work place neat and clean ➤ Remove the scrap immediately
	<ul style="list-style-type: none"> ➤ Material can fall down 	<ul style="list-style-type: none"> ➤ May hit the workers working at lower levels and prove fatal. 	<ul style="list-style-type: none"> ➤ Same as above plus ➤ Do not throw or drop material or equipment from height ➤ All tools to be carried in a toolkit bags or on working uniform ➤ Remove scrap from the planks ➤ Ensure wearing of helmet by the workers at low level
(K) CONFINED SPACES	<ul style="list-style-type: none"> ➤ Suffocation / drowning 	<ul style="list-style-type: none"> ➤ Unconsciousness, death 	<ul style="list-style-type: none"> ➤ Use respiratory devices, if required ➤ Avoid over crowding inside a confined space ➤ Provide Exhaust Fans for ventilation ➤ Do not wear loose clothes, neck ties,

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			etc. ➤ Fulfill conditions of the permit. ➤ Check for presence of hydrocarbons, O ₂ level ➤ Obtain work permit before entering a confined space ➤ Ensure that the connected piping of the equipment which is to be opened is pressure free, fluid has been drained, vents are open and piping is positively isolated by a blind flange
	➤ Presence of foul smell and toxic substances	➤ Inhalation can pose threat to life.	➤ Same as above plus ➤ Check for hydrocarbon and Aromatic compounds before entering a confined space ➤ Depute one person outside the confined space for continuous monitoring and for extending help in case of an emergency
	➤ Ignition / flame can cause fire	➤ Person may sustain burn injuries or explosion may occur	➤ Keep fire extinguishers at a hand distance ➤ Remove surplus material and scrap immediately ➤ Do not smoke inside a confined space ➤ Do not allow gas cylinders inside a confined space ➤ Use low voltage (24V) lamps for lighting ➤ Use tools with air motors or electric tools with max.

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> ➤ voltage of 24V ➤ Remove all equipments at the end of the day
(L) HANDLING AND LIFTING EQUIPMENTS	<ul style="list-style-type: none"> ➤ Failure of load lifting and moving equipments 	<ul style="list-style-type: none"> ➤ Can cause accident and prove fatal 	<ul style="list-style-type: none"> ➤ Avoid standing under the lifted load and within the operating radius of cranes ➤ Check periodically oil, brakes, gears, horns and tyre pressure of all moving machinery ➤ Check quality, size and condition of all chain pulley blocks, slings, U-clamps, D-shackles, wire ropes, etc. ➤ Allow crane to move only on hard, firm and leveled ground ➤ Allow lifting slings as short as possible and check gunny packings at the friction points ➤ Do not allow crane to tilt its boom while moving ➤ Install Safe Load Indicator ➤ Ensure certification by applicable authority.
	<ul style="list-style-type: none"> ➤ Overloading of lifting equipments 	<ul style="list-style-type: none"> ➤ Can cause electrocution and fire 	<ul style="list-style-type: none"> ➤ Safe lifting capacity of derricks and winches written on them shall be got verified. ➤ The max safe working load shall be marked on all lifting equipments ➤ Check the weight of columns and other heavy items painted on them and accordingly decide about the crane

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> ➤ capacity, boom and angle of erection ➤ Allow only trained operators and riggers during crane operation
	<ul style="list-style-type: none"> ➤ Overhead electrical wires 	<ul style="list-style-type: none"> ➤ Can cause electrocution and fire 	<ul style="list-style-type: none"> ➤ Do not allow boom or other parts of crane to come within 3 m reach of overhead HT cables ➤ Hook and load being lifted shall preferably remain in full visibility of crane operator.
(M) SCAFFOLDING, FORMWORK AND LADDERS	<ul style="list-style-type: none"> ➤ Person can fall down 	<ul style="list-style-type: none"> ➤ Person may sustain severe injuries and prove fatal 	<ul style="list-style-type: none"> ➤ Provide guard rails for working at height ➤ Face ladder while climbing and use both hands ➤ Ladders shall extend about 1m above landing for easy access and tying up purpose ➤ Do not place ladders against movable objects and maintain base at ¼ unit of the working length of the ladder ➤ Suspended scaffolds shall not be less than 500 mm wide and tied properly with ropes ➤ No loose planks shall be allowed ➤ Use PPE, like helmets, safety shoes, etc.
	<ul style="list-style-type: none"> ➤ Failure of scaffolding material 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Inspect visually all scaffolding materials for stability and anchoring with permanent structures. ➤ Design scaffolding

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
			<ul style="list-style-type: none"> for max. load carrying capacity ➤ Scaffolding planks shall not be less than 50x250 mm full thickness lumber or equivalent. These shall be cleared or secured and must extend over the end supports by at least 150mm and not more than 300 mm ➤ Don't overload the scaffolds ➤ Do not splice short ladders to make a longer one. Vertical ladders shall not exceed 6m.
	<ul style="list-style-type: none"> ➤ Material can fall down 	<ul style="list-style-type: none"> ➤ Persons working at lower level gets injured. 	<ul style="list-style-type: none"> ➤ Remove excess material and scrap immediately ➤ Carry the tools in a tool-kit bag only ➤ Provide safety nets
(N) STRUCTURAL WORKS	<ul style="list-style-type: none"> ➤ Personal negligence and danger of fall 	<ul style="list-style-type: none"> ➤ Can cause injury or casualty 	<ul style="list-style-type: none"> ➤ Do not take rest inside rooms built for welding machines or electrical distribution system ➤ Avoid walking on beams at height ➤ Wear helmet with chin strap and safety belts when working at height ➤ Use hand gloves and goggles during grinding operations ➤ Cover or mark the sharp and projected edges ➤ Do not stand within the operating radius of cranes
	<ul style="list-style-type: none"> ➤ Lifting / slipping of 	<ul style="list-style-type: none"> ➤ Same as above 	<ul style="list-style-type: none"> ➤ Do not stand under the lifted load

ACTIVITY	TYPE OF HAZARD	EFFECT OF HAZARD	PREVENTIVE MEASURES
	material		<ul style="list-style-type: none"> ➤ Stack properly all the materials. Avoid slippage during handling ➤ Control longer pieces lifted up by cranes from both ends ➤ Remove loose materials from height ➤ Ensure tightening of all nuts and bolts
(O) PIPELINE WORKS	➤ Erection / lowering failure	➤ Can cause injury	<ul style="list-style-type: none"> ➤ Do not stand under the lifted Load ➤ Do not allow any person to come within the radii of the side boom handling pipes ➤ Check the load carrying capacity of the lifting tools and tackles ➤ Use safe Load Indicators ➤ Use appropriate PPEs
	➤ Other	➤ Same as above	<ul style="list-style-type: none"> ➤ Wear gum boots in marshy areas ➤ Allow only one person to perform signaling operations while lowering of pipes ➤ Provide night caps on pipes ➤ Provide end covers on pipes for stoppage of pigs while testing/cleaning operations.

HSE CHECKLIST CUM COMPLIANCE REPORT (1/6)

Project: _____
 Date: _____
 Inspection By: _____
 Frequency : Fortnightly

Contractor : _____
 Owner : _____
 Report No. : _____
 Job No : _____

Note: write 'NA' wherever the item is not applicable

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
1	HOUSEKEEPING				
a)	Waste containers provided and used				
b)	Sanitary facilities adequate and clean				
c)	Passageways and Walkways clear				
d)	General neatness of working areas				
e)	Others				
2	PERSONNEL PROTECTIVE EQUIPMENT				
a)	Goggles; Shields				
b)	Face protection				
c)	Hearing protection				
d)	Safety shoes				
e)	Hand protection				
f)	Respiratory Masks etc.				
g)	Safety Belts				
h)	Safety Helmet/Hard Hat				
I)	Others				
3	EXCAVATIONS/OPENINGS				
a)	Openings properly covered or barricaded				
b)	Excavations shored				
c)	Excavations barricaded				
d)	Overnight lighting provided				
e)	Others				
4	WELDING & GAS CUTTING				
a)	Gas cylinders chained upright				
b)	Cables and hoses not obstructing				
c)	Screens or shields used				
d)	Flammable materials protected				
e)	Fire extinguisher(s) accessible				
f)	Others				
5	SCAFFOLDING				
a)	Fully decked platforms				
b)	Guard and intermediate rails in place				

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
c)	Toe boards in place				
d)	Adequate shoring				
e)	Adequate access				
f)	Others				
6	LADDERS				
a)	Extension side rails 1m above				
b)	Top of landing				
c)	Properly secured				
d)	Angle + 70 from horizontal				
e)	Others				
7	HOISTS, CRANES AND DERRICKS				
a)	Condition of cables and sheaves OK				
b)	Condition of slings, chains, hooks and eyes OK				
c)	Inspection and maintenance logs maintained				
d)	Outriggers used				
e)	Signs/barricades provided				
f)	Signals observed and understood				
g)	Qualified operators				
h)	Others				
8	MACHINERY, TOOLS AND EQUIPMENT				
a)	Proper instruction				
b)	Safety devices				
c)	Proper cords				
d)	Inspection and maintenance				
e)	Others				
9	VEHICLE AND TRAFFIC				
a)	Rules and regulations observed				
b)	Inspection and maintenance				
c)	Licensed drivers				
d)	Others				
10	TEMPORARY FACILITIES				
a)	Emergency instructions posted				
b)	Fire extinguishers provided				
c)	Fire-aid equipment available				
d)	Secured against storm damage				
e)	General neatness				
f)	In accordance with electrical requirements				
g)	Others				
11	FIRE PREVENTION				
a)	Personnel instructed				
b)	Fire extinguishers checked				
c)	No smoking in Prohibited Areas				
d)	Hydrants Clear				

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
e)	Others				
12	ELECTRICAL				
a)	Use of 3-core armoured cables				
b)	Usage of 'All insulated' or 'double insulated' electrical tools				
c)	All electrical connection are routed through ELCB				
d)	Natural Earthing at the source of power (main DB)				
e)	Continuity and tightness of earth conductor				
f)	Covering of junction boxes, panels and other energized wiring places				
g)	Ground fault circuit interrupters provided				
h)	Prevention of tripping hazards				
i)	Others				
13	HANDLING AND STORAGE OF MATERIALS				
a)	Properly stored or stacked				
b)	Passageways clear				
c)	Others				
14	FLAMMABLE GASES AND LIQUIDS				
a)	Containers clearly identified				
b)	Proper storage				
c)	Fire extinguishers nearby				
d)	Others				
15	WORKING AT HEIGHT				
a)	Erection plan and work permit obtained				
b)	Safety nets				
c)	Full body harness and lanyards; chute lines				
d)	Health Check record available for workers going up?				
e)	Others				
16	CONFINED SPACE				
a)	Work permit obtained				
b)	Test for toxic gas and sufficient availability of oxygen conducted				
c)	At least one person outside the confined space for monitoring deputed				
d)	Availability of sufficient means of entry, exit and ventilation				
e)	Fire extinguishers and first-aid facility ensured				
f)	Lighting provision made by using 24V lamps				
g)	Proper usage of PPEs ensured				
17	RADIOGRAPHY				
a)	Proper storage and handling of source as per BARC / AREB guidelines				
b)	Working permit obtained				
c)	Cordoning of the area done				

SL. NO.	ITEM	YES	NO	REMARKS	ACTION
d)	Use of appropriate PPE's ensured				
e)	Proper training to workers/supervisors imparted				
f)	Minimum occupancy of workplace ensured				
18	HEALTH CHECKS				
a)	Workers medically examined and found to fit for working : i) At heights ii) In confined space.				
b)	Availability of First-aid facilities				
c)	Proper sanitation at site, office and labour camps				
d)	Arrangement of medical facilities				
e)	Measures for dealing with illness				
f)	Availability of Portable drinking water for workmen & staff				
g)	Provision of crèches for children				
h)	Stand by vehicle available for evacuation of injured.				
19	ENVIRONMENT				
a)	Chemical and other effluents properly disposed				
b)	Cleaning liquid of pipes disposed off properly				
c)	Seawater used for hydro-testing disposed off as per agreed procedure				
d)	Lubricant Waste/Engine oils properly disposed				
e)	Waste from Canteen, offices, sanitation etc. disposed properly				
f)	Disposal of surplus earth, stripping materials, oily rags and combustible materials done properly				
g)	Green belt protection				

Signature of Resident
Engineer with Seal

ACCIDENT / INCIDENT REPORT

(To be submitted by Contractor after every Accident / Incident within 24 hours)

Report No: _____

Date: _____

Name of Site:- _____

CONTRACTOR _____

Type of Accident / Incident : Fatal Other Lost Time Non Loss Time First-Aid case

NAME OF THE INJURED.....

AGE

FATHER'S NAME.....

SUB-CONTRACTOR M/S.....

DATE & TIME OF ACCIDENT.....

LOCATION

BRIEF DESCRIPTION OF ACCIDENT

CAUSE OF ACCIDENT

NATURE OF INJURY/DAMAGE

MEDICAL AID PROVIDED/ACTIONS TAKEN

INTIMATION TO LOCAL AUTHORITIES (IF APPLICABLE)

DATE:

SIGNATURE OF CONTRACTOR
WITH SEAL

To : OWNER.....

1 COPY

: SITE-IN-CHARGE, HNGPL

3 COPIES

SUPPLEMENTARY ACCIDENT / INCIDENT INVESTIGATION REPORT

Supplementary to Report No: _____(Copy enclosed)

Project: _____
Name of Work : _____
Contractor: _____

Site: _____
Date: _____
Work Order / LOI No. : _____

NAME OF THE INJURED
AGE :
SUB-CONTRACTOR M/S.....
DATE & TIME OF ACCIDENT / INCIDENT
LOCATION.....

BRIEF DESCRIPTION & CAUSE OF A ACCIDENT/ INCIDENT

NATURAL OF INJURY/DAMAGE

COMMENTS FROM MEDICAL PRACTITIONER WHO ATTENDED THE VICTIM/INJURED

SUGGESTED IMPROVEMENT IN THE WORKING CONDITION IF ANY

LOSS OF MANHOURS AND IMPACT ON SITE WORKS

ANY OTHER COMMENT BY SAFETY OFFICER.

DATE:

SIGNATURE OF CONTRACTOR
WITH SEAL

To : OWNER.....
: SITE-IN-CHARGE, HNGPL

1 COPY
3 COPIES

MONTHLY HEALTH, SAFETY & ENVIRONMENT (HSE) REPORT
(To be submitted by each Contractor)

Actual work start Date: _____ For the Month of: _____
 Project: _____ Report No: _____
 Name of the Contractor: _____ Status as on: _____
 Name of Work: _____ Name of Safety officer: _____

ITEM		UPTO PREVIOUS MONTH	THIS MONTH	CUMU- LATIVE
a)	Average number of Staff & Workmen (average daily headcount, not man days)			
b)	Manhours Worked			
c)	Number of HSE meeting organized at site			
d)	Number of HSE awareness programmes conducted at site			
e)	Number of Lost Time Accidents (LTA)	Fatal		
		Other LTA		
f)	Number of Loss time Injuries (LTI)	Fatalities		
		Other LTI		
g)	Number of Loss Time Accidents			
h)	Number of First Aid Cases			
i)	Number of Near Miss Incidents			
j)	Man-days lost due to accidents			
k)	LTA Free Manhours i.e. Number of LTA free manhours from the Lst LTA			
l)	Compensation cases raised with Insurance			
m)	Compensation case resolved and paid to workmen			
n)	Whether workmen compensation policy taken	Y/N		
o)	Whether workmen compensation policy valid	Y/N		
p)	Whether workmen registered under ESI Act	Y/N		
Remark				

DATE:

Safety Officer /Resident Engineer
(Signature and Name)

To : OWNER
 : /, HNGPL (2 COPIES)

PERMIT FOR WORKING AT HEIGHT (ABOVE 2 METER)

Project Site : Sr. No.:
 Name of the work: Date:
 Name of Contractor : Nature of Work :
 Total No.of Workers: Exact location of work :
 Duration of work: from to

The following items have been checked and compliance shall be ensured during the currency of the permit:

Sl.	ITEM	DONE	NOT REQD.
1.	Equipment/Work Area inspected	<input type="checkbox"/>	<input type="checkbox"/>
2.	Considered hazard from other routine/non-routine operations and concerned person alerted	<input type="checkbox"/>	<input type="checkbox"/>
3.	ELCB provided	<input type="checkbox"/>	<input type="checkbox"/>
4.	Proper lighting provided	<input type="checkbox"/>	<input type="checkbox"/>
5.	Area cordoned off.	<input type="checkbox"/>	<input type="checkbox"/>
6.	Precautions against public traffic taken	<input type="checkbox"/>	<input type="checkbox"/>
7.	Sound Scaffolding provided	<input type="checkbox"/>	<input type="checkbox"/>
8.	Adequate protected Platform provided	<input type="checkbox"/>	<input type="checkbox"/>
9.	Acces and Exit to the area (Ladder properly fixed)	<input type="checkbox"/>	<input type="checkbox"/>
10.	Floor Openings covered	<input type="checkbox"/>	<input type="checkbox"/>
11.	Safety Net provided	<input type="checkbox"/>	<input type="checkbox"/>
12.	Heath check of personnel	<input type="checkbox"/>	<input type="checkbox"/>

A. Following personal protective equipment are provided (mark) and used as relevant Safety helmet/Gloves/Goggles/Shoes/Face Shield/Life Line/Safety Belt/Safety Harness.

B. This permit shall be available at the work site at all times.

CONFINED SPACE ENTRY PERMIT

Project Site : Sr. No.:
 Name of the work: Date:
 Name of Contractor : Nature of Work :
 Exact location of work :

Safety Requirements : POSITIVE ISOLATION OF THE VESSEL IS MANDATORY

(A) Has the equipment been ?								
Y	NR		Y	NR		Y	NR	
Y	Y	isolated from power / steam / air isolated	Y	Y	water flushed &/or steamed Manways	Y	Y	radiation sources removed
Y	Y	from liquid or gases depressurized &/or drained	Y	Y	open & ventilated cont. inset gas flow	Y	Y	Proper lighting provided
Y	Y	blanked / blinded / disconnected	Y	Y	arranged adequately cooled	Y	Y	
Y	Y		Y	Y		Y	Y	

(B) Expected Residual Hazards								
Y	NR		Y	NR		Y	NR	
Y	Y	lack of O ₂	Y	Y	combustible gas / liquid	Y	Y	H ₂ S / toxic gases
Y	Y	corrosive chemicals	Y	Y	pyrophoric iron / scales	Y	Y	electricity / static
Y	Y	Heat / steam / frost	Y	Y	high humidity	Y	Y	ionizing radiation
Y	Y		Y	Y		Y	Y	

(C) Protective Measures								
Y	NR		Y	NR		Y	NR	
Y	Y	gloves	Y	Y	ear plug / muff	Y	Y	goggles / face shield
Y	Y	protective clothing	Y	Y	dust / gas / air line mask	Y	Y	personal gas alarm
Y	Y	Grounded air educater / blower / AC	Y	Y	attendant with SCBA / air mask	Y	Y	rescue equipment / team
Y	Y	Fire fighting arrangements	Y	Y	safety harness & lifeline	Y	Y	communication equipment
Y	Y		Y	Y		Y	Y	

RADIATION WORK PERMIT

Project : Sr. No.:
 Name of the work : Date:
 Name of Contractor : Job No. :

Location of work :
 Source Strength :
 Cordoned distance (m) :

Name of Radiographing agency : Approved by Owner / HNGPL

The following items have been checked & compliance shall be ensured during currency of the permit :

S. No.	Item Description	Done
1.	Safety regulations as per BARC/AERB ensured while source in use/ in transit & during storage.	<input type="checkbox"/>
2.	Area cordoned off.	<input type="checkbox"/>
3.	Lighting arrangements for working during nights ensured.	<input type="checkbox"/>
4.	Warning signs / flash lights installed.	<input type="checkbox"/>
5.	Cold work permit taken (if applicable)	<input type="checkbox"/>
6.	PPEs like film badges, dosimeters used.	<input type="checkbox"/>

Additional precautions, if any _____

(Radiography Agency's BARC / AREB authorized Supervisor) (Contractor's Safety Officer)

Permission is granted.

Permit is valid from _____ AM/PM _____ Date to _____ AM/PM _____
 Date

(Signature of permit issuing authority)

Name : Designation : Date :

Permit renewal :

Permit extended upto		Additional precautions required, if any.	Sign of issuing authority with date
Date	Time		

Work completed / stopped / area cleared at _____ Hrs. of Date _____

(Sign of permit issuing authority)

Name :

RADIATION WORK PERMIT

Project : Sr. No.:
 Name of the work : Date:
 Name of Contractor : Job No. :

 Name of Contractor :

 Line No. / Equipment No. /Structure to be dismantled :

Location details of dismantling / demolition with sketch : (Clearly indicate the area)

The following items have been checked & compliance shall be ensured during currency of the permit :

S. No.	Item Description	Done	Not Applicable
1.	Services like power, gas supply, water, etc. disconnected.	<input type="checkbox"/>	<input type="checkbox"/>
2.	Dismantling / Demolishing method reviewed & approved.	<input type="checkbox"/>	<input type="checkbox"/>
3.	Usage of appropriate PPEs ensured.	<input type="checkbox"/>	<input type="checkbox"/>
4.	Precautions taken for neighboring structures	<input type="checkbox"/>	<input type="checkbox"/>
5.	First-Aid arrangements made	<input type="checkbox"/>	<input type="checkbox"/>
6.	Fire fighting arrangements ensured	<input type="checkbox"/>	<input type="checkbox"/>
7.	Precautions taken for blasting	<input type="checkbox"/>	<input type="checkbox"/>

(Contractor's Supervisor)

(Contractor's Safety Officer)

Permission is granted.

(Permit issuing authority)

Name :

Date :

Completion Report :

Dismantling / Demolishing is completed on _____ Date at _____ Hrs.

Materials / debris transported to identified location

Tagging completed (as applicable)

Services like power, gas supply, water, etc. restored

(Permit issuing authority)

DATA SHEETS

CONTENTS

<u>Sl.No.</u>	<u>Description</u>
1.0	NIL
2.0	NIL
3.0	NIL
4.0	NIL

DRAWING
(Attached Separately)

TECHNICAL SPECIFICATION OF
STEEL REINFORCED RUBBER HOSE

**STANDARD TECHNICAL
SPECIFICATION
FOR
STEEL REINFORCED RUBBER HOSE**

CONTENTS

SI No.	DESCRIPTION
1.0	SCOPE
2.0	MATERIAL
3.0	DIMENSIONS & TOLERANCES
4.0	FEATURES
5.0	MARKING
6.0	PACKAGING
7.0	INSPECTION / DOCUMENTS

1.0 SCOPE

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 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.

3.0 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.
- iii. Length of hose shall be as defined in M.R. & the tolerances on length shall be permitted $\pm 1\%$.

4.0 FEATURES

4.1 Mechanical properties

Tensile strength (Lining & cover) at break - 10 MPa (minimum)

Elongation (Lining & cover) in at break (%) - 200 & 250 respectively (minimum)

4.2 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.

4.3 Adhesion

The minimum adhesion between rubber lining & reinforcement, between layers of reinforcement and between reinforcement & cover shall be 2KN/m.

4.4 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.

4.5 Flexibility of Hose

The hose shall be capable of being bent empty to the radius 95 mm without flattening and suffering structural damages.

4.6 Ozone resistance

It shall be carried out as per clause no. 5.5.of IS 9573: 1978

4.7 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.

4.8 Bursting pressure

It shall be carried out as per Clause 5.5.2 of IS 9573. The minimum burst pressure shall be 5 Mpa.

4.9 Grip strength test

The hose shall comply to the requirement of Clause no. 5.5.7 of IS 9573.

4.10 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.

5.0 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



6.0 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.

7.0 INSPECTION / DOCUMENTS

- i. Inspection shall be carried out as per design codes/standards, 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 third party inspection agency appointed by Owner shall carry out random 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 Technical Specification, at the time of final inspection of each supply lot of material.
- v. Even after third party inspection, Owner 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 Technical specification, then Owner 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 Owner 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.