



**TENDER FOR**

**RATE CONTRACT AND EMPANELMENT FOR  
INSTALLATION OF ABOVE GROUND GI/COPPER  
PIPING & FITTINGS AT KANPUR, UNNAO, BAREILLY  
& JHANSIGA**

**E-TENDER No. 55022**

**TENDER NO. CUGL/C&P/TEN2324/25**

**TECHNICAL VOLUME**

**(Volume II of II)**

**CENTRAL U.P. GAS LIMITED**  
**Kanpur | India**

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**PROJECT NUMBER: 1036**



<b>SCOPE OF WORK</b>		<b>CLIENT JOB NO</b>		1 0 3 6	
		<b>TOTAL SHEETS</b>		0 8	
<b>DOCUMENT NO</b>	C211036	CGD	PL	SOW	0 0 5

## **CENTRAL U.P. GAS LIMITED**

**RATE CONTRACT AND EMPANELMENT FOR  
INSTALLATION OF ABOVE GROUND GI/COPPER PIPING &  
FITTINGS AT KANPUR, UNNAO, BAREILLY & JHANSI GA**

### **SCOPE OF WORK**




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## **1.0 INTRODUCTION**

M/s Central U.P. Gas Limited (CUGL) a Joint Venture of India's two Maharatana Companies, GAIL (India) Limited and Bharat Petroleum Corporation Limited incorporated on 25th February 2005. CUGL is authorized by the Petroleum and Natural Gas Regulatory Board (PNGRB) to operate in the Geographical Areas (GAs) of Kanpur (including some part of Unnao), Bareilly and Jhansi.

Central UP Gas Limited, invites tenders under sealed covers from bona fide and experienced Contractors of financial standing and reputation for the following job:

**RATE CONTRACT AND EMPANELMENT FOR INSTALLATION OF ABOVE GROUD GI/COPPER PIPING & FITTINGS AT KANPUR, UNNAO, BAREILLY & JHANSI GA.**

Central UP Gas Limited (CUGL) (hereinafter referred as Owner), is supplying Piped Natural Gas (PNG) to domestic, commercial, and industrial consumers and compressed natural gas (CNG) to automobiles in above mentioned GAs through its CGD and CNG networks. CUGL intends to develop its CGD and CNG network in above mentioned GA.

## **2.0 PURPOSE**

This document is for the scope of empaneling the contractor on rate contract for INSTALLATION OF ABOVE GROUD GI/COPPER PIPING & FITTINGS AT KANPUR, UNNAO, and BAREILLY & JHANSI GA. The target PNG domestic connection is considered 30,000 approx.

<b>Description</b>		<b>Kanpur, Unnao, Bareilly &amp; Jhansi</b>
PNG Connections	Domestic	30,000

## **3.0 DEFINITIONS**

Where used in this document, the following terms shall have the meanings indicated below, unless clearly indicated by the context to this order



Central U.P. Gas Limited

## INSTALLATION OF ABOVE GROUD GI/COPPER PIPING & FITTINGS AT KANPUR, UNNAO, BAREILLY & JHANSI GA

PROJECT	INSTALLATION OF ABOVE GROUD GI/COPPER PIPING & FITTINGS AT KANPUR, UNNAO, BAREILLY & JHANSI GA
OWNER	Central UP GAS Limited (CUGL)
MANUFACTURER	The party, which manufactures and supplies equipment and services to the OWNER or to Contractor
SOW	SCOPE OF WORK

### 4.0 DOCUMENT PRECEDENCE

It shall be the responsibility of the Contractor/ BIDDER to inform the OWNER of any errors, ambiguities, inconsistencies, discrepancies, or conflict of information that may be found to exist in any document, specification or drawing provided in the tender by the OWNER.

In case of conflict, the order of precedence shall be as follows:

- a. Scope of Work(SOW)
- b. Schedule of Rates(SOR)
- c. Data Sheets & QAP
- d. Standard Specifications
- e. Codes and Standards

As a general rule in the event of any discrepancy between technical matter and local laws/ regulations (and documents above listed) the most stringent shall be applied.

CONTRACTOR/ BIDDER shall notify OWNER of any apparent conflicts between SOW, Technical specifications, related datasheets, any code and standards and any other specifications noted herein. (Resolution and/ or interpretation precedence shall be obtained from OWNER in writing before proceeding with the design/ manufacturer or completion of services.)

### 5.0 SCOPE OF WORK

The main scope of work comprises Installation, Testing & Commissioning of above ground GI/ Cu pipe installation for PNG Connections for City Gas Distribution project including installation of Meters / Regulators etc., as per SOR. The scope also covers all the activities associated with the supply of materials (except free issue items).

#### **Owner's scope of supply (Free Issue Item).**

- Meter
- Regulators
- Isolation Valve
- Appliance Valve

#### **CONTRACTOR'S SCOPE OF WORK**



Supplied by the contractor

- Powder coated GI Pipes size from 1/2", 3/4", 1" & 12mm copper pipe
- Powder coated GI & Copper Fittings, Brass Fittings Etc.
- Corrugated Flexible Metal Hose (Anaconda, if applicable) & Rubber hose and all materials required for natural gas conversion.
- All PPE materials required for safe execution of projects.
- As other materials required for smooth execution of project over and above as mentioned.

All above supply quantity shall be procured from owners approved vendors only after approval from CUGL& as per instruction of Engineer-in-charge (EIC).

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

1. Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner/Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of work to Owner / Owner's representative for approval.
2. Contractor shall submit the QCT/procedure/drawing etc. of all the material to be procured by him for approval before procuring the items. If, QCT/procedure/drawing etc. are not approved from client/consultant then owner has the authority to refuse /reject the same lot material.
3. Receipt of regulators, domestic meters, Isolation and Appliance Valve as a free issue items from Owner's stores, loading, transportation, unloads at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approval for optimum route and permission for work from the concerned authority and CUGL/PMC/TPIA.
4. Selection of route with the CUGL/PMC/TPIA and marking the same on walls/floors between 'transition fitting' to 'cooking oven/stove/appliance', making openings and making provisions for fixing clamps. Making temporary but stable platforms/scaffolding /rope ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.
5. Contractor shall procure all material except free issue items for installation at the outlet of PE/ GI transition fitting up to the Domestic customers "Appliance /stove / oven forsatisfactory completion to the owner/owner's representative.
6. Supply and Installation of powder coated GI pipes of 1/2", 3/4" dia. between transition fittingsto customers kitchen appliances including NPT threading of GI pipes, supply of proper seal outs for threads to join fittings such as elbows, tees, connectors, regulators, meters, appliances & isolation valves etc., as per laid procedures and specifications including clamping and sealing etc. The powder coated GI pipe and Fittings shall be painted after the testing of the GI installation wherever touching is required to eliminate any coating defects during installation.
7. Supply & Installation of Copper pipes including supply of lead free solder wire and flux to join fittings including supply of fittings such as elbows, tees, connectors, meters, valves etc., complete as per procedures and specifications including clamping and sealing etc.
8. Supply of clamps for fixing pipes, Meters wherever required, painting of pipes and fittings. Providing consumables grout material, repair/restoration of walls/floors changes for the pipes including the materials required for conversions and tools and tackles etc. shall becompleted as per specification.

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9. Submit certified copies of RFC card to Projects & O&M after uploading the details in software prescribed by Client.
10. Cleaning, flushing, pneumatic testing and commissioning to the GI/Cu pipe & fittings, meters, valves etc. as per specification and hand over the same to Owner/Customer to the entire satisfaction of CUGL OFFICER/PMC/TPIA.
11. Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.
12. Restoration of walls, flooring and other damages while executing the above ground installation up to satisfaction of properly owner.
13. Preparation and submission of above ground installation card for each house indicating the laid GI/Cu pipe including fittings, mentioned the reasons, if connecting, testing, etc. is not provided to the customers and deviation statements on completion /commissioning of work.
14. Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works in new & existing gas charged areas shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner.
15. Following activities are also in Contractor's Scope:
  - Receive Customer's request and complaints logged on CUGL's portal/Offline.
  - Carry out joint technical feasibility survey for requests received.
  - Attend and resolve customer complaints within defined TAT.
  - Maintain and update the request and complaint status in CUGL's portal.
  - Contractor should execute GI/Cu Installation works with following priority
    - Online Domestic connections: Gas Supply is available in the locality and pipeline is available just outside kitchen – 20 days from date of receipt of registration
    - Fresh Riser Installation in Domestic Connections: Gas available in an apartment/complex but pipeline installation pending in the concerned Tower (for building with less than G+14 floors) Or In case of Kothi /Bungalow, where gas pipeline is available outside the premises (where service line is already installed)– TAT-40 days
    - Connection rates in project areas; in High Rise segment (TAT-90 Days) & low-rise segment (TAT-75 Days)
16. Maintain new connection tracking on CUGL's portal. Providing adequate manpower, minimum 2 no's each such as data entry operator, customer care executive etc. for data logging like new connection request & GI tracking, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period (TAT) Turn Around Time.
17. Providing adequate manpower for carrying out laying for PNG installation for emergency cases as and when required. The TAT period for carrying out such emergency cases are defined in tender document.
18. Printable material i.e. RFC book, sticker & safety Guidelines shall be provided by owner. All other printable materials like feasibility report etc. shall be in contractor's scope.

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19. All size of GI pipes & GI Fittings shall be powder coated before installation and it is in the scope of contractors. Contractor shall submit powder coating procedure to CUGL/PMC before powder coating of pipes & Fittings.

**6.0 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. 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.
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.
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.
4. No material shall be allowed to be taken outside the store without a gate pass.
5. The contractor shall be responsible for proper storage, preservation and watch & ward of the materials.

**7.0 RECONCILIATION OF OWNER SUPPLIED MATERIALS**

**7.1** The Contractor is responsible for reconciliation of material used for job completed in a month. This record will be used for the reconciliation of material at the end of the contract.

**7.2** For damaged or irreconcilable material, **twice** the cost of material shall be recovered and for Domestic Meters, **ten times** the cost shall be recovered.

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

**7.4** After the final reconciliation is carried out, the variances in materials issued against materials used and returned, will be assessed. All unused, scrap materials and salvageable materials shall be the property of the Owner and shall be returned by the Contractor category-wise at his cost to the Owner's designated store. In case the Contractor fails to do so or exceeds the limits of allowances specified below for scrap/ serviceable materials, then recovery for such quantities not returned as well as returned in excess of permitted limit by the Contractor will be done at the penal rate i.e. 200% (Double the landed cost) and 1000% (10 times the landed cost) in case of Domestic Meter 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 and measurement of the surplus materials to be returned to the store. Contractor shall also be responsible for suitable segregation of returned materials into separate stacks of serviceable and scrap materials as per instruction of Owner. Wherever certain material is covered

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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.

<b>ITEM</b>	<b>UNACCOUNTABLE</b>	<b>SCRAP</b>
Regulators, meters	0%	0%
Appliance & isolation valve	0%	0%

**7.5** Material consumption will be recorded. Material issued from the OWNER stores shall be consumed, recorded and returned using the same OWNER item code.

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

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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
GROUND GI/COPPER PIPING & FITTINGS IN LOW RISE  
DOMESTIC CONNECTIONS**

**SS – PE - 0003**


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GROUND GI/COPPER PIPING & FITTINGS IN LOW RISE  
DOMESTIC CONNECTIONS**

## **1.0 GENERAL INFORMATION**

M/s Central U.P. Gas Limited (CUGL) a Joint Venture of India's two Maharatana Companies, GAIL (India) Limited and Bharat Petroleum Corporation Limited incorporated on 25th February 2005. CUGL is authorized by the Petroleum and Natural Gas Regulatory Board (PNGRB) to operate in the Geographical Areas (GAs) of Kanpur (including some part of Unnao), Bareilly and Jhansi.

The main scope of this contract comprises the installation of above ground pipes from the outlet of 'PE/GI transition fitting' up to the domestic Customers 'Appliance/stove/oven valve' in New as well as in Existing Gas charged areas.

The scope includes installation & procurement of above ground GI/Cu pipes and associated fittings for domestic consumers. However, the piping may have to be carried out up to Appliance Valve, in case of some domestic customers required.

Except domestic meter, regulator, Isolation and appliance valve, Contractor shall procure each material (Powder Coated GI fittings, Powder coated GI Pipes, Cu Pipes, Cu/Brass fittings, etc.) which is required from the outlet of PE/GI transition fitting up to the Domestic Customers "Appliance/stove/oven valve".

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

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

## **2.0 DEFINITIONS**

OWNER	CENTRAL UP GAS LIMITED (CUGL)
SS	Present <<Standard Specification>> and its entire appendix, if any
TPIA	Third Party Inspection Agency to be appointed by CUGL
EIC	Engineer-in-charge
CUMULATIVE LENGTH	The riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection
REGULATOR PIECE	The GI pipe from transition fittings to Regulator

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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
GROUND GI/COPPER PIPING & FITTINGS IN LOW RISE  
DOMESTIC CONNECTIONS**

### **3.0 SCOPE OF WORK**

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

- Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner/Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of work to Owner / Owner's representative for approval.
  - Contractor shall submit the QCT/procedure/drawing etc. of all the material to be procured by him for approval before procuring the items. If, QCT/procedure/drawing etc. are not approved from client/consultant then owner has the authority to refuse /reject the same lot material.
  - Receipt of regulators, domestic meters, Isolation and Appliance Valve as a free issue items from Owner's stores, loading, transportation, unloads at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approval for optimum route and permission for work from the concerned authority and CUGL/PMC/TPIA.
  - Selection of route with the CUGL OFFICER/PMC/TPIA and marking the same on walls/floors between 'transition fitting' to 'cooking oven/stove/appliance', making openings and making provisions for fixing clamps. Making temporary but stable platforms/scaffolding /rope ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.
  - Contractor shall procure all material except free issue items for installation at the outlet of PE/ GI transition fitting up to the Domestic customers "Appliance /stove / oven for satisfactory completion to the owner/owner's representative.
  - Supply and Installation of powder coated GI pipes of ½", ¾" dia. between transition fittings to customers kitchen appliances including NPT threading of GI pipes, supply of proper seal outs for threads to join fittings such as elbows, tees, connectors, regulators, meters, appliances & isolation valves etc., as per laid procedures and specifications including clamping and sealing etc. The powder coated GI pipe and Fittings shall be painted after the testing of the GI installation wherever touching is required to eliminate any coating defects during installation.
  - Supply & Installation of Copper pipes including supply of lead free solder wire and flux to join fittings including supply of fittings such as elbows, tees, connectors, meters, valves etc., complete as per procedures and specifications including clamping and sealing etc.
  - Supply of clamps for fixing pipes, Meters wherever required, painting of pipes and fittings.
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GROUND GI/COPPER PIPING & FITTINGS IN LOW RISE  
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Providing consumables grout material, repair/restoration of walls/floors changes for the pipes including the materials required for conversions and tools and tackles etc. shall be completed as per specification.

- Submit certified copies of RFC card to Projects & O&M after uploading the details in software prescribed by Client.
  - Cleaning, flushing, pneumatic testing and commissioning to the GI/Cu pipe & fittings, meters, valves etc. as per specification and hand over the same to Owner/Customer to the entire satisfaction of CUGL OFFICER/PMC/TPIA.
  - Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.
  - Restoration of walls, flooring and other damages while executing the above ground installation up to satisfaction of properly owner.
  - Preparation and submission of above ground installation card for each house indicating the laid GI/Cu pipe including fittings, mentioned the reasons, if connecting, testing, etc. is not provided to the customers and deviation statements on completion /commissioning of work.
  - Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works in new & existing gas charged areas shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner.
  - Following activities are also in Contractor's Scope:
    - Receive Customer's request and complaints logged on CUGL's portal/Offline.
    - Carry out joint technical feasibility survey for requests received.
    - Attend and resolve customer complaints within defined TAT.
    - Maintain and update the request and complaint status in CUGL's portal.
    - Contractor should execute GI/Cu Installation works with following priority
    - Online Domestic connections: Gas Supply is available in the locality and pipeline is available just outside kitchen – 20 days from date of receipt of registration
    - Fresh Riser Installation in Domestic Connections: Gas available in an apartment/complex but pipeline installation pending in the concerned Tower (for building with less than G+14 floors) Or In case of Kothi /Bungalow, where gas pipeline is available outside the premises (where service line is already installed)– TAT-40 days
    - Connection rates in project areas; in High Rise segment (TAT-90 Days) & low-rise segment (TAT-75 Days)
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- Maintain new connection tracking on CUGL's portal. Providing adequate manpower, minimum 2 no's each such as data entry operator, customer care executive etc. for data logging like new connection request & GI tracking, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period (TAT) Turn Around Time.
- Providing adequate manpower for carrying out laying for PNG installation for emergency cases as and when required. The TAT period for carrying out such emergency cases are defined in tender document.
- Printable material i.e. RFC book, sticker & safety Guidelines shall be provided by owner. All other printable materials like feasibility report etc. shall be in contractor's scope.
- All size of GI pipes & GI Fittings shall be powder coated before installation and it is in the scope of contractors. Contractor shall submit powder coating procedure to CUGL/PMC before powder coating of pipes & Fittings.

#### **4.0 MATERIAL, MANPOWER EQUIPMENT AND MACHINERY**

##### **4.1 Material to be supplied as a free issue material**

Domestic meter, Regulator, Isolation and Appliance valve shall be supplied as a free issue material to the contractor. The contractor shall not use any other material from any other source of supply other than owner's supplied material without any written approval from EIC.

##### **4.2 Material/Equipment & machinery to be supplied by contractor**

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

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

Special tools shall be required at site for carrying out drilling work in walls other than Brick or

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RCC (Ex. Granite, Marble, Wooden, Glass Cutting etc.)

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

The contractor has to submit the valid calibration certificate for Pressure gauges. Contractor shall submit the manufacturer test certificate slab test certificate for all items procured by him for approval before commencing the execution.

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

#### **4.3 Plant and Equipment**

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

#### **4.4 Sealant, Grout**

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

#### **4.5 Clamps, Rawal Plugs, Screws and etc.**

The Clamps, Brackets for meter, Rawal Plugs, SS-304 Screws (2" length), Nozzles, etc. shall be approved lot wise by CUGL/PMC prior to installation. Re-drilling of existing appliance (burners) nozzles is strictly not permitted. The quality of materials procured will be got approved and will be as directed by EIC.

The indicative sketch of the Brackets for Meter, and GI/Copper Pipe Clamps is

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enclosed with the tender. No separate payment for the supply of Meter Brackets and GI/Copper clamps shall be made to the contractor.

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**4.6 Consumable Items**

- Special Consumables such as Teflon Tapes, solder wire, flux, lacquer, thinner shall be supplied by the contractor and are included in installation rates.
- These consumables shall be of reputed make companies and required grades/class

**4.7 Other Materials**

The contractor shall supply the following items where required:

- 4.7.1 All materials required for work, NPT threading, copper pipe jointing, testing etc.
- 4.7.2 All signs, barricades, lights and protective equipment.
- 4.7.3 All material required for working at higher floor levels (i.e., scaffolding, Ladder, Safety Belts, Self-Locking Safety Harness Belts etc.).
- 4.7.4 Special consumable such as grease for maintenance of domestic appliances, all paints for painting of GI Pipes, Consumables such as Teflon Tapes, Solder- wire, Flux, Lacquer, Thinner, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included for within the rates.
- 4.7.5 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.

**4.8 Acquisition, Receipt and Storage of Materials**

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

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

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

The Contractor shall physically examine all materials at the time of acceptance the material in store and notify the EIC immediately of any damage or defect noticed by the Contractor. The CUGL representative shall duly note any damage or defect in a site instruction book and both parties shall counter sign the entry.

Any damage not so recorded will be deemed not to have existed at the time of acceptance of material in store by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.

All materials shall be stored in contractor's stores near site in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals.

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

Material reconciliation indicating issue of material, consumptions and defective material shall be submitted on every three months basis.

## **5.0 ISSUE OF WORK INSTRUCTIONS**

- 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. It may vary in case of individual and multi storied flats.
  - All skilled personnel like jointers, conversion technicians will be approved and certified by Site In-charge. The technicians who will carry out jointing of copper material and conversions will undergo a test by Owner. Those who clear the test will be issued identity cards duly signed by Site In-charge. These technicians shall be only authorized
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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
GROUD GI/COPPER PIPING & FITTINGS IN LOW RISE  
DOMESTIC CONNECTIONS**

to take up respective jobs. In case it is found that contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per contract.

- The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour, supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.
- The schedule of items of GI/Cu installations have been described in brief and shall be held to be completed in all respect including safety requirements as per Standard Specification of HSE, tests, inspection, QA/QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works whatsoever shall be considered in execution of these items.

## **6.0 PROGRESS OF WORK**

The contractor shall proceed with the work under the contract with due expedition and without delay. Contractor shall assess the material requirement of the allotted area and submit the schedule plan for execution & purchasing before start of actual work.

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

## **7.0 WORK SHEETS**

- The quantities of GI/Cu pipe and other details will be checked by Owner's site engineer/representative and the same shall be incorporated in RFC cards. The detailed reports shall be signed by CUGL officer/PMC/TPIA, on site.
- Measurement sheets shall be prepared based on the RFC cards and checked and certified by the site engineers for billing purpose.
- If measurement sheets submitted are illegible, incomplete or incorrectly booked they will be returned to the contractor.

## **8.0 PERMISSIONS / APPROVALS**

- Contractor shall be responsible for obtaining permissions from society management, RWA, individual residents and any other concerned authority, if required, for completion of the work. Contractor must take the prior appointment from the residents for carrying out the work.
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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
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DOMESTIC CONNECTIONS**

- The contractor shall work in close consultation/coordination with the EIC.
- The contractor shall not sign/execute any agreement and/or undertaking on any such documents which amounts to be under taken by Owner. The same shall only be signed and executed by Owner; however, the contractor shall also liaison and coordinates for the same.
- The necessary coordination, liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the registered customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.
- A log book/job card for such appointments with Consumer/any other agencies shall be maintained and the schedule/appointment once taken shall be adhered to by the contractor. PMC/EIC shall review the records every week. The contractor shall submit the detailed list of RFC/Conversions and balance work on Registrations at least once a week as per approved format.
- The contractor is also required to obtain a "Labour License" from the Assistant Labor Commissioner of respective Administration/Central Govt.
- It will be the contractor's responsibility to familiarize himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.
- The contractor has to take responsibility of the action of supervisors, plumbers and helpers provided by him.

## **9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS**

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

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

## **10.0 RIGHT-OF-USE SERVEY AND MARKING**

The route of the pipeline to be installed shall be decided with consent of the consumer and Site Engineer/PMC/TPIA. Contractor must ensure that the persons/workers/supervisors/ working at site shall have proper identity cards prior to entering the premises of the consumer.

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

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

Owner/Consultant and the contractor at each premises or housing colony to be supplied with gas will conduct a joint survey. 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 a sketch of the agreed pipe routes, if necessary.

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

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

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

### **11.0 PROTECTION OF STRUCTURES AND UTILITIES**

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

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 has to immediately make things to original.

### **12.0 POWDER COATED GI AND COPPER ABOVE GROUND SERVICE PIPE**

The powder coated 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 regulator, valves, fittings, meters, clamps etc. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with ladders, scaffolding pipe, dies, tripods, vices, fittings and Teflon tape, drills for concrete and other masonry, drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, paint for marking etc.

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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
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All powder coated GI risers at the outside of buildings shall be fully supported to carry the weight of piping. A flanged foot or similar device, capable of supporting the total weight of the riser, shall support risers. The riser shall be installed 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 ANSI B 1.20.1

Contractor has to supply different types/sizes of powder coated clamps (Mild Steel) for fixing GI pipes suiting to the site conditions.

All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 mtrs. 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 CUGL OFFICER/PMC/TPIA. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.

Where pipe passes through the balcony and the surface is 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 is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc. Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.

### **12.1 NON LMC**

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

- **Regulator piece:** Regulator Piece: Powder coated GI pipe of 1/2" dia installed of length 1.5m from transition fitting up to inlet of regulator. Its length may vary as per site situation subject to prior approval from CUGL/PMC.
  - **Riser for Bungalow /Apartments having floors up to G+3:** Powder coated GI riser pipe of 1/2" dia shall be installed from regulator isolation valve to lateral isolation valve for G+3 Apt and Individual kothi /Bungalow.
  - **Riser for Apartments having floors more than G+3:** Powder coated GI riser pipe of 3/4" dia shall be installed from regular isolation valve to lateral isolation valve for Apt and Individual Kothi/Bungalow having floors more than G+3.
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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
GROUND GI/COPPER PIPING & FITTINGS IN LOW RISE  
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## **12.2 LMC**

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

- **Installation of Meter**

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

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

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

Note: Installation of meter should be done at height of approx. 04 to 06 feet.

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

The Contractor shall ensure that GI installations and rubber hoses shall not be exposed to direct heat of Gas burners. The installation should have minimum clearance of about 300 mm from electric point mains & switches. Minimum distance between Appliance Valve & Gas Burners shall be 0.3 Meters. The isolation valve shall be installed after entering the customer premises/kitchen but before the meter installation.

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

- **NG Conversion**

The Contractor shall provide the material such as rubber tube, jets, nozzles, clamps and conversion of burner the burner.

### **Powder Coating /Painting of GI Pipes**

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

- (a) **Painted (for scratched powder coated pipes and fittings only):**
-

**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
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- 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, and Nerolac. (No other make shall be used for painting).

All painting materials including primers and thinners brought to site by contractor for application shall be procured directly from manufacturers/dealers as per specifications and shall be accompanied by manufacturer's test certificates. The contractor shall ensure that smooth finish is attained after carrying out painting.

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

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

**(b) Powder coating (refer attached Specification for powder coating)**

Contractor will be required to install powder coated GI pipes & GI Fittings shall submit detailed procedure of powder coating for approval to Consultant prior to supply of GI pipes & GI fittings. After installation of the entire piping system, final touching shall be done to the satisfaction of EIC.

**13.0 TESTING OF GI / COPPER INSTALLATION**

- The installation from PE/GI transition fitting up to regulator shall be tested at the pressure of 2.0bar (g) for a hold period of 2 hours with no pressure drop. All the joints in the installation shall be checked with soap solution.
  - The GI installation from regulator outlet to Isolation valve at meter inlet (except meter) shall be tested at a pressure of 2.0 bar (g) for a hold period of 2 hours with no pressure drop. All the joints in the installation shall be checked with soap solution.
  - The GI/copper installation from Meter outlet to appliance valve (except meter) shall be tested at a pressure of 100 mbar with manometers or diaphragm gauge for a hold period of minimum 15 minutes and all the joints shall be checked with soap solution. Testing to be carried out with the entire satisfaction to TPIA/PMC.
  - The meter 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.
  - The contractor shall supply the Calibrated Pressure Gauges/ Manometer/Diaphragm Gauges of suitable range for testing of GI/Copper Installations ranging from 0-4 bars/0-150 m bar/0-250 m bar respectively. The calibration certificate shall be submitted before
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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
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the start of the execution work.

- The pressure gauges shall be calibrated from time-to-time as desired by EIC but positively once in every six months.
- The details of testing shall be properly recorded in the GI/Copper cards.
- The ends/joints shall be painted only after carrying out testing of the installation. Powder coating to GI pipes shall be carried out in factory/ shop, and repair/ touching shall be carried out at site.

#### **14.0 INSPECTION**

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

#### **15.0 PURGING & COMMISSIONING**

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

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

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

- Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.
- Ensure the area is well ventilated, and free from ignition sources.
- Continue to purge until gas is available at other appliances; Check availability of gas using Methane- detector
- Internal piping i.e. Meter Inlet, Diaphragm Meter & copper pipe shall be tested pneumatically & with soap solution from inside of each domestic connection

#### **16.0 RESTORATION**

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

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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
GROUND GI/COPPER PIPING & FITTINGS IN LOW RISE  
DOMESTIC CONNECTIONS**

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

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

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

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

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

### **17.0 SUBMISSION OF FINAL RECORDS**

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

- Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given completed.
- The details recorded in RFC cards of every domestic house.
- Details of houses where piping done along with materials used.
- Total material consumption report.
- Material reconciliation with respect to the materials issued.
- Test reports & calibration certificates of gauges etc.
- Any other documents/records required.
- Extra Piping details

### **18.0 COMPLIANCE TO HEALTH, SAFETY & ENVIRONMENT (HSE) FOR LOW RISE GI:**

Scope include use of Fall arrestor, Ascenders / descenders, PPE, Barricades/ Warning Boards (03 No's) connected with warning board & Caution tapes in areas where piping work is in progress, Use of Safety shoes, Walky talky, Hand gloves, Reflective jackets, Hard hats (helmets), eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications. Contractor shall also prepare and submit duly certified Safety check list signed by TPIA/PMC. In case of non-compliance, penalty shall be applicable as per SCC clause.

This set-up is applicable up to 4th (G+4) floor and full body safety harness with accessories

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shall be of KARAM or equivalent make.

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**STANDARD SPECIFICATION - INSTALLATION OF ABOVE  
GROUD GI/COPPER PIPING & FITTINGS IN LOW RISE  
DOMESTIC CONNECTIONS**

**19.0 ANNEXURE 1  
TOOLS & EQUIPMENT TO BE PROVIDED BY CONTRACTOR FOR  
GI/COPPER WORK**

S. No.	Hand Tools Description	Per Technician	Per Team
1	Pipe Wrench 250 mm	1	4
2	Pipe Wrench 350 mm	1	4
3	Pipe Wrench 450 mm	-	2
4	Adjustable Spanner 50 mm	-	4
5	Adjustable Spanner 150 mm	1	2
6	Adjustable Spanner 250 mm	1	2
7	Set of combination spanner 3/16"- 11/4"AF	1	1
8	Set of combination spanners 5mm-30mm	1	1
9	Large tool boxes	1	2
10	Set flat - headed screw drivers	1	2
11	Set Philips screw drivers	1	2
12	Small hammer	1	2
13	Combination pliers/mole grips	1	2
14	Set of files	1	2
15	Drill bits for 1"pipe	-	2
16	Stocks and dies for NPT threading 1/2", 3/4", GI pipe	-	3
17	Blowtorch	-	1
18	Soldering Iron	-	2
19	Copper Pipe Bending Machine	-	2
20	Hand drill 3/8"chuck	-	2
21	Portable electric drill 240v, heavy duty	-	2
22	Spare blades	4	4
23	Batter Powered torches	2	2
24	Measuring Tape 30m	1	2
25	Wire Brush	1	2
26	Portable Pipe vice & tripod	-	2
27	Set steel twist drills 0.5-2.0mm (for appliance conversion)	-	1
28	Set steel twist drill 1mm-10mm	-	2
29	Set masonry drills 1mm-10mm	1	2
30	Graphite based grease	As required	As required
31	Lubricating Oil	As required	As required
32	Hand Cleaner	As required	As required
33	Copper pipe cutter 12mm	-	4
34	GI Pipe Cutters 1/2" Gas Detection Equipment Power Generator 2.5 KVA Pressure Gauge (0-10 bar) Pressure Gauge (0-4 bar) Diaphragm Gauge (0-400m bar) Manometer (0-150m bar)	-	2
		As required	-
		As required	-
		2	4
		2	8
		1	2
		1	1
35	Automatic Thread Cutting Machine	-	As required
36	GI Pipe Cutter	-	2



**STANDARD SPECIFICATION FOR WELDED  
RISER & GI/COPPER PIPING INSTALLATIONS FOR  
PNG CONNECTIONS IN HIGH RISE BUILDINGS**

**SS-PE-0004**

<b>REV. No</b>	<b>DATE</b>	<b>Purpose</b>	<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>

**STANDARD SPECIFICATION  
FOR WELDED RISER & GI/COPPER PIPING INSTALLATIONS  
FOR PNG CONNECTIONS IN HIGH RISE BUILDINGS**

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**STANDARD SPECIFICATION  
FOR WELDED RISER & GI/COPPER PIPING INSTALLATIONS  
FOR PNG CONNECTIONS IN HIGH RISE BUILDINGS**

## **1.0 INTRODUCTION**

M/s Central U.P. Gas Limited (CUGL) a Joint Venture of India's two Maharatana Companies, GAIL (India) Limited and Bharat Petroleum Corporation Limited incorporated on 25th February 2005. CUGL is authorized by the Petroleum and Natural Gas Regulatory Board (PNGRB) to operate in the Geographical Areas (GAs) of Kanpur (including some part of Unnao), Bareilly and Jhansi.

The main scope of this contract comprises the installation of above ground pipes from the outlet of 'PE/GI transition fitting' up to the domestic Customers 'Appliance/stove/oven valve' in New as well as in Existing Gas charged areas.

The scope includes installation & procurement of above ground GI/Cu pipes and associated fittings for domestic consumers. However, the piping may have to be carried out up to Appliance Valve, in case of some domestic customers required.

Except domestic meter, regulator, Isolation and appliance valve, Contractor shall procure each material (Powder Coated GI fittings, Powder coated GI Pipes, Cu Pipes, Cu/Brass fittings, etc.) which is required from the outlet of PE/GI transition fitting up to the Domestic Customers "Appliance/stove/oven valve".

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

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

## **2.0 DEFINITIONS**

OWNER	Central UP Gas Ltd., CUGL
TPIA	Third Party Inspection Agency to be appointed by CUGL.
EIC	Engineer – in –charge
CUMULATIVE LENGTH	The riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection

## **3.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY**

- **Material to be supplied as a free issue material**

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

**STANDARD SPECIFICATION  
FOR WELDED RISER & GI/COPPER PIPING INSTALLATIONS  
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from any other source of supply other than owner's supplied material without any written approval from EIC.

- **Material / Equipment & machinery to be supplied by contractor**

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

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

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

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

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

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

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

- **Plant and Equipment**

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

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- **Sealant, Grout**

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

- **Clamps, Rawal Plugs, Screws and Nozzles etc.**

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

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

- **Consumables Items**

- Consumables such as Electrodes, Teflon Tapes, solder wire, flux, lacquer; thinner shall be supplied by the contractor and are included in installation rates.
- These consumables shall be of reputed make companies and required grades/class.

- **Other Materials**

The contractor shall supply the following items wherever required:

- All materials required for work, NPT threading, copper pipe jointing, testing etc.
  - All signs, barricades, lights and protective equipment.
  - All material required for working at height (i.e. scaffolding, Ladder, Safety Belts).
  - Self-Locking Safety Harness Belts PETZL make as mentioned in safety procedure are mandatory.). Contractor shall provide but not limited to ascender, descended and pulley system essentially to carry out work at height.
  - Motorized suspended platform with skilled operator shall be preferred for installation above 25<sup>th</sup> storey building.
  - Special consumable such as grease for maintenance of domestic appliances, all paints for painting of GI Pipes, Regulator Boxes, Consumables such as Teflon
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Tapes, Solder-wire, Flux, Lacquer, Thinner, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included within the rates.

- 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.

- **Acquisition, Receipt and Storage of Materials**

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

The Contractor shall carry out assessment of material required for GI/Copper installation in allocated area. After approval from Owner, contractor shall place order for purchasing of Powder coated GI Pipes & fittings, Powder coated Wrought Steel Fittings (Forged Fittings), Copper pipes & fittings, Brass Fittings and Reinforced Rubberhose (Technical specifications attached in the tender document), MS/PVC clamps using SS304/brass screws, super hold nylon rawl plug anchor to any of the approved vendors as per the list attached in the tender document. The contractor shall also ensure that the ITP for these materials shall be approved before the start of production activity. Once ITP is approved, contractor shall forward inspection call to the Owner depending upon the material requirement at the site. The inspection of these materials shall be carried out by Owner appointed third party inspection agency. It is contractor's responsibility to submit documents, arranging dispatch clearance, handling, loading, transportation and unloading of these materials at their own respective stores. In case of any defective material found shall be returned to CUGL store within one month of issue.

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

The Contractor shall physically examine all free issue materials at the time of acceptance of the material in CUGL' store.

Any damage not so recorded will be deemed not to have existed at the time of acceptance of material in store by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.

All materials shall be stored in contractor's stores near site in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals.

The Contractor shall be required to submit material reconciliation statement every month/ before issuing any free issue material from CUGL store duly certified by CUGL representative.

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

Material reconciliation indicating issue of material, consumptions and defective material shall be submitted on monthly basis.

#### **4.0 ISSUE OF WORK INSTRUCTIONS**

- The contractor will be required to carry out GI installation as per instructions of CUGL OFFICER/PMC/TPIA.
- All skilled personnel like welders, jointers, conversion technicians will be approved and certified by Owner/Owner's Representative. The technicians who will carry out welding of Risers, joining of copper material and conversions will undergo a test by Owner. Those who clear the test will be issued identity cards duly signed by Owner/Owner's representative. Approved technicians shall be only authorized to take up respective jobs. In case it is found that contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per contract.
- The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour , supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.
- The schedule of items of GI/Cu installations have been described in brief and shall be held to be completed in all respect including safety requirements as per Technical specification of HSE, tests, inspection, QA/QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works whatsoever shall be considered in execution of these items.

#### **5.0 PROGRESS OF WORK**

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

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

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

The penalty and incentives will be calculated and applied on basis of monthly target as per SCC of Tender.

## **6.0 WORK SHEETS**

- The quantities of GI/Cu pipe and other details will be checked by Owner's site engineer and the same shall be incorporated in RFC cards. The detailed reports shall be signed by CUGL officer/PMC/TPIA
- Measurement sheets shall be prepared based on the RFC cards and checked and certified by the site engineers for billing purpose.
- If measurement sheets submitted are illegible, incomplete or incorrectly booked, it will be returned to the contractor.

## **7.0 PERMISSIONS / APPROVALS**

- Contractor shall be responsible for obtaining permissions from society management, RWA, individual residents and any other concerned authority, if required, for completion of the work. Contractor must take the prior appointment from the residents for carrying out the work.
  - The Contractor shall work in close consultation/ co-ordination with the Owner/ Owner's Representative.
  - The Contractor shall not sign/execute any agreement and/or undertaking on any such documents which amounts to be undertaken by Owner. The same shall only be signed and executed by Owner; however, the prospective bidders shall also liaison and coordinate for the same.
  - The necessary coordination, liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the registered customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.
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A log book/job card for such appointments with Consumer/any other agencies shall be maintained and the schedule/appointment once taken shall be adhered to by the contractor. Owner/Owner's Representative shall review the records every week. The contractor shall submit the detailed list of RFC/Conversions and balance work on Registrations at least once a week as per approved format.

- The contractor is also required to obtain a "Labour License" and BOCW registration from the Assistant Labour Commissioner of respective Administration/Central Govt.
- It will be the contractor's responsibility to familiarise himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.
  - The contractor has to take responsibility of the actions of supervisors, plumbers and helpers provided by him.

## **8.0 REFERENCE SPECIFICATION, CODES AND STANDARDS**

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

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

## **9.0 RIGHT-OF-USE SURVEY AND MARKING**

The route of the pipeline to be installed shall be decided with consent of the consumer and Owner/Owner's Representative. Contractor must ensure that the persons/workers/supervisors/ working at site shall have proper identity cards prior to entering the premises of the consumer.

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

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

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

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

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

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

### **10.0 PROTECTION OF STRUCTURES AND UTILITIES:**

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

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

### **11.0 GI AND COPPER PIPE ABOVE GROUND SERVICE PIPE**

- **Definitions:**

- a. High Rise Buildings – A building having fourteen or more storey's above ground level. (i.e. of G + 14 orientation)
  - b. Riser - A riser is the vertical section of a service pipe laid up a building which supplies a number of laterals.
  - c. Lateral-A lateral is a horizontal off-take from a riser, which supplies a single customer/dwelling.
  - d. Service Regulator (SR) – Service Regulator is a regulator installed on a gas service line to control the pressure from 4 bar to 100 mbar that, in an emergency automatically assumes control of the pressure downstream of the station, in case that pressure exceeds a set maximum.
  - e. Meter Regulator (MR) – Meter regulator is a pressure regulator installed in series with another pressure regulator which reduces the pressure from 100 mbar to 21mbar.
  - f. Riser Isolation Valve (RIV) - Riser Isolation valve is fitted at the bottom of the riser to isolate the riser from the underground gas supply network.
  - g. Lateral Isolation Valve (LIV) – Lateral Isolation Valve is fitted on horizontal riser (lateral) after TEE to facilitate online Tappings and other maintenance works.
  - h. Meter Control Valve (MCV) - A Meter Control Valve is fitted immediately upstream
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of the meter to enable the internal pipe work inside the property to be isolated from the upstream gas supply network. It must be fitted in a manner that the consumer can easily operate the valve handle.

- **Specification for Welding**

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

The welded pipe joints shall include the followings:

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

**Welding Consumables:**

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

**Welding Process:**

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

**Welding**

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

- **Planning and Design of GI Welded Riser**

- a. Risers and laterals must be designed to run through the optimal possible route approved by CUGL representatives, taking into consideration potential meter positions, design regulations and access for future maintenance.
  - b. The riser and associated laterals must be constructed in the most economical manner using the minimum no. of fittings, minimum pipe and considering future maintenance requirements.
  - c. For buildings above 14 floors - for ease in construction and maintenance the preferred method will be welded pipe –work laid in a purpose designed and built ventilated utilities shaft.
  - d. Risers and laterals must be laid a minimum of 300 mm from any electrical equipment or installations. On occasions where the pipe has to cross over a cable, this has to be done at right angles and a minimum gap of 25 mm must be maintained between the pipe and cable. Consideration may be given to wrapping the pipe with electrical insulation tape for protection against electrical short
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circuiting.

- e. Provision for access to the riser for future maintenance must be made at the design stage & involved undertaking a risk assessment for undertaking future maintenance work.
  - f. 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 service regulator, meter regulator, valves, fittings, meters, clamps etc. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with ladders, scaffolding pipe, dies, tripods, vices, fittings and Teflon tape, drills for concrete and other masonry, drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, paint for marking etc.
  - g. All Welded GI risers at the outside of buildings shall be fully supported to carry the weight of piping. A flanged foot or similar device, capable of supporting the total weight of the riser, shall support risers. The riser shall be installed 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 ANSI B1 20.1
  - h. Contractor has to supply different types/sizes of approved powder coated clamps (Mild Steel) for fixing GI pipes suiting to the site conditions. The contractor shall get approval from Owner/Owner's Representative for every fresh lot of the clamps, brackets, regulator boxes and other consumables, prior to start of installation.
  - i. All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 mtrs. Maximum distance between clamps shall be 1.0 - 1.5 m when pipe goes to the straight, if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from center line of fittings at every sides. However, the same may be changed as per site conditions/as directed by CUGL/PMC/TPIA. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.
  - j. Where pipe passes through the balcony and the surface is slightly elevated around the service pipe or its surrounding, sleeves to be provided 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 is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc.
  - k. Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.
  - l. For welded riser, riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection. The payment shall be done through running meter rates as per SOR.
  - m. The rates of GI Pipe and Copper pipe including installation of valves and fitting etc.
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from Lateral isolation valve till home appliances are payable as per SOR.

- n. Installation of Meter and Meter Regulators with associated inlet and outlet connections/fittings shall be connected with meter. The rate also includes testing of joints till commissioning.
  - o. Except Meter, Meter Regulator, Isolation and appliance valve, Contractor shall procure all other materials (i.e. Pipe, fittings, clamps, SS screws etc.) as per attached specification for installation and to the entire satisfaction of Owner/ Owner's Representative.
  - p. The contractor shall also ensure that gas supply shall not be provided to the customer in any Concealed Piping.
  - q. The Copper service pipe installation work includes all work necessary to connect downstream of the meter (inside the kitchen) to the Customers appliances. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with these, he will be required to provide ladders, scaffolding pipe, drills for concrete and other masonry, special drills for timber, Granite, Marble Stones and laminated surfaces, provisions for cutting glass of window inside Customers property, bending tools, sleeves to facilitate the pipe passing through floors and walls, etc. Copper pipes & fittings shall be provided by Contractor.
  - r. During installation the Copper pipe is to be cut to proper length with tube Cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer/inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional blow torch to melt solder wire. Contractor ensure that jointing of Cu pipe & Fittings shall be done by skilled manpower.
  - s. Contractor has to supply different types/sizes of approved clamps (PE 80/PVC) for fixing Copper pipes suiting to the site conditions. Contractor has to take prior approval of CUGL/PMC for quality of the clamps, solder, flux, lacquer, thinner etc. The approval shall be taken for every fresh lot of clamps from CUGL/PMC before installation at site.
  - t. All copper piping shall be clamped to the walls at intervals not exceeding 500 mm. The solder wire shall be of reputed company of diameter size 3.25mm, lead free as per BS 29453:1994 (Soft solder alloys) and supplied in coils. The detail specification is attached in tender for reference. Solders for use with copper tube & fittings generally melt within the temperature range 180°C - 250°C. The contractor has to furnish the certificate of confirmation of standards before start of work.
- **Riser and Laterals Fabrication, Installation and Testing: -**  
  
Heavy class Galvanized Iron (GI) pipes, conforming to IS 1239- Part 1 duly Polyester Powder Coated with 70 microns' thickness and Wrought Steel fittings (Forged fittings) conforming to IS-1239 Part 2 shall be used for welded riser.
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Powder and Galvanized (Zinc) coating shall be removed by light duty grinder or by any other suitable tool at both ends of riser pipe at about 25mm in length where welding is to be performed.

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

The entire riser assembly shall be fabricated with socket welds for threaded riser assembly. Threaded joints are permitted after first isolation valve on laterals where riser is not approachable from balcony and in case if riser is in approach of balcony within 300 mm gap from balcony laterals may be threaded with tee of welded riser on account of workability and future maintenance considerations.

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

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

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

Ventilation is provided to prevent gas leaks from causing the atmosphere to become unsafe. Ventilation shall be natural. It is not permitted to use mechanical ventilation to achieve the required ventilation levels. Special Safety Harness and Protective equipment's of PETZL make are mandatory for riser installation. Details would be as per approved Safety Job Procedure. Ensure that all equipment's and safety devices used are inspected, certified by competent authority valid & suitable for use. Plumber deployed for riser installation for high rise buildings shall be certified and prequalified with medical tests as per Safety Job Procedure.

- **Meter & Meter Regulator Positions**

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

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

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

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

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

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

- **Installation of Meter**

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

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

Firmly secure the meters on the wall with good quality super hold nylon anchor Rawl Plugs, SS 304/brass screws etc. In case the Rawl Plugs are not holding then wooden blocks or other fixing arrangements like cement etc. to be used for proper grouting.

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

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

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

- **Laterals**

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

- **Ventilation**

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

- **Pipes Passing Through Walls**

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

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

- **Painting of GI Pipes & GI Fittings**

Contractor shall install powder coated GI pipes & GI Fittings in consultation with CUGLOFFICER/PMC/TPIA. Contractor shall submit detailed procedure of powder coating for approval to PMC prior to supply of GI pipes.

## **12.0 TESTING OF GI/COPPER INSTALLATION**

- Only pretested riser shall be erected using pulley arrangement. Pretesting shall be done with compressed air at 2 bar (g) for minimum duration of 30 minutes.
  - Risers and laterals shall be Leak tested with compressed air at 2 bar (g) for minimum 2 hrs after vertical installation.
  - Once testing is satisfactorily completed, uncoated portion (welded) of risers and laterals shall be painted as per painting procedure.
  - The GI/Copper installation from lateral valve to appliance valve shall be tested at a pressure of 100 mbar (g) for a holding period of 15 minutes with no pressure drop. All the joints in the installation shall be checked with soap solution.
  - The contractor shall supply the Calibrated Pressure Gauges / Manometer / Diaphragm Gauges of suitable range for testing of GI/Copper Installations ranging from 0-4 bars / 0-500 mbar respectively. The calibration certificate shall be submitted before the start of the execution work.
  - The pressure gauges shall be calibrated from time-to-time as desired by CUGL/PMC but positively once in every six months.
  - The details of testing shall be properly recorded in the GI/Copper cards.
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### **13.0 INSPECTION**

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

### **14.0 PURGING & COMMISSIONING**

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

Care shall be taken to ensure that the outlet is so located that vent gas cannot drift into buildings. The commissioning of the GI installation should be performed as follows:

- Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.
- Ensure the area is well ventilated and free from ignition sources.
- Continue to purge until gas is available at other appliances.
- Internal piping i.e. Meter Inlet, Diaphragm Meter & copper pipe shall be tested pneumatically & with soap solution from inside of each domestic connection.

### **15.0 RESTORATION**

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

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

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

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

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

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

**16.0 SUBMISSION OF FINAL RECORDS**

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

- Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given /completed.
- The details recorded in RFC cards of every domestic house.
- Details of houses where piping done along with materials used.
- Total material consumption report.
- Material reconciliation with respect to the materials issued.
- Test reports & calibration certificates of gauges etc.
- Any other documents/records required.
- Extra Piping details

**17.0 Compliance to Health, Safety & Environment (HSE) High Rise:**

Scope includes use of fall arrestor, Ascenders / descended, PPE, Barricades/ Warning Boards (03 No's) connected with warning board/Caution tapes in areas where piping work is in progress, Use of Safety shoes, Wacky talky, Hand gloves, Reflective jackets, Hard hats (helmets), eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications. Contractor shall also prepare and submit duly certified Safety check list signed by TPIA/PMC. In case of non-compliance, penalty shall be applicable as per SCC clause.

This set-up is applicable for more than 5<sup>th</sup> (G+5) and above including high rise. Above 4th floor full body safety harness & accessories of PETZL make is compulsory.

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**ANNEXURE # 1**

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

<b>S.NO.</b>	<b>HAND TOOLS DESCRIPTION</b>	<b>PER TECHNICIAN</b>	<b>PER TEAM</b>
1	Pipe wrench 250 mm	1	4
2	Pipe wrench 350 mm	1	4
3	Pipe wrench 450 mm	-	2
4	Adjustable spanner 50 mm	-	4
5	Adjustable spanner 150 mm	1	2
6	Adjustable spanner 250 mm	1	2
7	Set of combination spanner 3/16"-11/4" AF	1	1
8	Set of combination spanners 5mm - 30mm	1	1
9	Large tool boxes	1	2
10	Set flat-headed screw drivers	1	2
11	Set Philips screw drivers	1	2
12	Small hammer	1	2
13	Combination pliers/mole grips	1	2
14	Set of files	1	2
15	Drill bits for 1" pipe	-	2
16	Stocks and dies for NPT threading 1/2", 3/4", GI Pipe	-	3
17	Blowtorch	-	1
18	Soldering iron	-	2
19	Copper Pipe Bending Machine	-	2
20	Hand drill 3/8" chuck	-	2
21	Portable electric drill 240V, heavy duty	-	2
22	Spare blades	4	4
23	Battery powered torches	2	2
24	Measuring tape 30 m	1	2
25	Wire brush	1	2
26	Portable pipe vice & tripod	-	2
27	Set steel twist drills 1mm-10mm	-	2
28	Set masonry drills 1mm-10mm	1	2
29	Graphite based grease	As required	As required
30	Lubricating oil	As required	As required

**STANDARD SPECIFICATION  
FOR WELDED RISER & GI/COPPER PIPING INSTALLATIONS  
FOR PNG CONNECTIONS IN HIGH RISE BUILDINGS**

31	Hand cleaner	As required	As required
32	Copper pipe Cutter 12mm	-	4
33	GI Pipe Cutters ½"	-	2
	Gas Detection Equipment	As required	-
	Power Generator 2.5 KVA	1	-
	Pressure Gauge (0-10 bar)	2	4
	Pressure Gauge (0-4 bar)	2	8
	Diaphragm Gauge (0-400 m bar)	1	2
	Manometer (0-150 m bar)	1	1
	Automatic Thread cutting machine	-	2
35	GI Pipe Cutter	-	2
36	Welding Equipment	01 set per site	01 set per site
37	Full Body Safety Harness like PETZL or Equivalent	03 set per site	03 set per site
38	Motorized Suspended Platform	As required	As required

# STANDARD SPECIFICATION – SUPPLY GI PIPES

## VPC – SS – PE - 0005

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REV. No	DATE	Purpose	Prepared	Checked By	Approved By
00	20.06.18	ISSUED AS STANDARD	BS	MVK	AD

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## STANDARD SPECIFICATION - GI PIPES

### 1.0 INTRODUCTION AND SCOPE

Owner plans to augment Piped Natural Gas (PNG) network. It supplies natural gas to domestic & commercial and few industrial customers.

This present document covers the technical specification for the procurement of GI Pipes used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for GI pipes of heavy steel tube. Unless modified by this specification, requirements of IS 1239 (Part-I): 2004 (Latest edition) shall be valid.

### 2.0 DEFINITIONS

Owner	Shall mean Indian OIL Corporation Limited. (IOCL)
Manufacturer	Means the Manufacturer of the GI pipe.
SS	Means the present <<Standard Specification>> and all its appendix, if any.
TPIA	Means the Inspection Agency to be appointed by Owner.

### 3.0 MATERIAL

The material used for the manufacturing of GI pipes confirming to IS 1239 (Part -1): 2004 (Latest edition).

### 4.0 DIMENSIONS, THICKNESS & DIMENSIONALTOLERANCES

The dimensions & nominal mass of tubes shall be in accordance with Table 5 subject to the tolerances permitted in CL.8.1 & 9 of IS 1239 (Part-I) : 2004 ( Latest edition ). Length of each pipe shall be 6 mtrs with + 6, - 0 mm tolerance. However, pipe length shall be considered 6 m. only for measurement / payment purpose.

Nominal Diameter DN	15 mm	20 mm
Grade	Heavy	Heavy
Outer Dia. (Max. / Min.)	21.8 mm / 21.0 mm	27.3 mm / 26.5 mm
Thickness ( mm )	3.2	3.2
Nominal weight (Kg / m)	1.44	1.87

### 5.0 END CONNECTION OF PIPE

GI Pipes shall be supplied with plain end.

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## STANDARD SPECIFICATION - GI PIPES

### 6.0 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

### 7.0 FREEDOM FROM DEFECTS

On visual examination the outside & inside surfaces of pipes shall be smooth & free from defects such as cracks etc.

### 8.0 GALVANIZING

- Pipes shall be galvanized to meet the requirement of IS: 4736 – 1986 with latest amendment.
  - Zinc conforming to any grade specified in IS: 13229- 1991 with latest amendment shall be used for the purpose of galvanizing.
  - Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.
  - Mass of zinc coating: Minimum mass of zinc coating determined as per IS: 6745 shall be 360gms/m<sup>2</sup>.
  - Uniformity of galvanized coating: The galvanized coating when determined on a 100 mm long test piece in accordance with IS 2633: 1986 with latest amendment shall withstand 5 one – minute dips.
  - Freedom from defect: The zinc coating on internal & external surfaces shall be uniform adhered, reasonably smooth & free from such imperfections as flux, ash & drop inclusions, bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits & blisters. Rejection & acceptance for these defects shall be as per Appendix - A of IS 2629: 1985 with latest amendments.
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## STANDARD SPECIFICATION - GI PIPES

- **Samplings**

- a) All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be IS:4711 1995 with latest amendment.
- b) The sample selected according to Clause 6.1 & 6.2 of IS: 4736 – latest edition.
- c) The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 5.1 of IS: 4736 – 1986 with latest amendment.
- d) Criteria for conformity: As per IS: 4736 – 1986 with latest amendments.

### **9.0 PRESSURE TEST**

Hydrostatic pressure test shall be carried out at a pressure of 5 Mpa for the duration of at least 3 second and shall not show any leakage in the pipe. Vendor to submit the internal pressure test certificate for the same. Owner Representative or Third party Inspection Agency appointed by Owner shall witness finish goods testing as per the sample procedure specified in IS: 1239 (Part-1) – latest edition.

### **10.0 MARKING**

Each pipe shall be embossed with Owner's logo, manufacturer's name or trademark, size designation, class of pipe at the interval of not more than 1 meters.

Each packing containing pipes shall carry the following embossed, stamped or written by indelible ink.

- Manufacturers name or trademark.
- Class of pipe –Heavy.
- Indian standard mark (ISI).
- Lot number / Batch no. of production.

Each pipe conforming to this standard shall also be marked with BIS standard mark.

### **11.0 INSPECTION / DOCUMENTS**

Inspection shall be carried out as per Owner Technical Specification.

Owner Representative or Third Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.

The manufacturer shall have a valid license to use ISI monogram for manufacturing of pipe in accordance with the requirement of IS: 1239.

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## STANDARD SPECIFICATION - GI PIPES

Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / inspection reports as per Owner Tech. Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

For any control, test or examination required under the supervision of TPIA/Owner/Owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date and place along with production schedule.

Even after third party inspection, Owner reserves the right to select a sample of pipes randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the right to reject all production supplied from the batch.

### **12.0 PACKAGING**

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

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ENERGISING QUALITY

## STANDARD SPECIFICATION - SUPPLY GI FITTINGS

**VPC-SS-PE-0006**

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<b>00</b>	<b>18.06.18</b>	<b>ISSUED AS STANDARD</b>	<b>BS</b>	<b>MVK</b>	<b>AD</b>
<b>REV. No</b>	<b>DATE</b>	<b>Purpose</b>	<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>

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**STANDARD SPECIFICATION - GI FITTINGS**

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## STANDARD SPECIFICATION - GI FITTINGS

### 1.0 SCOPE

Owner plans to augment Piped Natural Gas (PNG) network. It supplies natural gas to domestic & commercial and few industrial customers.

This present document covers the technical specification for the procurement of GI fittings used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for Malleable Cast Iron Fittings unless modified by this specification, requirements of IS 1879 – latest edition shall be valid.

### 2.0 DEFINATIONS

Owner	Shall mean Indian Oil Corporation Limited (IOCL)
Manufacturer	Means the Manufacturer of the GI fittings.
SS	Means the present <<Standard Specification>>and its appendix, if any.
TPIA	Means the Inspection Agency to be appointed by Owner.

### 3.0 MATERIAL

The material used for the manufacturing of GI fittings shall conform to ISI 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.

### 4.0 DIMENSIONS THICKNESS & DIMENSIONAL TOLERANCES

- Dimensions of various types of fittings shall be as specified in sections 2 to 10 of IS 1879 – 1987 with latest amendments, as applicable.
- Wall thickness of fittings and tolerances on them shall be as given in Table 1.2 of S 1879 – 1987 with latest amendments,
- In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.
- Elbows, Tees, Sockets and caps shall be of reinforced type.

### 5.0 WEIGHT

Weights of various types of fittings shall be as specified in sections 2 to 10 of S 1879 – 1987 with latest amendments, as applicable.

### 6.0 THREADS

- Threads shall be NPT type and conforming to ASME B1.20.1.
  - Outlets of fittings shall be threaded to dimensions & the tolerances as specified in ASME B1.20.1.
  - All internal & external threads shall be tapered.
  - For checking conformity of threads gauging practice in accordance with ASME B1.20.1
-

## STANDARD SPECIFICATION - GI FITTINGS

shall be followed.

- Chamfering: The outlet of fittings shall have chamfer.

### 7.0 FREEDOM FROM DEFECTS

On visual examination, the outside & inside surfaces of fittings shall be smooth & free from any defects such as cracks, injurious flaws, fine sand depth etc.

### 8.0 GALVANIZING

- Fittings shall be galvanized to meet the requirement of IS: 4759-1996 with latest amendments.
- Zinc conforming to any grade specified in IS: 13229-1991 with latest amendments shall be used for the purpose of galvanizing.
- Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.
- Coating requirements: Mass of coating shall be 610 - 700gms/m<sup>2</sup>.
- 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.
- **Samplings**
  - a. All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be given in Table 2 of IS 4759 - latest edition.
  - b. The sample selected according to Column 1 & 2 of Table 2, IS: 4759 - latest edition shall be tested for visual requirements as per Clause 6.2 of IS: 4759 - latest edition
  - c. The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 9.2 of IS: 4759 - latest edition.
  - d. Criteria for conformity: As per Clause 8.3 of IS: 4759-latest edition.
  - e. Test procedure shall be as per Clause 9 of IS: 4759-latest edition.

### 9.0 PRESSURE TEST

Vendor shall carry out pneumatic pressure test as per Clause 11.1b of 1879 - 1987 with latest amendments on each & every fittings. Vendor to submit the Internal Quality control certificate for the same. Owner shall witness pneumatic testing as per the sampling procedure specified in 1879 - 1987 with latest amendments.

### 10.0 COMPRESSION TEST

This test shall be conducted to judge the malleability of the pipe fittings & shall be carried out as per Clause 12 of 1879 - 1987 with latest amendments.

### 11.0 SAMPLING

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## STANDARD SPECIFICATION - GI FITTINGS

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per clause 14 of 1879 – 1987 with latest amendments. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

### **12.0 MARKING**

Each fitting shall be embossed with OWNER's logo, manufacturer's name or trademark and the size designation.

Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

- Manufacturer's name or trademark.
- Designation of fittings.
- Lot number.

Each fitting conforming to this standard shall also be marked with BIS standard mark.

### **13.0 PACKAGING**

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

### **14.0 INSPECTION / DOCUMENTS**

- Inspection shall be carried out as per Owner Technical Specification.
  - Owner Representative or Third-Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.
  - Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Owner Tech Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.
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**STANDARD SPECIFICATION – SUPPLY COPPER FITTINGS**

**VPC –SS-PE-0007**

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<b>00</b>	<b>18.06.18</b>	<b>ISSUED AS STANDARD</b>	<b>BS</b>	<b>MVK</b>	<b>AD</b>
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## 1.0 SCOPE

This specification covers the requirements for 12 mm OD X 0.6 mm wall thickness Copper tube, Half Hard. Unless modified by this specification, requirement of BS EN 1057 (latest), Half Hard, shall be valid, with the recommended changes in physical properties to suit wrinkle free bend ability.

## 2.0 MATERIAL

The material used for the manufacturer of Copper tube shall confirm to BS EN 1057(latest), Grade Cu - DHP or CW024A.

- **Mechanical Properties:**

- a. Ultimate Tensile Strength–250N/sq.mm(min)
- b. Elongation – 30% (min)
- c. Hardness - 75 to 100 on HV scale.

- **Chemical Properties:**

In Each heat one no. of the copper tube will be tested for chemical properties to confirm to non-arsenic Cu - DHP / CW024A as per BS EN 1057 to have the following chemical composition:

Copper Percentage including silver : Min 99.9%  
Phosphorus Percentage : 0.015 to 0.040%

## 3.0 DIMENSIONAL TOLERANCES

The mean outside Diameter of the tube shall not vary from the specified outside diameter by more than the amount of tolerances specified in table 4 of BS EN 1057. The tolerance on the wall thickness shall be as specified in table 5 of BS EN 1057.

The length of the tube shall be 3 m. Allowable tolerance shall be (-0, +0.5 mm).

## 4.0 MANUFACTURE

The tubes shall be solid drawn by the process of melting, extrusion and thereafter Bright annealing. The ends shall be cut clean & square with the axis of the tube in no case shall tubes be redrawn from old or used tubes.

## 5.0 FREEDOM FROM DEFECTS

- The tubes shall be free from internal & external fins, flaws, skin defects, blow holes etc. or other irregularities which might restrict the free flow of fluid and shall be so designed that resistance to the flow of fluid through the tubes is minimized.
- All tubes will be supplied 100% Eddy Current tested as per ASTM E243 and BS EN 1057. Eddy Current testing is a computer aided test, wherein the tube passes through a probe & an electromagnetic field is created around the peripheral of the tube to detect any flaw or blow hole which may not be visible to the naked eye. The manufacturer must have in-house Eddy Current testing facilities to supply to Owner. Owner reserves the right to witness the Eddy Current facility at the manufacturer's factory premises.

## 6.0 HYDROSTATIC TEST

Hydrostatic test shall be carried out minimum 35 bar pressure for a period of 10 second as per EN 1057 (latest).

## 7.0 DRIFT EXPANDING TEST

Drift expanding test shall be carried out as per EN 1057. The O.D. of the tube end shall be

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expanded by 30% using a conical mandrel (at angle 45°) with no wrinkles, cracks, break or any form of defect should occur on the tube during & after the test.

## **8.0 CARBON FILM TEST**

Copper tubes to be tested for carbon film test & the manufacturer will certify that the tubes meet the requirement of clause 8.5 of BS EN 1057.

## **9.0 CARBON CONTENT TEST**

Copper tubes to be tested for carbon content test to ensure a carbon level to avoid the formation of carbon film during installation. Max. Carbon level shall be permitted as per clause 6.5 of BS EN1057.

## **10.0 MARKING**

Each tube shall be permanently marked every meter with OWNER's Logo, manufactures name & size and specification of the tube.

Each packing containing tubes shall carry the following, stamped or written in indelible ink.

- Manufacturers name or trademark
- Designation of tubes (OD x wall thk)
- Lot number.
- No. of the standard (EN1057)

## **11.0 PACKAGING**

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's consultant before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

## **12.0 INSPECTION/ DOCUMENTS**

- Inspection shall be carried out as per OWNER Technical Specifications, relevant codes/standard and Inspection Plan/ QAP. Vendor to prepare detailed QAP and submit the same for approval of OWNER / OWNER's Authorized Consultant.
  - OWNER consultant or third-party inspection agency appointed by OWNER shall carry out stage wise inspection during manufacturing/ final inspection.
  - Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per OWNER Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.
  - Even after third party inspection, OWNER reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in OWNER Technical specification, then OWNER reserves the rights to reject all production supplied from the batch.
  - For any control test or examination required under the supervision of TPIA/owner/owner's consultant, latter shall be informed in writing one (1) week in advance by vendor about inspection date & place along with production schedule.
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**STANDARD SPECIFICATION – SUPPLY  
COPPER TUBE**

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**VPC –SS-PE-0008**

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## 1.0 SCOPE

This specification covers the requirements for 12 mm OD X 0.6 mm wall thickness Copper tube, Half Hard. Unless modified by this specification, requirement of BS EN 1057 (latest), Half Hard, shall be valid, with the recommended changes in physical properties to suit wrinkle free bend ability.

## 2.0 MATERIAL

The material used for the manufacturer of Copper tube shall confirm to BS EN 1057(latest), Grade Cu - DHP or CW024A.

- **Mechanical Properties:**

- a. Ultimate Tensile Strength–250N/sq.mm(min)
- b. Elongation – 30% (min)
- c. Hardness - 75 to 100 on HV scale.

- **Chemical Properties:**

In Each heat one no. of the copper tube will be tested for chemical properties to confirm to non-arsenical Cu - DHP / CW024A as per BS EN 1057 to have the following chemical composition:

Copper Percentage including silver : Min 99.9% Phosphorus

Percentage : 0.015 to 0.040%

## 3.0 DIMENSIONAL TOLERANCES

The mean outside Diameter of the tube shall not vary from the specified outside diameter by more than the amount of tolerances specified in table 4 of BS EN 1057. The tolerance on the wall thickness shall be as specified in table 5 of BS EN 1057.

The length of the tube shall be 3 m. Allowable tolerance shall be (-0, +0.5 mm).

## 4.0 MANUFACTURE

The tubes shall be solid drawn by the process of melting, extrusion and thereafter Bright annealing. The ends shall be cut clean & square with the axis of the tube in no case shall tubes be redrawn from old or used tubes.

## 5.0 FREEDOM FROM DEFECTS

- The tubes shall be free from internal & external fins, flaws, skin defects, blow holes etc. or other irregularities which might restrict the free flow of fluid and shall be so designed that resistance to the flow of fluid through the tubes is minimized.
- All tubes will be supplied 100% Eddy Current tested as per ASTM E243 and BS EN 1057. Eddy Current testing is a computer aided test, wherein the tube passes through a probe & an electromagnetic field is created around the peripheral of the tube to detect any flaw or blow hole which may not be visible to the naked eye. The manufacturer must have in-house Eddy Current testing facilities to supply to OWNER. OWNER reserves the right to witness the Eddy Current facility at the manufacturer's factory premises.

## 6.0 HYDROSTATIC TEST

Hydrostatic test shall be carried out minimum 35 bar pressure for a period of 10 second as

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per EN 1057 (latest).

### **7.0 DRIFT EXPANDING TEST**

Drift expanding test shall be carried out as per EN 1057. The O.D. of the tube end shall be expanded by 30% using a conical mandrel (at angle 45°) with no wrinkles, cracks, break or any form of defect should occur on the tube during & after the test.

### **8.0 CARBON FILM TEST**

Copper tubes to be tested for carbon film test & the manufacturer will certify that the tubes meet the requirement of clause 8.5 of BS EN 1057.

### **9.0 CARBON CONTENT TEST**

Copper tubes to be tested for carbon content test to ensure a carbon level to avoid the formation of carbon film during installation. Max. Carbon level shall be permitted as per clause 6.5 of BS EN1057.

### **10.0 MARKING**

Each tube shall be permanently marked every meter with OWNER's Logo, manufactures name & size and specification of the tube.

Each packing containing tubes shall carry the following, stamped or written in indelible ink.

- Manufacturers name or trademark
- Designation of tubes (OD x wall thk)
- Lot number.
- No. of the standard (EN1057)

### **11.0 PACKAGING**

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's consultant before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

### **12.0 INSPECTION/ DOCUMENTS**

- Inspection shall be carried out as per OWNER Technical Specifications, relevant codes/standard and Inspection Plan/ QAP. Vendor to prepare detailed QAP and submit the same for approval of OWNER / OWNER's Consultant.
  - OWNER's Consultant or third-party inspection agency appointed by OWNER shall carry out stage wise inspection during manufacturing/ final inspection.
  - Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per OWNER Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.
  - Even after third party inspection, OWNER reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in OWNER Technical specification, then OWNER reserves the rights to reject all production supplied from the batch.
  - For any control test or examination required under the supervision of TPIA/owner/owner's Consultant, latter shall be informed in writing one (1) week in advance by vendor about inspection date & place along with production schedule.
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**STANDARD SPECIFICATION**

**- BRASS**

**FITTINGS**

**VPC -SS-PE-**

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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 BS 864 / EN 1254 Part 1 shall be valid.

## 2.0 MATERIAL

- The material used for the manufacturer of Brass Capillary Fittings shall conform to EN 1254-1 (latest), Half Hard.
- Material used for the solder should conform to BS EN 29453 and should be lead free. Solder material shall be generally melting within the temperature range 180 ° C to 250 °C.
- Threading on the Brass fittings shall be done as per BS21.

## 3.0 DIMENSIONAL TOLERANCES

Dimensions tolerances of various types of brass capillary fittings (End feed fittings). shall be as per EN 1254 Part 1.

The tolerances at the end shall be as per EN 1254 Part I in nominal diameter which is as follows (Ref. table below)

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	+ 0.15	0.20	0.02

The minimum wall thickness of a fitting shall be in accordance as given below (Ref Table 3 of EN 1254 Part 1)

<u>Nominal Dia mm D</u>	<u>Minimum Wall thickness (mm) Brass</u>
12	1.1

## 4.0 END CONNECTION

End connection of the fitting must be capable of end feeding to the NPT x 12 mm. Internal solder ring type fitting is not acceptable.

## 5.0 CHEMICAL PROPERTIES

Chemical composition of Brass shall be as mentioned in EN 1254 PART I. Dezincification-resistant brass material CuZn36Pb2As or CW602N.

Cu	61.0-63.0 %
Pb	01.7-02.8 %
As	0.02 -0.15%

Remaining is zinc.

## 6.0 CARBON IN BORE

The internal surface of brass capillary fittings for soldering or brazing shall not contain any detrimental film nor present a carbon level high enough to allow the formation of such a film during installation. The maximum total carbon level on internal surfaces shall not

exceed  $1.0 \text{ mg/dm}^2$  when tested in accordance with the specification. This test shall be carried out as per clause no. 5.4 of EN 1254 -1.

### **7.0 RESISTANCE TO DEZINCIFICATION**

The fittings shall be manufactured from alloys containing more than 10% Zinc. So fittings shall be required to be resistant to dezincification. It shall be carried out as per Cl. 5.5 of EN 1254 -1.

### **8.0 STRESS CORROSION RESISTANCE TEST**

A stress corrosion resistance is to be carried out as per method defined in ISO 6957 using test solution of pH9.5 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  $1.5 \times 25$  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.

### **MARKING**

Each fittings shall be embossed with OWNER' s logo, manufacturers name and trade mark BS 864 / EN 1254 Part- I and designation of fittings.

Each packing containing fittings shall carry the following stamped or written in indelible ink.

### **13.0 PACKAGING**

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

### **14.0 INSPECTION/ DOCUMENTS**

- Inspection shall be carried out as per design codes/standards, OWNER Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's consultant.
  - OWNER's consultant or third-party inspection agency appointed by OWNER shall carry out random inspection during manufacturing/ final inspection.
  - Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per OWNER Technical Specification, at the time of final inspection of each supply lot of material.
  - Even after third party inspection, OWNER 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 OWNER Technical specification, then OWNER reserves the rights to reject all production supplied from the batch.
-

- Vendor shall prepare and submit the detail drawings of required brass fitting for approval by OWNER QSPL before starting production.
- For any control test or examination required under the supervision of TPIA/owner/owner's consultant, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

**STANDARD SPECIFICATION FOR STEEL REINFORCED RUBBER  
HOSE**

**VPC-SS-PE-0010**

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## 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 SPECIFICATION FOR POWDER COATING

Owner	Shall mean Indian Oil Corporation Limited (IOCL)
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
PTS	Means the present <<Particular Technical Specification>> and its appendix, if any.
TPIA	Means the Inspection Agency to be appointed by OWNER.
Type 4	Wire Reinforced hose for domestic / commercial installations

## 3.0 MATERIAL

- 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.
- Reinforcement material: - It shall have wire reinforcement in braided form in between the lining & cover.
- Cover: - It shall be manufactured out of synthetic rubber compound resistant to abrasion, weather and natural gas. The cover color shall be orange.
- The whole shall be consolidated by wrapping or any other suitable method and uniformly vulcanized to give good adhesion between reinforcement plies and the rubber lining of the cover.

## 4.0 DIMENSIONS & TOLERANCES

- Bore size

Nominal base (mm)	Minimum base diameter (mm)	Minimum bend radius (mm)
8mm	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.

- The Minimum thickness so lining & cover shall be 2 mm & 1 mm respectively.
- Length of hose shall be as defined in M.R. & the tolerances on length shall be permitted  $\pm 1\%$ .

## 5.0 FEATURES

- **Mechanical properties**

Tensile Strength (Lining & Cover) at break - 10 MPa (minimum)

Elongation (Lining & Cover) in at break (%) - 200 & 250 respectively (minimum)

- **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.

- **Adhesion**

The minimum adhesion between rubber lining & reinforcement, between layers of reinforcement and between reinforcement & cover shall be 2KN/m.

- **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.

- **Flexibility of Hose**

The hose shall be capable of being bent empty to the radius 95 mm without flattening and suffering structural damages.

- **Ozone resistance**

It shall be carried out as per clause no. 5.5 of IS 9573: 1978

- **Hydro static 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.

- **Bursting pressure**

It shall be carried out as per Clause 5.5.2 of IS 9573. The minimum burst pressure shall be 5 Mpa.

- **Grip strength test**

The hose shall comply to the requirement of Clause no. 5.5.7 of IS 9573.

- **Burning behavior**

The burning test shall be carried out on hose as per clause no. 5.5.8 of IS9573. The hose at least shall not burn till 45second.

## 6.0 MARKING

Each hose shall be indelibly marked as follows:

- Manufacturer's name or trade mark., if any
- Nominal bore
- Batch no. / Lot no.
- Month and year of manufacturer
- Type of hose i.e. Type 4
- BIS marking

## 7.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material

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being procured. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

## **8.0 INSPECTION/ DOCUMENTS**

- Inspection shall be carried out as per design codes/standards, OWNER Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's consultant.
  - For all test's purposes, the minimum time between vulcanization & testing shall be 16h.
  - OWNER's consultant or third-party inspection agency appointed by OWNER shall carry out random inspection during manufacturing/ final inspection.
  - Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per OWNER Technical Specification, at the time of final inspection of each supply lot of material.
  - 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 OWNER Technical specification, then OWNER reserves the rights to reject all production supplied from the batch.
  - Vendor shall prepare and submit the detail drawings of required steel reinforced rubber hose for approval by OWNER QSPL before starting production.
  - For any control test or examination required under the supervision of TPIA/owner/owner's consultant, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.
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**STANDARD SPECIFICATION FOR PURE POLYESTER POWDER  
COATING**

**VPC -SS-PE-0011**

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<b>REV</b>	<b>DATE</b>	<b>Purpose</b>	<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

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**1.0 SCOPE**

This Specification specifies the requirements for powder coating (Pure Polyester) of GI Pipes & fitting suitable to use for carrying Natural Gas directly expose to sunlight.

**2.0 SPECIFICATION FOR POWDER COATING**

Powder Material	:	Pure Polyester.
Application	:	Electrostatic Spraying (40 – 90 KV Manual/ Automatic)
Backing Schedule	:	180 <sup>0</sup> C to 200 <sup>0</sup> C for 10 mm (Metal Temperature) Coating
Thickness	:	50-60Microns

**3.0 TESTING**

Film Type	:	Glossy/Satin 86
Gloss600	:	95%
Cross Hatch Adhesion (ASTM D-5870)	:	GT = 0/100
Cylindrical bending Test (ASTM D -522) 5mm Rod dia	:	Passes
Enrichsen cupping (min)	:	8 Passes
Pencil Hardness(mm)	:	2H
Scratch Resistance (Kg. Mm)	:	3
Impact Resistance Kg. Min (ASTM D- 2794)	:	Direct 150 Indirect 150
Salt Spray Resistance (ASTM B-117)	:	1000 Hrs. (min)
Porosity (DIN 53161)	:	Passes
Humidity Resistance	:	1000 Hrs. (min)

**4.0 MARKING**

Each fitting shall be embossed with manufacture's name or trademark and the size designation. Each packing containing fittings shall carry the following stamped or

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written by indelible ink.

- Manufacturers name or trademark.

- Designation of fitting.
- Lot number.

Each fitting conforming to this standard shall also be marked with BIS standard mark.

## 5.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per OWNER Technical Specification.
- OWNER representative or Third-Party Inspection Agency appointed by OWNER shall carry out stage wise inspection during manufacturing/final inspection.
- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test inspection reports as per OWNER Tech Spec. &- specified code for 100% material, at the time of final inspection of each supply lot of material.
- Even after third party inspection, OWNER/ OWNER's Consultant 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/ OWNER's Consultant Reserves the rights to reject all production supplied from the batch. **(ASTM D- 2247)**

Weathering : 60-70% Gloss retention after 1000Hrs.

(sun test with water  
immersion, Xenon  
150K.lux)

Colour : Light colour as approved by OWNER/CONSULTANT

**STANDARD SPECIFICATION – FORGED FITTINGS  
(WROUGHT STEEL FITTINGS)  
FOR USE AT PRESSURE UP TO 100 MBAR (G)**

**VPC-SS-PE-0012**

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## 1.0 SCOPE

This specification covers the requirements for Wrought Steel Fittings for Natural Gas for use at pressures up to 100 mbar (g). Unless modified by this specification, all the requirements of IS 1239 Part 2: 1992 and the latest editions of the standards mentioned herein this specification, including all revisions, shall apply.

## 2.0 SPECIFICATION FOR POWDER COATING

Owner	Shall mean Indian Oil Corporation Limited (IOCL).
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
SS	Means the present <<Standard Specification>> and its appendix, if any.
TPIA	Means the Inspection Agency to be appointed by Owner.

## 3.0 MATERIAL

The material used for the manufacturing of wrought steel fittings shall conform to IS 1387: 1967 generally, and IS 1239 Part 2: 1992

## 4.0 DIMENSIONS & TOLERANCES

- Dimensions of various types of fittings shall be as specified in the table 1 to 31 of IS 1239 Part 2: 1992.
- Wall thickness on fittings & tolerances on them shall be as given in table 1 to 31 of IS 1239 Part 2: 1992.
- In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.

## 5.0 THREADS

- Outlet of fittings shall be threaded to dimensions & the tolerances as specified in IS 554: 1999.
- All internal & external threads shall be tapered.
- After threading, the pipe body may be hot dip galvanized as per normal practice followed by cold galvanizing (spraying) of the threaded portions. The threaded portions shall be protected using end caps, etc.
- For checking conformity of threads gauging practice in accordance with IS 8999: 2003 shall be followed.
- Chamfering: The outlet of fittings shall have chamfer. The chamfer shall have an included angle of  $900 \pm 50$  for internal threads &  $700 \pm 100$  for external threads.

## 6.0 FREEDOM FROM DEFECTS

On visual examination the outside & inside surfaces of fittings shall be smooth & free from defects such as cracks, injurious flows, fine sand depth, etc. Other workmanship shall be as per Clause 14 of IS 1239 Part 2: 1992.

## 7.0 GALVANIZING

- Fittings shall be galvanized to meet the requirements of IS 4759: 1996.
  - Zinc conforming to any grade specified in IS 209: 1992 or IS 13229: 1991 shall be used for the purpose of galvanizing.
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- **Galvanized Bath:** The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.
- **Coating requirements:** Mass of coating shall be 610 gms/ m<sup>2</sup>. In case of pipe nipples (manufactured in accordance with the requirements of IS 1239 Part 1: 2004), the mass of coating of 400 gms/m<sup>2</sup> shall also be acceptable.
- **Freedom from defects:** The zinc coating shall be uniformly adhered, reasonably smooth & free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness runs, rust strains, bulky white deposits & blisters; otherwise the pipes shall be liable for rejection.
- **Sampling Plan for galvanizing**
  - a) All materials of the same type in a coating bath having uniform coating characteristics shall be grouped together to constitute a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be as given in Table 2 of IS 4759: 1996.
  - b) The sample selected according to Column 1 & 2 of Table 2, IS 4759: 1996 shall be tested for visual requirements as per Para 8 of IS 4759: 1996. Vendor shall have appropriate correspondence between galvanizing lot number and pipe manufacturing lot number for identification / traceability.
  - 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: 1996.
  - d) Criteria for conformity: As per Clause 8.3 of IS 4759: 1996.
  - e) Test procedure shall be as per Clause 9 of IS 4759: 1996. All galvanizing test results shall be included in the Manufacturer's Test Certificate.

## 8.0 PRESSURE TEST

Pneumatic pressure test shall be carried out on each & every fittings as per procedure given in IS 1239 Part 2: 1992.

## 9.0 COMPRESSION TEST

As per IS 1239 Part 2: 1992.

## 10.0 SAMPLING

Owner's consultant or Third-Party Inspection Agency appointed by Owner shall witness the tests as per procedure for sampling plan given in IS 4711: 1974. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

## 11.0 MARKING

Each fitting shall be embossed with Owner's logo, manufacturer's name or trademark and the size designation.

Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

- Manufacturer's name or trade mark.
  - Designation of fittings.
  - Lot number.
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Each fitting conforming to this standard shall also be marked with BIS standard mark.

## **12.0 PACKAGING**

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

## **13.0 INSPECTION / DOCUMENTS**

- Inspection shall be carried out as per Owner Technical Specification.
  - Owner's Consultant or Third-Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.
  - Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Owner Tech Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.
  - 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.
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**STANDARD SPECIFICATION  
FOR INSTALLATION OF MRS & INTERNAL PIPING  
FOR COMMERCIAL & INDUSTRIAL CUSTOMERS**

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**STANDARD SPECIFICATION  
FOR INSTALLATION OF MRS & INTERNAL PIPING  
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## **1.0 GENERAL INFORMATION**

Pipeline Division of Indian Oil Corporation Limited (IOCL), a Government of India undertaking, owns and operates over 14,189 Km of pipeline network. Indian Oil Corporation Limited (IOCL) proposes has been authorized by PNGRB to Lay, Build and Operate City Gas Distribution networks in Chappra in Saran District (Muzaffarpur GA)

## **2.0 APPLICABLE CODES & STANDARDS**

### **2.1 GENERAL**

Piping works shall be carried out in accordance with the requirement of this specification and other National/international relevant applicable standards like Oil India Safety Directorate (OISD) norms, PNGRB, ASME B 31.3-Process Piping Systems, ASME B 31.8 "Gas transmission and distribution piping systems."

Minimum requirement shall be as per latest edition of following codes and standards

#### **ASME STANDARDS**

ASME B 16.5	Pipe flanges and flanged fittings up to 24"
ASME B16.34	Valves-flanged and Butt welding ends
ASME B 31.8	Gas transmissions and distribution piping system
ASME VIII, DIV-I	Boiler and Pressure Vessel code
ASME B 16.9	Factory-made wrought steel butt welding fittings
ASME B 31.3	Process piping

#### **ASTM STANDARDS**

ASTM A 53/A 53 M	Pipe steel black and hot dipped, Zinc-Coated, Welded and seamless
ASTM A 105/A 105 M	Forgings, Carbon steel, for piping components
ASTM A193/A 193 M	Alloy steel and stainless steel bolting materials for high temperature services.
ASTM A194/A194 M	Carbon and alloy steel nuts for bolts for high temperature Services
ASTM A234/A 234 M	Piping, fitting, of wrought carbon steel and alloy steel for moderate and elevated temperature
ASTM A 370	Mechanical testing of steel product
ASTM A 515	Pressure vessel plate, carbon steel for intermediate and higher temperature services

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ASTM A 516                      Pressure vessel plate, carbon steel for intermediate and higher temperature services

ASTM A 707/A 707 M              Flanges, forged, carbon and alloy steel for low temperature Service

**API STANDARDS**

API 5L                              Specification for line pipe

API 1104                          Specification for welding pipeline and related facilities

API 6D                              Specification for pipeline valves (Ball, Gate, Plug Ball and Check Valves)

API 6 FA (Spec 6 FA)              Specification for fire Test for valves

BS 5351                              Specification of small size valves (Below 2")

**ISO STANDARDS**

ISO 148                              Determine the impact strength of steel and energy absorbed by charpy.

ISO 9001                              Quality Management Standards

**OIL INDUSTRY SAFETY DIRECTORATE (OISD STANDARDS)**

OISD-GGN-115                      Guidelines on fire fighting, Equipment and appliances in Petroleum industry

OISD-standard-113                  Hazardous area classification

OISD-Standard-163              Process Control Room SafetyIn

case of contradiction, the most stringent will apply

**3.0 SYSTEM OF UNITS**

The international system of Units (SI), also known as the "Metric system" shall be used. The international Gas union (IGU) has also recommended, generalizing the use of the SI system in all matters relating to Gas and Gas facilities.

**4.0 PROCESS PARAMETERS**

Inlet pressure                              : Max. 4 barg

Out let pressure                            : 0.1 barg-4 bar (Variable)

Operating temp                            : 0 – 45°C

Design Pressure                           : 19 barg

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Design temp. (min/max)	: 0/+60°C
Hydro test Pressure (MRS)	: 1.5 x Design Pressure (Hydrostatic Test) with minimum test duration of 4 hrs.
Pneumatic Leak Test	: 6 bar for minimum 4 hrs.
Flow (m <sup>3</sup> /hr)	: Up to 250 m <sup>3</sup> /hr (at 2 barg 750 SCMh)
Process Fluid	: Natural Gas

## 5.0 MATERIAL SPECIFICATION OF PIPING SYSTEM

Materials to be used for piping system shall comply with the minimum requirements of relevant standards & codes.

Pipes	ASTM A106 Gr. B (Seamless)/API 5L Gr.B/ IS-ASTM A 53/A53 M Gr.B/ 1239Heavy
Flanges	ASTM A105/ A 105
Restricting Orifice* plate	SS 304
Rubber Gasket (washer)	High Nitrile Synthetic Rubber Grade 215
Fittings	ASTM A234 Gr WPB
Ball Valves	A 105/A 216 Gr WCB
Insulation	NA
Insulating gasket	Same as Pipe (Ring A 105)
Spiral Wound Gasket (washer)	ANSI B 16.20
Nuts and Bolts	AS per PMS
Rubber hose	Type-4 as per IS:9573
Painting	As per enclosed "

The size of orifice of restricting orifice plate shall be 11 mm for G10/G16/G25, 13mm for G40 and 15mm for G65 RPD meter.

The size of orifice of rubber gasket (washer) shall be 5mm for G4, 8mm for G6, 10mm for G10 & G16 and 13mm for G25 Diaphragm meter.

**Note:** - Over and above these specifications and materials, Please refer below the specifications.

1. For Piping material refer " PMS-1C1"
2. All stud bolts and nuts shall hot dipped galvanized as per ASTM A53.

## 6.0 SITE ENVIRONMENTAL DATA/CONDITIONS

Environmental/ climatic conditions for various sites are given below

Typical :

**STANDARD SPECIFICATION  
FOR INSTALLATION OF MRS & INTERNAL PIPING  
FOR COMMERCIAL & INDUSTRIAL CUSTOMERS**

Temperature	:	(Min/Max.) <sup>0</sup> 1.7 <sup>0</sup> C/48.5 <sup>0</sup> C
Rain fall	:	*
Wind	:	*
Seismic Zone	:	*
Relative humidity	:	90%
Elevation from Mean Sea Level	:	205 met.
Hazardous Area Classification	:	*

## **7.0 PIPE DESIGN/ SIZING**

### **8.1 Coding of Piping Classes**

Each Class is named by a code consisting in three of four parts:

#### **First parts:**

A figure designating the material:

- 1= 1500 lbs ANSI - PRESSURE - 18.75 bar g
- 3= 300 lbs ANSI - PRESSURE - 49.00 bar g
- 6= 600 lbs ANSI - PRESSURE - 98.00 bar g
- 9= 900 lbs ANSI -

#### **Second part:**

A letter designating the material:

- A= Allot steel
- C= Carbon steel
- F= Fiberglass reinforced plastic/epoxy (FRP)
- G= Galvanized
- P= Plastic (HDPE)
- S= Stainless steel
- V= PVC

#### **Third part:**

A sequential number to differentiate two or more piping classes of the same rating and same material but presenting some differences related to the handled fluid.

#### **Fourth part:**

A letter designating the underground:



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FOR INSTALLATION OF MRS & INTERNAL PIPING  
FOR COMMERCIAL & INDUSTRIAL CUSTOMERS**

- U= Underground
- AG= Above Ground

## **8.2 Wall Thickness**

The wall thickness of pipe shall be as follows:

Wall thickness of pipe shall be calculated as specified in the applicable sections of:

- ANSI B 31.8 for classes covering the main process and auxiliary gas lines.
- ANSI B 31.3 for classes covering utilities lines.

## **8.3 Corrosion Allowance**

The minimum corrosion allowances used to calculate wall thickness as follows:

- Carbon steel and ferrite alloys in classes calculated following ANSI B 31.8 : 1.6 mm
- Carbon steel and ferrite alloys in classed calculated following ANSI B 31.3 : 1.6 mm
- Stainless steel : 0 mm
- Plastic and PRP pipes : 0 mm

## **8.4 Wall Thickness Calculation**

- a) Pipes for natural gas shall comply with ASME/ANSI B 31.8 code. Pipe wall thickness will be calculated as follows:

$$t = \frac{PD}{2xSxFxExT} + C$$

- T = nominal wall thickness (mm)
- P = design pressure (MPa)
- S = minimum yield strength (Mpa)
- F = design factor = 0.40
- E = longitudinal joint factor
- = 1.0 for API 5L (seamless or ERW or SAW)

- T = temperature de-rating factor = 1.0
- C = corrosion allowance (mm)

- b) Pipes for Utilities lines have a wall thickness complying with ASME/ANSI B 31.3 code:

$$t = \left\{ \frac{PD}{2xSxFxExT} + C \right\} x (1+a)$$

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FOR INSTALLATION OF MRS & INTERNAL PIPING  
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- T = Nominal wall thickness (mm)
- S = Allowable stress (MPa)
- P = Design pressure (MPa)
- E = Longitudinal joint factor
- Y = Coefficient as per table 304.1.1 of ANSI 31.3
- C = Corrosion allowance (mm)
- A = Negative fabrication tolerance (%)

## **8.0 Wall Thickness Calculation**

1.0 Nitrogen at 7kg/cm<sup>2</sup>

2.0 Above utility data may change according site condition and availability of resources.

## **9.0 SAFETY**

All required Personal Protective Equipments (PPEs) for carrying out the jobs safely to be provided to the workers.

The agency has to ensure that potential safety factors, health and environment effects are assessed before execution of the job and necessary actions required for ensuring safety of human and environment are taken care of.

Jobs at customer locations are to be carried out as per safety Work Permit System of IOCL- i.e, permit will be issued at site every day after ensuring all safety precautions and execution of the job to be done in presence of representatives of IOCL's Technical, Fire & Safety and designated Contract Supervisor.

## **10.0 FABRICATION OF MRS AND INTERNAL PIPING:**

This part covers fabrication, erection and installation of MRS, Common header for MRS installation, internal pipeline with fittings for supply natural gas to commercials and Industrial units from MRS till customer's appliances. Work for internal Piping shall be carried out as per instructions and after allotment of work by EIC. The Indicative diagram is shown in bid documents.

On allotment of work, Contractor shall carry out joint survey along with IOCL/IOCL's representative of the customer's premises for finalization of location of MRS/Common header or route of internal Piping and as per requirement and shall subsequently submit construction plan to IOCL for Procurement of material (Pipe, fittings, consumables etc.), Inspection, Fabrication Erection Installation Testing and Commissioning of MRS, Common header & Internal Piping as enclosed at Annexure – 3. The material procurement plan includes make of pipes & fittings to be procured as per the approved make list (enclosed in tender document at) for approval from EIC.

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After approval of plan from EIC and before start of fabrication, Contractor shall procure material and submit material test certificates (MTC'S) of all materials including pipes, fittings ball valves, consumables (incl. Electrodes) etc.. for review of EIC and shall subsequently arrange their physical inspection. Contractor shall also submit documents for welding procedure specifications (WPS) for the similar kind of job for IOCL's approval.

IOCL may instruct the contractor to carry out survey of proposed customer and shall in turn submit the estimate for material and execution along with drawing without any changes. Welder shall be qualified for proposed WPS according to the applicable codes. If the same welder is doing the similar kind of job continuously for the last six months and qualified by reputed consulting organizations like EIL/MECON/TEPL, the welder shall be allowed to work on submission of welders qualification Certificate.

Only E6010/E7018 electrodes of reputed make (LINCOLN, ESAB etc.) shall be used for welding of piping joints. The electrode E7018 shall be baked in mother oven before usage at site. All flanges used shall be of welded neck type. No plate flanges made by Gas cutting shall be used. Flanges dimensions, ratings, facing, face finish and manufacturing shall be as per ANSI B16.5 unless otherwise specified. All fittings shall be seamless in construction unless otherwise specified. All fittings of size 1" and above shall have butt-welded ends and shall comply with attached piping class.

Mitre joint shall not be used and the same shall be replaced with a Standard Elbow with short radius ( $<_1D$ ). Piping Spools (If required), Supports etc. shall be pre-fabricated or shop fabricated. Pipe shall be supported on walls or Suitable supports (clamps, steel supports etc.) (refer drawing in tender document at Annexure - 4) and at adequate interval of space not less than 2 metres. The material and size of angles shall be MS and of minimum size 75 x 75 x 8 mm.

End Preparation, alignment and fit up of the pipe length to be welded, pre heating, welding, post heating and heat treatment (if required) shall be as per IOCL welding specification/design codes and standards. Pipe joints shall be butt-welded. However as per site requirement, flanged joints (if necessary) may also be used. Contractor to ensure provision for locking/sealing arrangement for meter/valves to avoid misuse.

All (100%) root joints alignment & fit up shall be witnessed by IOCL/IOCL representative followed with a mandatory DP (Dry penetrate) test. In addition to the DP test, RT will be carried out in presence of IOCL's representative on at least 10% of joints in single MRs using unique joint no. The dimension tolerances for piping fabrication shall be as per IOCL's standards design codes and standards.

Contractor shall carry out Hydro test for each MRS in their factory and shall carry out installation only after duly certification from IOCL/IOCL's representative. The test reports/certificates (DP test RT, Hydro test, NDT) issued against a single MRs shall be presented to IOCL's site representative for verification and before start of installation. The format FPR DPT, RT, Hydro test, Welding inspection & NDT is attached at Annexure - 5, 6, 7, 8 & 9 respectively.

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For MRS, dimensions tolerance of 100% both ways against pre-defined length (refer drawings attached in tender) shall be included in fabrication & installation rates (payable as per SOR Item no.

210 to 250) and no separate charges shall be claimed in case of any additional joints, fittings etc.. used for completion of installation. The bidder shall quote rates against each SOR in correlation with drawings, tentative BOM (Bill of Materials) attached in tender document. Any installation/piping in excess/ short to predefined length of MRS shall be payable/deductible through SOR item no. 610 to 630 as per size of pipe used. The length of the MRS shall be measured after installation and RFC and shall duly be certified in RFC card for payments. Contractor shall provide suitable locking arrangement in MRS with isolation valve by wire sealing as per instruction of Engineer In-charge.

The rates for internal piping (downstream of MRS) are payable through SOR item nos. 590 to 650 and includes procurements, fabrications, welding and installation till commissioning. No separate charges are payable for any repair & modifications (on customer's request) even after installation & testing however before commissioning and are inclusive in rates. The ball valves installed in common header/Internal piping shall be payable separately through SOR item no. 360 to 410, depending upon the size of pipeline.

Laying of concealed pipeline in the cavity of the walls/ceiling/basement shall be avoided. In locations where the pipeline has to be laid in a covered trench or below ground level, it should be avoided however considering the minimal alternatives/ constraints at site, the laying is possible after written approval from EIC, cold wrap & coating shall be applied on the surface of the pipe followed by Holiday test. The pipe shall be properly supported on clamps/I supports with minimum clearance of 4" from ground level. IOCL may also instruct the contractor for installation/laying of MDPE pipeline and transition fittings for such below ground sections which shall be laid in correlation of technical specification of MDPE pipeline laying and payable as per the respective pipe SOR's.

In case where MRs fabrication & installation is carried out considering twin metering and single regulation (in a single MRS), the payment against the installation of both streams shall be made as per SOR item no. 240 or 250 for one of the stream and as per SOR item no. 590 to 650 for the other stream depending upon the type and size of the CS Pipeline used for MRs fabrication. Also, in case of twin metering and twin regulation, the payment against the installation of either of the streams shall be made as per SOR item no. 210 to 250 and for loop line connecting both streams in running meter as per SOR item no. 590 to 650 depending upon the type and size of the CS pipeline used for MRS fabrication.

Any preparation of the threads for installation, completion of MRS, common Header & internal piping is inclusive in rates. All the MRS shall be fabricated in the Contractors workshop and tested in presence of IOCL's representative before installation. After complete installation of the MRS at the allocated locations; the flange joints shall be tested online along with Meter & Regulator before commissioning.

The branches of the pipeline shall be using standard fittings. Also, branching on common header will be payable in running meters.

## **11.0 ERECTION OF MRS SKID**

### **11.1. Cleaning of piping before erection.**

Before erection, all pre-fabricated spool pieces, pipe, fittings etc. shall be cleaned inside and outside by suitable means (Mechanical or chemical). The cleaning process shall include

- Removal of all foreign materials such as scale, sand, weld spatters, cutting chips etc. by wire brush, cleaning tools and blowing out the foreign material with compressed air and/or flushing out with water.
- Special cleaning requirements (if any), shall be carried out as per IOCL specification/piping design codes/standards.

### **11.2. Pipe routing and Layout**

Pipe routing and lay-out shall be as per IOCL approved pipe route, GAD, P&IDs and piping support drawings and applicable design code and standards. In case of fouling of a line with other piping, structure, equipments etc. The matter shall be brought to the notice of Engineer-in-charge and corrective action shall be taken as per his instructions. Above ground pipeline shall be laid either on MS clamps fixed on the wall or on the pipe supports with BOP more than 2 mtr height.

The selection of route of installation gas pipeline connection in the premises of the industry/ commercial establishment is key to safety and integrity of gas installation and public. It should be installed above ground having in well-ventilated area and having easy approach.

All risers and lateral piping should be clamped to the building at intervals not exceeding one meter. Laying of concealed pipeline inside the cavity of the walls, ceiling, basement etc. should be avoided, Platform and cross-over shall be provided for ease of operation and maintenance of pipeline if required. All supports shall be installed strictly as per approved support drawing/instruction of engineer-in-charge.

While laying the pipeline, care should be taken that valves installed on the pipeline should be approachable for easy operation and maintenance.

### **11.3. Flanges Connections**

While lifting up mating flanges, care shall be taken to properly align the pipe and to check the flanges for trueness so that the faces of the, flanges can be pulled together without inducing any stresses in the pipe and the equipment.

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The assembly of the flange joint shall be done in such a way that the spiral wound gasket between the two flange faces is uniformly compressed to achieve this bolt shall be tightened in a proper sequence. Copper strips/ jumpers shall be installed on all flange joints in order to provide earth continuity to MRS & internal piping.

#### **11.4. Vents**

Venting facilities shall be provided for any emergency evacuation of gas from the pipeline. Vent line shall be fitted with a flapper and shall be at 3 meter height from the nearest operating platform, with ends at open space.

#### **11.5. Painting**

After installation of the above ground MRS & Internal piping system, painting of MRS/piping shall be done after RFC with proper surface preparation and application of primer and finish coat of paints as per IOCL painting specifications enclosed in Annexure I, to prevent atmospheric corrosion, The standard colour code for Natural gas piping shall be 'Canary yellow'. The gas flow direction shall be marked "in Red" on the MRS or Internal Piping.

#### **11.6. Valve Installation**

Valve shall be installed in a position as specified in the valve manufacturer installation and O&M manual. Care shall be exercised to ensure that all hL11 bore ball valve shall be installed with the "Gas flow direction arrow" marked on the valve body pointing in the right direction after written consent from EIC.

#### **11.7. Instruments**

All the required instruments (PG, TG, flow control valves, interlocks, control panel etc..) shall be installed on the pipeline as per attached MRS Drawings, Owner's approved installations procedure, applicable design code and standards, manufacturer's installation, O&M Manual after proper calibration, testing and inspection of the instruments as per manufacturer's calibration procedures. It is mandatory to install pressure gauges on the downstream internal piping at start and end point. Any installation of additional pressure gauge will be payable as per **SOR item No. 330 to 350** and subsequent fillet welding of sockets & installation of pressure gauge will be payable as per **SOR item no. 480 to 490**.

#### **11.8. Rubber Hose**

The Steel Pipe and Appliances connect to Hose shall be in the same 1'00111. The length of hose should be kept minimum but shall not exceed 1.50 meters. Hose shall be easily accessible to inspect. Hose shall not be used in conditions where ambient temperature exceeds its design temperature. Hose shall be so installed [hat it is not twisted, looped or kinked in and should be free from external pressure. Design and Construction of Hose shall be Type IV as per IS: 9573 (Latest revision).

#### **11.9. Supports**

Pipeline for PNG supply to Commercial/Industrial connection shall be adequately supported at suitable intervals as per piping design code and standard and good engineering practices. There are various types of clamp supports for supporting and suspending horizontal as well as vertical/riser pipes. The support's schematic drawing for piping are attached with the tender documents at Annexure -- 4. The material & size of the angle shall be MS & minimum size --- 75 x 75 x 8 mm.

### **11.10. Electrical Equipments**

All the required Electrical equipments shall be installed as per Owner's approved installation procedure, applicable design code (OISI). 149) and standards, manufacturer's installation / O&M Manual after proper calibration, testing and inspection of the equipments as per manufacturer's calibration procedures.

## **12.0 INSPECTION AND TESTING**

### **12.1. Material Inspection**

All materials, items and their parts shall be subjected to all mandatory as well as supplementary (wherever specified) inspection, testing and checks called for in the respective codes/standards/data sheets/IOCL approved manufacturer's QAP of Vendor at manufacturer's workshop/factory as well construction site. All fit-ups shall be checked for proper Root gap, surface cleaning and orientation etc. before starting the welding and inspected by IGL / IOCL's representative.

Dye-penetrant test shall be done after root welding for all the butt & Socket weld joints. As per the instruction of EIC/PMC, Radiography test may be performed randomly on joints for 10% (percentage) on random selection basis.

### **12.2. Execution Inspection**

- Ensure availability of Work Permit and Fire permit
- Visual Inspection of installation of various equipments, instruments and their associated components, electrical equipments, pipe fitting and valves etc..
- Dimensional checking of equipment, pipe, fitting and valves etc..
- Inspection of Calibration of instruments
- Inspection of testing and commissioning of pipeline system
- Inspection and checking of DFT of painting of equipment, pipe, pipe supports etc..
- Inspection and checking of Mechanical completion of pipeline system with the approved construction drawing and work procedures for installation and erection of various equipment/pipeline
- Ensure availability of First AID Box, PPE and fire extinguishers.
- Inspection of flushing, cleaning and Hydro testing of Piping system

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- All welded joints shall be subjected to visual inspection according to ASME 1.3/31.8 and radiography according to API1104.
- Inspection test plan shall be as per ANNEXURE-2
- Verification/Inspection of all the mill and workshop test certificates applicable to related material. spare, equipment, pipe, fittings, valves, supports, paints, IJ etc..
- The entire piping system shall be subjected to hydrostatic testing or pneumatic strength testing.
- 10% RT shall be done for all the Butt joints on random selection basis. Overall decisions rests with the EIC to increase %( percentage) of RT on joints, in case of any additional RT (on instruction of EIC) rates shall be payable as per SOR item no. 500 to 550.
- The test pressure should be 1.5 times of design pressure in case of Hydrostatic testing or 1.1 times or the design pressure in case of Pneumatic testing. However test pressure and time duration may vary depending upon the application and flow.
- Before commencement of strength Test, calibration reports of pressure gauges and equipments shall be reviewed by IOCL/IOCL's representative.
- Pressure gauge range shall be minimum 1.5 times and maximum 4 times of test pressure.
- Before starting hydrostatic testing, testing and inspection reports shall be submitted to IOCL for verification and only after getting formal clearance from IOCL, testing shall be carried out.
- The test pressure for the piping system shall be kept on hold for 4 hr with no pressure drop. For internal piping with pipe length less than 25 meters, the test pressure shall be kept on hold for 4 hrs. Whereas if length more than 25 meters, minimum test pressure duration shall be minimum 12 hr to max. 24 hrs. depending upon customers/ site requirement.
- After hydro testing proper dewatering and purging shall be carried out.
- Care should be taken to ensure that the purge outlet is so located that vent gas cannot drift in the building.
- The method of purging should be such that no pockets of air left in any part of the piping.
- It should be ensured that the area is well ventilated and free from ignition source.
- Inspection and testing of Electrical, Civil and Instrumentation work shall be carried out by quality control inspector of related Engineering disciplines.
- All the MTC/TC, Inspection and test reports for mandatory as well as supplementary (wherever specified) shall be submitted to IOCL.

### **13.0 PRE-COMMISSIONING AND COMMISSINING**

The various acceptance criteria and handover of the MRS system shall comprise of the following 2 stages.

- Pre commissioning



- Commissioning/Start-up

### **13.1. Pre-Commissioning**

IOCL representative shall carry out the following minimum check (including other relevant checks as may consider describe by manufacturer of meter, regulator, valves, etc.. to ensure that the MRS has been mechanically completed in all respect for pre- commissioning.

- A schedule of required activities for pre- commissioning /commissioning/ performance guarantee test/handover shall be readily available.
- Prior to pre-commissioning of MRS and associated facilities (piping, valves, instrumentation, electrical system) shall be mechanically completed to be ready for commissioning
- All the consumables, tools and tackles, utilities, etc. bare available.
- Fire fighting system and PPE are readily available.
- All the statutory permits are available.
- The emergency management plan is available.

Following are the minimum required pre-commissioning checks but not limited to:

### **13.2. System Check**

#### Checking of piping /Mechanical System

The entire facilities/system shall be checked against the IOCL's/IOCL's representative latest approved P & Id, GADs and other relevant design specified andcodes.

#### Checking of utilities

Checking of all relevant utilities like, service water, compressed air, nitrogen, power, power back-up system etc.. to facilitate commissioning and safety.

### **13.3. Pneumatic testing**

#### Air Flushing

The entire MRS and associated facilities shall be flushed and air cleaned to ensure readiness of the system for pneumatic test. Chemical cleaning may also be considered as per site requirements

#### Pressure Testing

Pneumatic testing shall be carried out a pressure of 6 bar g by mean so of

compressed air. The test pressure shall be maintained to permit through inspection of all joints for leakage or signs of failure.

Any joint found leakage during the pressure test shall be re-tested to the specified pressure after repair.

#### **13.4. Completion of Testing and Drying**

After pneumatic test are completed, the pressure is released gradually without damaging the equipment, facilities and maintaining personnel safety measures. All vents and drains shall be kept opened till the entire system is completely drained. After draining, the system shall be completely dried using dry air.

#### **13.5. Insertion**

The insertion operation should start immediately after drying is complete. The contractor shall submit a detailed purging procedure for approval of IOCL/IOCL's representative prior to its implementation. During the insertion operation, the air left in the piping system shall be replaced by nitrogen before admitting the natural gas into the pipe system. The maximum allowable oxygen content inside the piping system shall be less than 1% by volume. No extra payment shall be made for nitrogen cylinders and is included in SOR.

#### **13.6. Test Records**

Records in triplicate shall be prepared and submitted by the contractor to the IOCL/IOCL's representative for each piping system/ facilities for the test performed.

#### **13.7. Safety Review before start-up of commissioning**

A pre-start up safety review shall be carried out of the entire piping system before permitting natural gas into the new facility.

The following minimum safety review is envisaged: Availability of all relevant design documents, welding

Availability of all relevant design documents, welding.

#### **13.8. Commissioning**

Once all pre-requisite activities (safety and pre-commissioning) test have been completed, clearance for commissioning the system shall be obtained from IOCL/IOCL's representative.

- The commissioning operation shall be controlled and supervised by authorize personnel who are fully known to their responsibilities during commissioning.

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- The pipeline system shall be slowly charged with natural gas and pressurized gradually up to its operating conditions/parameters.
- The contractor shall obtain the IOCL/IOCL's representative approval of his commissioning procedure prior to starting commissioning operation.
- The pipeline system shall be slowly charged with natural gas and pressurized gradually up to its operating conditions / parameters.
- Commissioning of MRS system shall be considered completed and acceptable when the piping system is charged with natural gas at operating pressure and the MRS system is operated at normal operating conditions with all instruments/controls working satisfactorily at normal operating conditions.

**GAS CHARGING IN INTERNAL PIPING**

From safety point of view gas should be taken to the burners, section wise namely:

- Gas charging in internal piping
- Gas Charging in gas train burner

Sr. No	Activities	Precautions
1	Confirm the closure of gas train inlet	Observe carefully closing mark
2	Crack open the MRS outlet valve and raise the section pressure to 1 or 2 bar g or as required	Keep valve key ON position and a man with walky- talky
3	Crack open the pressuregauge tapping valve near gas train Intel valve and vent out nitrogen	Do not inhale nitrogen gas Ensure No spark. No naked flame. Methane concentration in atmosphere should not increase more than 2% if required, do venting/draining intermittently
4	Measure methane percentage. It should match feed gas composition	
5	Close the pressure gauge tapping valve completely	
6	Open the MRS outlet valve fully and observe the system for 5-10 minutes	

## 14.0 CONVERSION

Conversion of Burners & supply of Rubber Hose

The work in this section shall be carried out along with the internal piping or on request i.e. case to case basis and includes:

The changing of nozzles and associated controls in accordance with manufactures instructions for canteen, T-type, RV, imported burners/ovens/grills/hotplate etc.. the and imported burners/ovens/grills/hotplate. The contractor shall supply the Reinforced rubber hoses at the time of conversions, Minimum size 8 mm dia. per connection -- 1.5 meters with fixing clamps, however the size may vary for type of burners converted on NG. The contractor has to supply all types of nozzles/jets required for all types or appliances including canteen, T-type, RV, imported burners, Grills, Ovens, without any extra charges to IOCL, All activities are inclusive and are payable through **SOR. Item no. 860.**

Cleaning and performing minor maintenance of appliances, during the tenure of the contract. Attend all complaints related to proper working of appliances, testing for gas escapes, soundness and performance of appliances. Instructing & educating customer for safe use of natural gas and for fixing of safety and conversion labels. Contractor must attend the complaints regarding appliances, leakage, fire etc. till the total area is handed over to Owner's operation and maintenance.

All consumables (Nozzles, greases etc.), changing or repairing of any items damaged during conversion are in contractor's scope, The contractor will have to provide both pin gauges and standard sized nozzles, The payment will be released by IOCL only after submission of necessary documents i.e. JMR card of the individual commercial/ industrial connection.

## 15.0 MODIFICATION IN EXISTING MRS

It includes taking shutdown of existing MRS, dismantling meters/ regulators, replacement/fixing of meters/regulators with associated inlet and outlet connections/fittings supply of pipes & fittings, pipe cutting, threading, welding & firmly fixing with approved meter clamps/ brackets and other supports by proper grouting. Restoring the area to the original condition as per the specifications and (to the complete satisfaction of consumer and IOCL) is also included in the scope.

Modifications / replacements (of meter or regulator or both) in MRS using threaded fittings/ flanged end (same size or bigger) shall be payable through SOR Item 110. 660 to 710 depending upon the types and unit of meters and regulators replaced, The rates include all as above along with testing of joints till re-commissioning. Wherever, there are modifications in MRS

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which can be carried out only through welding for same length of MRS or bigger upto 3.00 mtrs in addition to MRS length, the work is payable only through no. or joints welded for completion of modifications and no separate payments is applicable for additional pipe/fitting used and payable as per SOR Item no, 720 to 780 only. In case erected length after modification is more than 3.00 mtrs of original length of MRS, then the running meters shall be applicable and payable through SOR item no. 790 to 850 only.

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**ANNEXURE - 01**

PAINT SYSTEM FOR ABOVE GROUND PIPING									
Paint system Nr.	Substrate	Exposure conditions	Surface preparations	1 <sup>st</sup> Coat	2 <sup>nd</sup> coat	3 <sup>rd</sup> coat	4 <sup>th</sup> coat	5 <sup>th</sup> coat	Nominal Total DFT
201	Bare carbon steel & ferritic alloys	T up to 65°C	Sa3	Zinc rich ethyl silicate primer 75(µm)	Epoxy Sealer polyamide/ C 50 (µm)	High Build epoxy polyamide U/C recoatable 80(µm)	PU finish recoatable 50(µm)		255µm
201P	As above but site touch-up	T up to 650C	Sa3 (spot blast)S03 only when blasting is not possible	Zinc rich two pack epoxy primer 50(µm)	Epoxy M.I.O . recoatable 80 (µm)	Epoxy HB U/C. recoatable 60 (µm)	PU finish 50µm		240µm
201 W	Bare carbon steel to be welded	T up to 650C	Sa 2.5 min.	Welding primer two components epoxy 20 (µm)	6 to 9 months after welding procedure cleaning of weld With 3rd coat Touch-up If needed	HB M.I.O Epoxy Modified U/C 80µm	HB M.I.O Epoxy Modified U/C 80µm	PU finish 50µm	230µm
202	Bare carbon steel & ferritic alloys	T up to 650C	Sa3	Zinc rich ethyl silicate primer 75(µm)	Heat resist. Silicone Acrylic White 30µm	Heat resist. Silicone Acrylic White 30µm			135µm
202 P	As above but site touch-up	T up to 65°C	Sa3 (spot blast)	Zinc ethyl silicate primer 75(µm)	Heat resist. Silicone Acrylic White 30µm	Heat resist. Silicone Acrylic White 30µm			135µm

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**ANNEXURE - 02**

S r.	Particulars	Type of Inspection	% of Inspection	Scope	
				Contractor	IOCL/TPI
1	Material Test Certificate verification	TC verification (Raw Material)	100%	Contractor	IOCL/TPI
2	Welding Procedure Specification	Document verification /approval	100%	P	R
3	Welders qualification Test	Document verification/ witness	100%	P	R
4	DP Test	DP rest on root	100%	P	R/W (in case of new welder)
5	Welding Inspection	Visual inspection	100%	P	RW(min 10%)
6	Radiography	Review of films	100%	P	RW(min 10%)
7	Hydro/Pneumatic Testing	Hydro/Pneumatic testing of entire pipeline	100%	P	W

**Legend:**

P- Perform, R-Review, RW- Random Witness (min 10%), W-Witness, TPI- Third Party Inspector







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**ANNEXURE - 05**

DP TEST REPORT					
Client:	INDIAN OIL CORPORATION LIMITED			REPORT NO.	
Project:				DATE	
MRS No.				PIPE MATERIAL	
S. No	Size	JOINT NO.	SEGMENT	INSPECTED BY	REMARKS
CONTRACTOR's (Name & Signature)	TPIA (Name & Signature)		PMC (Name & Signature)		IGL (Name & Signature)



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**ANNEXURE – 07**

HYDROTEST REPORT						
Client:	INDIAN OIL CORPORATION LIMITED			REPORT NO.		
Project:				DATE		
				SITE		
S. No	TIME	PRESSURE (kg/cm <sup>2</sup> )	TEMPERATURE (deg.C)	PRESSURE RELEASED (kg/cm <sup>2</sup> )	PRESSURE DROPPED/INCREASED	REMARKS
CONTRACTOR'S (Name & Signature)		TPIA (Name & Signature)		PMC (Name & Signature)		IGL (Name & Signature)

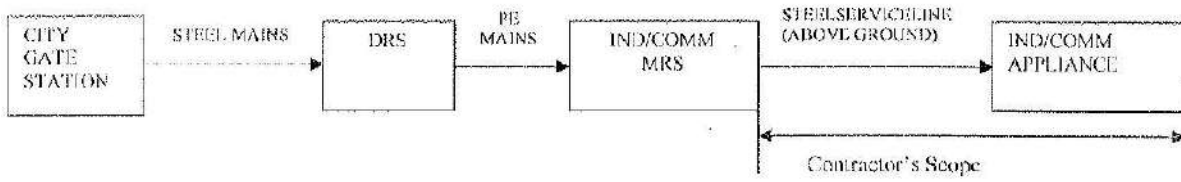




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**ANNEXURE -10**

(TYPICAL PNG DISTRIBUTION SYSTEM FOR INDUSTRIAL / COMMERCIAL CUSTOMERS)





## **HEALTH, SAFETY AND ENVIRONMENT [HSE] SPECIFICATIONS**

### **1.0 SCOPE**

These specifications establish the 'Health, Safety and Environment [HSE] Management' requirement to be complied with by the Contractors during executing their Job. Requirements stipulated in these specifications shall supplement the requirements of 'HSE Management' given in relevant act(s) / legislation(s).

### **2.0 REQUIREMENTS OF 'HEALTH, SAFETY AND ENVIRONMENT [HSE] MANAGEMENT SYSTEM' TO BE COMPLIED BY BIDDERS**

- 2.1** Preferably, the Contractor should have a documented 'HSE Policy' to cover commitment of their organization to ensure health, safety and environment aspects in their line of operations or they must follow the 'HSE policy' of CUGL for safe execution of work.
- 2.2** The Contractor shall ensure that the CUGL's 'Health, Safety and Environment [HSE]' requirements are clearly understood and faithfully implemented at all level, at sites.
- 2.3** Contractor shall promote & develop consciousness for Health, Safety & Environment among all personnel working for the Contractor. Regular work-site meetings (Tool box talk) shall be arranged as 'HSE' activities to cover hazards involved in various operations during executing their jobs, location of First Aid Box, trained personnel to give First Aid, Assembly Points, and fire protection measures such as water and fire extinguishers etc.
- 2.4** Non-conformance of 'HSE' policy and directives as per CUGL by Contractor [including their sub-Contractors] as brought out during review/audit by CUGL / external agency authorized by CUGL, shall be complied by Contractor and its report to be submitted to CUGL.
- 2.5** Contractor shall adhere consistently to all provisions of 'HSE' requirements. In case of non-compliance of continuous failure in implementation of any of the 'HSE' provisions, CUGL may impose penalty and subsequent stoppage of work for non-compliance. The decision of imposing monetary penalty & work-stoppage shall be taken by EIC with consultation with Safety Officer of CUGL.
- 2.6** All fatal accidents and other personnel accidents shall be investigated for root cause by CUGL and Contractor shall extend all necessary help and cooperation in this regard. Recommend corrective and preventive actions of findings will be communicated to Contractor for taking suitable actions should be taken by the Contractors to avoid recurrence of such incidences.
- 2.7** Contractor shall ensure that all their staffs and workers, including their sub-Contractor(s), shall wear 'Personal Protective Equipments [PPEs]' such as safety helmets, safety shoes, safety belts, dust mask, ear plug, protective goggles, gloves, etc., as per job requirements. All these gadgets shall conform to relevant IS specifications or equivalent.
- 2.8** Contractor shall assign competent & qualified personnel for carrying out various tasks/jobs as per requirement.





**HEALTH, SAFETY AND ENVIRONMENT [HSE] SPECIFICATIONS**

- 2.9 All equipments should be tested and certified for its capacity before use.
- 2.10 Contractor shall ensure storage and utilization methodology of materials that are not detrimental to the environment. Where required, Contractor shall ensure that only the environment-friendly materials are used.
- 2.11 All persons deployed at site shall be knowledgeable of and comply with the environmental laws, rules and regulations relating to the hazardous material substances and waste. Contractor shall not dump release or otherwise discharge of dispose-off any such materials without the express authorization of EIC of CUGL.
- 2.12 Contractor should obtain all work permits before start of activities [as applicable] like hot work, cold work, confined space, electrical isolation, work at heights and its use & implement all precautions mentioned therein.
- 2.13 Contractor should display at site office and work locations caution boards, provide posters, banners for safe working to promote safety consciousness, etc.
- 2.14 Contractor should properly barricade the facility where work is in progress for safe working and reclaim the work zone after completion of work to promote safety consciousness.

**3.0 RELEVANT CODES FOR 'PERSONAL PROTECTION EQUIPMENTS'**

IS: 2925 - 1984	Industrial Safety Helmets
IS: 47701 - 1968	Rubber Gloves for Electrical Purpose
IS: 6994 - 1973 [Part-I]	Industrial Safety Gloves [Leather & Cotton Gloves]
IS: 1989 - 1986 [Part-II]	Leather Safety Boots & Shoes
IS: 5557 - 1969	Industrial & Safety Rubber Knee Boots
IS: 6519 - 1971	Code of Practice for Selections, Care & Repair of Safety Footwear
IS: 11226 - 1985	Leather Safety Footwear Having Direct Molding Sole
IS: 5983 - 1978	Eye Protectors
IS: 9167 - 1979	Ear Protectors
IS: 3521 - 1983	Industrial Safety Belts & Harnesses

**Guidelines for imposition of punitive fines**

- 4.0 Punitive fines on contractors are imposed for violation of safety rules & regulations during execution of jobs. Objective of punitive fines is to work as deterrent for contractors in violation of safety rules & regulation and to improve safety atmosphere in general at all site.

**Proposed guidelines for imposition are described below:**

- 4.1 For first time violation of safety rules & regulation by any contractor, HSE-officer will issue a warning letter to contractor with intimation to EIC of work centre with a copy to MD & DC.
- 4.2 In case of second time violation of safety rules & regulations by same contractor, EIC will call



## HEALTH, SAFETY AND ENVIRONMENT [HSE] SPECIFICATIONS

contractor in person and will have a meeting to discuss reason for repetitive violation along with HSE-Officer. A warning letter will also be issued by EIC to contractor.

- 4.3 In case of further violation, punitive fines will be imposed on contractor. Amount as fine will be decided as per severity of violation of safety. However, minimum fine would be Rs.5,000/- and in multiple of Rs.5,000/-, thereafter for every instant.
- 4.4 This will be limited to 5% of contract value, as maximum cumulative penalty.
- 4.5 This practice of punitive fines is to be implemented across all CUGL sites for all contracts.
- 4.6 Practice of punitive fines will be applicable for projects sites also and would be over and above the deduction made by M/s CUGL for safety violation from running bills.

## STANDARD QUALITY ASSURANCE PLAN



### Brass Fittings

SR. No	DESCRIPTION	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA (As per EN 1057/ PTS)	FORMAT OF RECORD	INSPECTION		REMARKS
						VENDOR	TPIA	
1	Raw material: Chemical/ Physical Requirement	one in each heat	As per EN 12164/ PTS	As per EN 12164/ PTS	MTC	P	W	
2	<b>Final product</b>					P	W	
2.1	Resistance dezincification	one in each heat	As per EN 6509/ PTS	As per EN 6509/ PTS	Test Report	P	W	
2.2	Carbon bore test	one in each heat	As per EN 1254/ ISO 6957/PTS	As per EN 1254/ISO 6957/ PTS	Test Report	P	W	
2.3	Stress corrosion resistance test	one in each heat	As ISO 6957	ISO6957	Test Report	P	W	
2.4	Hydrostatic pressure test	100%	As per EN 1254/EN 12164	Min 37.5 bar @ 15 min.	Test Report	P	RW	Min 10 % by TPIA
2.5	Pneumatic pressure test	100%	As per EN 1254/ EN 12164/ PTS	Min 6 bar @ 15 second	Test Report	P	RW	Min 10 % by TPIA
2.6	Visual Inspection (Free from defect)	100%	As per EN 12164/ EN 1254/PTS	As per EN 1254/ PTS	Test Report	P	RW	Min 10 % by TPIA
2.7	Dimensional Inspection (O.D, Wall thk., Length etc.)	100%	As per EN 12164/EN 1254/PTS	As per EN 1254/ PTS	Test Report	P	RW	Min 10 % by TPIA
3	Marking	100%	EN 12164/ EN 1254	As per EN 1254		P	RW	Min 10 % by TPIA

**CLIENT: CENTRAL UP GAS LTD**

**STANDARD QUALITY ASSURANCE PLAN**



**Brass Fittings**

4	Documentation	-	PTS	PTS	Test Report	P	H	
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LEGENDS: H-HOLD

RW – RANDOM WITNESS

W-WITNESS

P-PERFORM

TPIA- THIRD PARTY INSPECTION AGENCY

MTC – MATERIAL TEST CERTIFICATE

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply to the applicable codes along with complying additional requirement of PTS.
2. The TPIA shall use this QAP for inspection against subject tender and may consider this document as approved.
3. Procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
4. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
5. All reference Codes / Standards documents, PTS shall be arranged by vendor / supplier for reference of TPIA at the time of inspection.
6. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC.

**Approved Vendor List**

M/s Chandan Enterprises	M/s Paras Industries Limited
M/s Umesh enterprises	M/s Om Brass Enterprises
M/s KPC Flexi Tubes	M/s Mehta Bros, Mumbai
M/s Chokhawala Distributors –Brass Adaptor	M/s Kabsons Gas Equipment Pvt. Ltd.
M/s Fast Tech Engineers Pvt. Ltd.	

Notes: - Above Vendor List is indicative only & any other Vendors apart from as mentioned above may be accepted subject to approval by Owner based on past track record.

**CLIENT: CENTRAL UP GAS LTD**



## STANDARD QUALITY ASSURANCE PLAN COPPER FITTINGS

SR. No	DESCRIPTION	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA (As per EN 1057/ PTS)	FORMAT OF RECORD	INSPECTION		REMARKS
						VENDOR	TPIA	
1	Raw material: Chemical Requirement	One in each heat	As per EN 1254/ PTS	Material grade Cu-DHP/ CW 024A Cu + Ag: Min 99.9% P: 0.0015% to 0.040%	MTC	P	R	
2	Final product: Chemical Requirement	One in each heat	As per EN 1254/ PTS		Test Report	P	W	
3	Carbon in bore tests (Carbon film test, carbon content test)	One in each heat	As per EN 1254/ISO 6957/ PTS	As per EN 1254/ISO 6957/ PTS	Test Report	P	W	
4	Stress corrosion resistance test	One in each heat	As per ISO 6957/ PTS	As per ISO 6957/ PTS	Test Report	P	W	
5	Hydrostatic pressure test	100%	As per EN 1254/ PTS	Min 37.5 bar @ 15 min.	Test Report	P	RW	MIN 10 % BY TPIA
6	Pneumatic pressure test	100%	As per EN 1254/ PTS	Min 6 bar @ 10 second	Test Report	P	RW	MIN 10 % BY TPIA
7	Dimensional Inspection (O.D, Wall thk., Min. Length of engagement etc.)	100%	As per EN 1254/ PTS	As per EN 1254/ PTS	Test Report	P	RW	MIN 10 % BY TPIA
8	Visual Inspection (Free from defect)	100%	As per EN 1254/ PTS	As per EN 1254/ PTS	Test Report	P	RW	MIN 10 % BY TPIA
9	Marking	100%	As per EN 1254/ PTS	As per EN 1254/ PTS	-	P	RW	MIN 10 % BY TPIA
10	Documentation	-	As per EN 1254/ PTS	As per EN 1254/ PTS	Inspection Report	P	R	

LEGENDS:      **PTS-** PARTICULAR TECHNICAL SPECIFICATION  
**P-**PERFORM

**RW** – RANDOM WITNESS      **W-**WITNESS  
**TPIA-** THIRD PARTY INSPECTION AGENCY

**CLIENT: CENTRAL UP GAS LTD**



## STANDARD QUALITY ASSURANCE PLAN COPPER FITTINGS

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply to the applicable codes along with additional requirement of PTS.
2. The TPIA shall use this QAP for inspection against subject tender and may consider this document as approved.
3. Procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
4. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
5. All reference Codes / Standards documents, PTS shall be arranged by vendor / supplier for reference of TPIA at the time of inspection.
6. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC.

<b>Approved Vendor List</b>	
M/s Rajco metal	M/s Jay Banas M/s Mehta Tubes Limited- Trade Mark "MEXFLOW"
M/s Paras Industries	M/s Mercure Metal & Alloys Pvt Ltd
M/s Chandan Enterprises	M/s Mehta Tubes
M/s Jay Banas Metals Pvt. Ltd.	

Notes: - Above Vendor List is indicative only & any other Vendors apart from as mentioned above may be accepted subject to approval by Owner based on past track record.

**CLIENT: CENTRAL UP GAS LTD**



**STANDARD QUALITY ASSURANCE PLAN**  
**GI PIPES POWDER COATED CONFORMING TO IS:1239 (PART-1):2004 (Latest edition)**

S.N	COMPONENTS /OPERATIONS	CHARACHTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	VENDOR	TPIA
1	2	3	4	5	6	7	8	9	10	11
1	<b>RAW MATERIAL INSPECTION</b>									
1.1	RAW MATERIAL (Steel tube Heavy Duty Class C)	IDENTIFICATION	Major	Co-relation with MTC.	100%	IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	T.C.	P	R
		CHEMICAL COMPOSITION	Major	Chem. Analysis	One per Heat	IS: 1239 / P.O./ PTS	IS:1239/P.O. Spec./PTS	T.C.	P	R
		PHYSICAL PROPERTIES (T.S., Y.S., % Elongation)	Major	Lab. Test	One per Heat	IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	T.C.	P	R
		VISUAL & DIMENSIONS	Major	Visual & Measurement	100%	IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	T.C.	P	R
2	<b>IN PROCESS INSPECTION</b>									
2.1	PIPE MANUFACTURING	SURFACE DEFECT	Major	Visual	100%	IS:1239/P.O.	IS:1239/P.O. Spec./PTS	IIR	P	R
		DIMENSIONS (O.D., THK. LENGTH etc.)	Major	Measurement	SCALE OF SAMPLING FOR TESTING AS PER IS 4711:2008 TABLE NO. 1 & 2	IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	IIR	P	R
		MASS (Kg/Mtr)	Major	Measure.		IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	IIR	P	R
2.2	END PREPARATION	END TYPE & DIMENSIONS	Major	Visual & Measurement	SCALE OF SAMPLING FOR TESTING AS PER IS 4711:2008 TABLE NO. 1 & 2	IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	IIR	P	R
2.3	PHYSICAL PROPERTIES	TENSILE Strength, ELONGATION & BEND Test/FLATTENING TEST AS APPLICABLE	Major	Lab. Test		IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	IIR	P	R

**CLIENT: CENTRAL UP GAS LTD**



**STANDARD QUALITY ASSURANCE PLAN**  
**GI PIPES POWDER COATED CONFORMING TO IS:1239 (PART-1):2004 (Latest edition)**

2.4	LEAK TEST	HYDRAULIC	Critical	Leak Test	100%	IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	IIR	P	R
2.5	GALVANIZING	ZINC COATING UNIFORMITY & MASS	Major	Galv. Test (Mass of Zinc Coating & Uniformity)	ONE SAMPLE AT EVERY FOUR HOURS & AS PER IS:4736	IS: 4736	IS: 4736 & IS: 2633	IIR	P	R
2.6	FINISH, PAINTING & MARKING	OVERALL FINISH, PAINTING & MARKING	Major	Visual	100%	IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	IIR	P	R
3	<b>POWDER COATING TEST</b>									
3.1	POWDER COATING TEST	SALT SPRAY RESISTANCE	Major	Visual	1000 Hrs (MIN.)	IS: 13871	IS: 13871	IIR	P	R
3.2		POROSITY	Major	Visual	-	IS: 13871	IS: 13871	IIR	P	R
3.3		HUMIDITY RESISTANCE	Major	Visual	1000 Hrs (MIN.)	IS: 13871	IS: 13871	IIR	P	R
3.4		WEATHERING GLOSS RETENTION AFTER 1000 Hrs.(Sun Test with Water Impression , Xenon 150 K lux)	Major	Visual	60 - 70%	IS: 13871	IS: 13871	IIR	P	R
3.5		COLOUR	Major	Visual	CANARY YELLOW	IS: 13871	IS: 13871	IIR	P	R
4	<b>FINAL INSPECTION</b>									
4.1	FINISHED	FINISH DIMENSIONS	Critical	Visual &	SCALE OF	IS:1239/P.O.	IS:1239/P.O.	Dimensional	P	W

**CLIENT: CENTRAL UP GAS LTD**





Central U.P. Gas Limited

**STANDARD QUALITY ASSURANCE PLAN**  
**GI PIPES POWDER COATED CONFORMING TO IS:1239 (PART-1):2004 (Latest edition)**

	PRODUCT		Measurement.	SAMPLING AS PER IS 4711:2008 TABLE NO. 1 & 2	Spec./PTS	Spec./PTS	IR			
		PHYSICAL PROPERTIES (TENSILE STRENGTH, ELONGATION & BEND TEST/ FLATTENING TEST AS APPLICABLE)	Critical	Lab.Test	One Sample per Heat	IS:1239/P.O. Spec./PTS	IS:1239/P.O. Spec./PTS	Physical IR	P	W
		MASS OF ZINC COATING, UNIFORMITY & ADHESION TEST	Critical	GALV. TEST (LAB Test)	One Sample per Heat	IS 4736	IS 4736	GALV. REPORT	P	W
		LEAK TEST (HYDRAULIC TEST)	Critical	Leak Test	100% by MFR.	IS:1239/P.O. Spec./Tender Spec	IS:1239/P.O. Spec./Tender Spec	IR	P	RW (Min. 10% per lot by TPIA)
		REVIEW OF ALL TEST CERTIFICATE I REPORTS & VENDOR'S IIR	Major	Review	All TC	IS:1239/P.O. Spec./Tender Spec., EN 10204	IS:1239/P.O. Spec./Tender Spec., EN 10204	R	P	R
		Coating Thickness	Major	Visual	Random as per IS: 13871	IS: 13871/ PTS	IS: 13871/ PTS	IIR	P	W
4.2	POWDER COATING TEST	GLOSS 60 DEG.	Major	VISUAL	AS PER IS: 4711/ IS:13871	IS: 13871/ PTS	IS: 13871/ PTS	IR	P	W
		CROSS HATCH ADHESION	Major	VISUAL	AS PER IS: 13871	IS: 13871/ PTS	IS: 13871/ PTS	IR	P	W
		CYLINDRICAL BENDING TEST	Major	VISUAL	AS PER IS: 13871	IS: 13871/ PTS	IS: 13871/ PTS	IR	P	W
		ENRICHSEN CUPPING	Major	VISUAL	AS PER IS: 13871	IS: 13871/ PTS	IS: 13871/ PTS	IR	P	W
		PENCIL HARDNESS	Major	VISUAL	AS PER IS: 13871	IS: 13871/ PTS	IS: 13871/ PTS	IR	P	W
		SCRATCH RESISTANCE	Major	VISUAL	AS PER IS: 13871	IS: 13871/ PTS	IS: 13871/ PTS	IR	P	W
		IMPACT RESISTANCE	Major	VISUAL	AS PER IS: 13871	IS: 13871/ PTS	IS: 13871/ PTS	IR	P	W
4.3	-	IDENTIFICATION & MARKING	Major	VISUAL	IS: 4711	IS: 1239 / P.O. Spec./PTS	IS: 1239 / P.O. Spec./PTS	-	P	W
4.4	-	WORKMANSHIP	Major	VISUAL	IS: 4711	IS: 1239 / P.O. Spec./PTS	IS: 1239 / P.O. Spec./PTS	-	P	R
4.5	-	PERFORMANCE OF INSTRUMENTS	Major	CALIBERATION	EACH INSTRUMENT	IS: 1239 / P.O. Spec./PTS	IS: 1239 / P.O. Spec./PTS	CALIBRATION CERTIFICATE	P	R

LEGENDS: H-HOLD      P-PERFORMANCE      R-REVIEW RW – RANDOM WITNESS W-WITNESS TC-TEST CERTIFICATE IIR-INTERNAL INSPECTION REPORTIR-INSPECTION REPORT      TPIA - THIRD PARTY INSPECTION AGENCY

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply to the applicable codes.

**CLIENT: CENTRAL UP GAS LTD**



**STANDARD QUALITY ASSURANCE PLAN**  
**GI PIPES POWDER COATED CONFORMING TO IS:1239 (PART-1):2004 (Latest edition)**

2. The TPIA shall use this QAP for inspection against subject tender and may consider this document as approved.
3. Mechanical & Chemical Testing shall be done in NABL Accredited Lab.
4. Procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications.
5. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
6. All reference Codes / Standards documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA at the time of inspection.
7. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC.

**APPROVED VENDOR LIST FOR GI PIPE**

M/s Swastik Pipe Ltd.	M/s Jindal Pipes Ltd
M/s Vishal Pipes	M/s Rama Steel Tubes
M/s Fortune Pipes Ltd.	M/s Indian Seamless Metals Tube Ltd. (Pune)
M/s Indus Tubes Ltd.	M/s Advance Steel Tubes Ltd.
M/s Good Luck Tubes Ltd.	M/s Surya Roshni Ltd.
M/s APL Apollo Tubes Ltd.	M/s P S Steel Tubes Ltd. Bhilai

Notes: - 1. Above Vendor List is indicative only & any other Vendors apart from as mentioned above may be accepted subject to approval by Owner based on past track record.

**CLIENT: CENTRAL UP GAS LTD**

## STANDARD QUALITY ASSURANCE PLAN GI FITTINGS

SR. No	DESCRIPTION	COMPONENT	CHARACTERISTICS	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	RECORD	INSPECTION		REMARKS
								MANUF.	TPIA	
1	Chemical composition of material	Test Bar	Marking and correlation with TC	As per IS: 14329 Grade BM 300	IS: 14329 Grade BM 300, PO, PTS, Material specification	IS 14329/ PO, PTS Material specifications	Mill T.C.	R	R	
2	Chemical composition of Final product	Fitting	Chemical properties	As per IS: 14329 Grade BM 300	IS: 14329 Grade BM 300, PO, PTS, Material specification	IS 14329, PO, PTS, Material specifications	T.C.	P	R	
3	Cleaning and Finishing	Fitting	Descaling/ Peel Off	100% by Manufacturer	IS 14329	IS 14329	Inspection Report	P	RW	As per sampling Procedure of IS 1879 Table No-29
4	Destructive Testing (Tensile, Elongation & Hardness)	Fitting	Mechanical Properties	As per IS 14329	IS 14329	IS 14329	Lab Report	P	W	
5	Compression Test	Fitting	Malleability	Three samples per Heat Treatment Batch	IS 1879	IS 1879	Inspection Report	P	W	As per sampling procedure of IS 1879
6	Pressure Test	Fitting	Pneumatic	IS 1879	IS 1879	IS 1879	Inspection Report	P	W	As per sampling procedure of IS 1879
7	Alignments of Thread	Fitting	ASME B1.20.1/NPT	IS 1879	IS 1879	IS 1879	Inspection Report	P	W	As per sampling procedure of IS 1879
8	Galvanizing	Fitting	Integrity of galvanized coating	As listed in IS 4759	IS 4759	IS 2629	Inspection / Lab Report	P	W	As per sampling procedure of IS 4759
9	Final inspection	Fitting	Visual, Dimensions, Thread Gauge	IS 1879	IS 1879	IS 1879/ PTS	Inspection Report	P	W	

**CLIENT: CENTRAL UP GAS LTD**



Central U.P. Gas Limited

# STANDARD QUALITY ASSURANCE PLAN GI FITTINGS

Alignment, Finish, weld bevel, Bore, Marking, Powder Coating Thickness\*

10	Marking	Fitting	Size, Owner & Manufacturer Logo	100%	IS 1879/PTS	IS 1879/PTS	Inspection Report	P	R	
11	Documentation	-			As per the terms and conditions of the PO & PTS	As per the terms and conditions of the PO & PTS	Compliance certificate & TC	P	R	

LEGENDS: -            H-HOLD                      P-PERFORM     R-REVIEW            RW – RANDOM WITNESS  
                                    W-WITNESS                      TC-TEST CERTIFICATE                      TPIA-THIRD PARTY INSPECTION AGENCY

NOTES:

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply to the applicable codes.
2. The TPIA shall use this QAP for inspection against subject tender and may consider this document as approved.
3. Mechanical & Chemical Testing shall be done in NABL Accredited Lab.
4. Procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications.
5. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
6. All reference Codes / Standards documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA / CUGL at the time of inspection.
7. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC.

### Approved Vendor List

M/s Sarin Industries Ltd.	M/s Jinan Meide Casting Co. Ltd.
M/s Jupiter Metal Industries Ltd.	M/s. Green Malleable Pvt. Ltd.
M/s Jainsons Industries Ltd.	M/s Chandan Enterprises (GI Clamps & Meter Clamps)
M/s Jay Banas	M/s Industrial Valves & Components, Delhi
M/s Rajnesh Malleables Ltd., Delhi	M/s Excel Metal & Engineering Industries, Mumbai

CLIENT: CENTRAL UP GAS LTD



## STANDARD QUALITY ASSURANCE PLAN GI FITTINGS

M/s Modern Stores & Engineering Concern, Kolkata	M/s Mehta Brother & Co., Mumbai- (Make: M/s Jinan Meide Casting Co. Ltd., Japan)
M/s Chokhawala Distributors	

Notes: - 1. Above Vendor List is indicative only & any other Vendors apart from as mentioned above may be accepted subject to approval by Owner based on past track record.

CLIENT: CENTRAL UP GAS LTD



## STANDARD QUALITY ASSURANCE PLAN COPPER TUBING

						INSPECTION		
SR. No	DESCRIPTION	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA (As per EN 1057/ PTS)	FORMAT OF RECORD	VENDOR	TPIA	REMARKS
1	Raw material: Chemical Requirement	As per EN 1057	As per EN 1057/PTS	Material grade Cu-DHP/ CW 024A Cu + Ag: Min 99.9% P: 0.0015% TO 0.040%	MTC	P	R	
2	Final product: Chemical Requirement	As per EN 1057	As per EN 1057/PTS		Inspection Report	P	W	
3	Physical test (Tensile, Elongation, Hardness etc.)	As per EN 1057	As per EN 1057/PTS	UTS- Min. 235 N/ Sq.mm Elongation - Min 30% Hardness- 75 TO 100 HV scale	Inspection Report	P	W	
4	Carbon film test	As per EN 1057	As per EN 1057/PTS	As per EN 1057/ PTS (Maximum Residual carbon- 0.20 mm/ sq. dm)	Inspection Report	P	W	
5	Carbon content test	As per EN 1057	As per EN 1057	As per EN 1057/ PTS	Inspection Report	P	W	
6	Drift expanding test	As per EN 1057	As per EN 1057	As per EN 1057/ PTS	Inspection Report	P	W	
7	Hydrostatic test	As per EN 1057	As per EN 1057	Min 35 bar/ 10 second	Inspection Report	P	RW	Min 10 % by TPIA
8	Eddy current test	As per EN 1057	As per EN 1057	As per EN 1057/ PTS	Inspection Report	P	RW	Min 10 % by TPIA
9	Dimensional Inspection (O.D, Wall thk, Length etc.)	As per EN 1057	As per EN 1057	As per EN 1057/ PTS	Inspection Report	P	RW	Min 10 % by TPIA
10	Visual Inspection (Free from defect)	As per EN 1057	As per EN 1057	As per EN 1057/ PTS	Inspection Report	P	RW	Min 10 % by TPIA
11	Marking	As per EN 1057	As per EN 1057	As per EN 1057/ PTS	Inspection Report	P	RW	Min 10 % by TPIA
12	Documentation	-	As per EN 1057	As per EN 1057/ PTS	Inspection Report	P	R	

**CLIENT: CENTRAL UP GAS LTD**



## STANDARD QUALITY ASSURANCE PLAN COPPER TUBING

LEGENDS: - H-HOLD AGENCY    RW – RANDOM WITNESS    W- WITNESS    P- PERFORM    TPIA- THIRD PARTY INSPECTION  
PTS- PARTICULAR TECHNICAL SPECIFICATION

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply to the applicable codes.
2. The TPIA shall use this QAP for inspection against subject tender and may consider this document as approved.
3. Procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications.
4. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
5. All reference Codes / Standards documents, PTS shall be arranged by vendor / supplier for reference of TPIA at the time of inspection.
6. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC.

### Approved Vendor List

M/s Rajco metal	M/s Jay Banas M/s Mehta Tubes Limited- Trade Mark "MEXFLOW"
M/s Paras Industries	M/s Mercure Metal & Alloys Pvt Ltd
M/s Chandan Enterprises	M/s Mehta Tubes

Notes: - Above Vendor List is indicative only & any other Vendors apart from as mentioned above may be accepted subject to approval by Owner based on past track record.

**APPROVED VENDOR LIST**

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<b>REV</b>	<b>DATE</b>	<b>Purpose</b>	<b>Prepared By</b>	<b>Checked By</b>	<b>Approved By</b>
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**APPROVED VENDOR LIST**

**APPROVED VENDOR LIST**

<b>ITEM CODE / DESCRIPTION</b>	<b>GI Pipe</b>
<b>VENDOR NAME</b>	<b>Remark</b>
M/s Swastik Pipe Ltd.	
M/s Jindal Industries Ltd.	
M/s Vishal Pipes Ltd.	
M/s Indus Tubes Ltd	
M/s Advance steel Tubes Ltd.	
M/s Good Luck Tubes Ltd.	
M/s Surya Roshni Limited	
M/s. APL Apollo Tubes Limited	
M/s. Jindal Pipes Limited	
<b>ITEM CODE / DESCRIPTION</b>	<b>GI fittings</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s Sarin Industries Ltd.	
M/s Jupiter Metal Industries Ltd.	
M/s Jainsons Industries Ltd.	
M/s Jinan Meide Casting Co. Ltd.	
M/s. Green Malleable Pvt. Ltd.	
M/s Chandan Enterprises(GI Clamps & Meter Clamps)	
M/s Jay Banas	
<b>ITEM CODE / DESCRIPTION</b>	<b>Copper tubes &amp; Fittings</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s Rajco metal	
M/s Jay Banas M/s Mehta Tubes Limited- Trade Mark "MEXFLOW"	
M/s.Paras Industries	
M/S Mercure Metal & Alloys Pvt Ltd	
M/s Chandan Enterprises	
<b>ITEM CODE / DESCRIPTION</b>	<b>Brass Fittings</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s Chandan Enterprises	
M/s Paras Industries Ltd.	

**APPROVED VENDOR LIST**

M/s. Chokhawala Distributors –Brass Adaptor.	
M/s Kabsons Gas Equipment Pvt. Ltd.	
M/s Fast Tech Engineers Pvt. Ltd.	
<b>ITEM CODE / DESCRIPTION</b>	<b>Steel Re-inforced Rubber Hose(Type-4)</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s Super Seal Flexible Hose Ltd.	
M/s Suraksha Products Pvt. Ltd.	
M/s Vansh Industries	
M/s T & L Gases	
<b>ITEM CODE / DESCRIPTION</b>	<b>Warning Mat</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s Sparco Multiplast Pvt. Ltd.,	
M/s Singhal Industries , Ahemdabad	
M/s Puja Packing, Mumbai	
M/s Bina Enterprises, Mumbai	
M/s Shree Vijay Wire & Cable Industries	
<b>ITEM CODE / DESCRIPTION</b>	<b>HDPE PIPES/DUCT</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s Climax Synthetics (P) Ltd., Vadodra	
M/s Indian Poly Pipes, Calcutta	
M/s Jain Irrigation Systems Ltd., Jalgaon	
M/s Kirti Industries (India) Ltd., Indore	
M/s Ori Plast Limited, Calcutta	
M/s Phoel Industries Limited, Delhi	
M/s Sangir Plastics (P) Ltd., Mumbai	
M/s Veekay Plast,Jaipur	
M/s Kisan Irrigation	
M/s Dutron Polymers Ltd.	
M/s Manikya Plastichem (P) Ltd	
M/s Himalyan Pipe Industries	
M/s Vishakha Irrigation Pvt. Ltd.	

**APPROVED VENDOR LIST**

M/s Hari Plast	
<b>ITEM CODE / DESCRIPTION</b>	<b>Corrugated Flexible Metal Hoses (Anaconda)</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s KPC Flex Tubes	
M/s Vestas Hose Division	
M/s Alpha Flexi Tubes	
M/s Chandan Enterprises	
<b>ITEM CODE / DESCRIPTION</b>	<b>PE(Fittings &amp; Valves)</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s AVK Valves India Pvt. Ltd.	
M/s TEGA MUHENDISLIK SAN TIC	
M/s GEORG FISCHER PIPING SYSTEMS PVT. LTD.	
M/s KIMPLAS PIPING SYSTEMS LTD.	
M/s GLYNWED PIPE SYSTEMS (I) PVT. LTD.	
M/s Aliaxis Utilities & Industry Pvt. Ltd.	
<b>ITEM CODE / DESCRIPTION</b>	<b>Isolation &amp; Appliance Valve</b>
<b>VENDOR NAME</b>	<b>REMARKS</b>
M/s Enologas Bonomi S.P.A	
M/s Ningbo Zhiqing industrial Co Ltd.	
M/s Chandan Enterprises	
M/s Jainsons Industries	
M/s Inkal Ventures Pvt. Ltd.	